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Role of Impact Assessment in Sustainable Development

Edited by
Paolo Biancone and Silvana Secinaro

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Preface to "Role of Impact Assessment in Sustainable Development"

At a time of extreme difficulty for companies and society, a wide range of studies and guidelines invoke impact assessments as a driver for more sustainable development and effective resource planning.

The issue of sustainable development is determined not only by the effective use of resources and the application of appropriate strategies, but also by considering social aspects. Thus, impact assessments have been established in companies considering multiple criteria of different natures (i.e., economic, environmental, and social) and the transparency and engagement of various stakeholders, such as organizations, government, and communities.

Several studies have highlighted the role of environmental and strategic impact assessments (EIAs and SEAs, respectively) as facilitators of the evidence of climate change impacts within organizations. In the same way, social impact assessments (SIAs) are a means of resilience in responding to changes in the needs of external stakeholders seeking to replace the contributions of public authorities, and therefore identifying opportunities that enhance benefits for local communities. The literature focuses extensively on both lines of research; however, few studies have focused on how hybrid organizations, for example, can be involved in these processes.

Social impacts and environmental impacts have reflections on economic aspects. They are closely related to the complex reality in which hybrid organizations provide their services by focusing on both social impact and profit aspects by involving different sectors (i.e., public/private/third sectors in terms of governmental/profit/non-profit). Involvement of all of these factors could play a key role in promoting sustainable development through specific social, institutional, and technological innovations and practices.

This book discusses the role of environmental and social impact assessments in companies, such as profit and non-profit realities as a pathway for sustainable development and the role of hybrid organizations in the context of growth and change. The book includes theoretical analyses, case studies, and literature reviews on impact assessment using broad perspectives. Finally, the links between social assessment and social finance are addressed.

We like to imagine that this book might be helpful primarily to managers and representatives of the third sector. In addition, it will be useful for researchers to explore and continue analysis in this area of research.

The editors are grateful to all the authors who contributed to the volume, and to the reviewers who made it possible to increase the final scientific quality.

Paolo Biancone and Silvana Secinaro

Editors

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Review

Mapping Social Impact Assessment Models: A Literature Overview for a Future Research Agenda

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Abstract: The social impact assessment (SIA) process is widely utilised and is receiving increasing interest from both scholars and practitioners. A systematic approach was applied in this study to search for articles about SIA models. In the first step, we analysed six main SIA model mappings between 2004 and 2015. In the second step, 98 models were identified. The main findings include the definition of emerging paths for the future research agenda on this topic. Compared with previous SIA mappings, we identified 22 additional models that are related to the sustainability discourse. The meaning of sustainability is defined both by the emergence of new systems in finance that require specific metrics and in relation to the global agenda towards sustainable development. It is interesting to notice how social impact models, sustainability indicators (under the global framework of sustainable development goals (SDGs)) and new financial scores (such as environmental, social and governance (ESGs)) are converging into a common discourse, even if divergence is still present, and further research is needed to unlock the relationships among them.

Keywords: social impact; social impact assessment; social impact models; sustainability; third sector; SIA models; comprehensive review

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1. Introduction

Over the last few years, attention has focused on the study of different models of measurement and evaluation of value that cannot be directly recognised through conventional financial metrics [1]. This growing attention has led to changes in organisations that operate in the third sector and in hybrid companies, which, at various levels, are increasingly trying to find credible solutions to demonstrate the social value generated through processes of measurement and social impact assessment (SIA).

Issues in SIA are receiving more attention from a whole range of social enterprises in what Young et al. [2] defined as the "Social Enterprise Zoo", each with a different approach and purpose.

At the same time, governments on regional and national scales have launched programmes to strengthen their ability to assess the social value generated by the evolution of the traditional welfare state. They are in the difficult position of having to respond to a growing demand for public goods and services with fewer resources available for public financing yet, at the same time, are being faced with challenges concerning the management of public debt, as dictated by spending constraints and increasing social need from an aging population and increased immigration [3,4].

When this study discusses social impact, it refers to Clark's definition [5]: "Social impact is the portion of the total outcome that occurred as a direct result of the intervention, net of that portion that would have occurred equally without the intervention".

The scope of social impact is the construction and transmission of a set of information capable of expanding and deepening the knowledge of the value generated to better

guide decision-making processes at different levels is precisely the treated topic of social impact [6–8].

A central issue is the debate about "who" is affected by the impact discussion. It is necessary to start from the assumption that the impact generated can be positive or negative, and this can be precisely the most immediate answer, because it is able to influence the well-being of people, the community and the community [9].

For this reason, each stakeholder, with different levels of priority, is interested in the issue. Some scholars argue that the primary stakeholder in impact evaluation is the PA [10]. We find impact as an element of relationship between different organizational configurations that populate a redrawn geography of value, where distinctions and perimeters are no longer marked by mere formal elements, but by different visions, intentions, and values. To address the question of who is interested in SIA, Klemelä [11] examined the role of legitimation means from the perspective of different stakeholders.

The study does not address the issue of impact for specific stakeholders, such as the public, private or non-profit sector. However, through this insight, the impact generated will directly and indirectly benefit the whole community.

When dealing with the topic of social impact, there are three key aspects to keep in mind: intentionality, measurability and additionality; the authors focus on the second mentioned. Assessing social impact is still not easy today, largely because of the difficulties in identifying qualitative and quantitative metrics to demonstrate the extent to which social impact is generated.

In many of the existing contributions, the effort needed to align theory and practice is noticeable. These studies show that in academic discourse, there are many assumptions that practitioners are not able to make for various reasons. For Smith and Stevens [5], this is particularly true for SIA models, where the developed metrics range from highly qualitative, self-developed input measures to more sophisticated quantitative output and impact measures.

However, the SIA process is widely utilised, and it is gaining increasing interest from both scholars and practitioners. In this study, we analysed SIA models in order to understand their main features and the emerging paths that may determine the future research agenda on this topic. We particularly noticed that the last academic work that tried to summarise the scientific production on SIA is a paper from six years ago [6], and since this time, the number of publications on this topic has continually increased, thus suggesting a need for a new systematisation of the literature.

The remainder of the paper is as follows. Section 2 presents the theoretical background of the study. Section 3 describes the method for conducting the literature review. Section 4 focuses on the analysis of the six main SIA model mappings that emerged from the literature. Section 5 presents an update of SIA model mappings, identifying 98 models. Section 6 consists of concluding considerations, limitations and ideas for the future research agenda.

2. Theoretical Background

The definition of "impact" has been widely discussed in the literature as cited in the previous section [6,12–16]. Social Impact Assessment combines social research, public engagement, planning and social change management [17].

Social impact measurement aims to assess the social and environmental value produced by the activities or operations of any organization (for-profit, non-profit or public). Although any company can have a social impact, we will always need to distinguish between companies that are socially oriented, such as non-profit organizations, social enterprises and public bodies, and those that create it indirectly. For these reasons, it is necessary to make order among the entire panorama of models, precisely to create tools that can best represent the impact of an organization, enhancing its social vocation.

The relationship between impact and complexity seems particularly interesting considering the systems change perspective and the possibility of legitimizing forms of value generation not recognized by conventional financial metrics [18]. The complexity approach

has unveiled the perspectives of SIA from being a performance construct specific to a minority portion of organizations to becoming a determinant for the generation of new cross-sectoral relationships among public, for-profit, and non-profit organizations

Arvidson and Lyon [19] stated that social impact can be perceived as a social construction. The complexity of SIA lies in this: there is no clear definition of what is meant by "social", so discretion must be involved when assessing social impact [19,20].

Through the analysis of the existing literature, we identified five streams of studies that discuss, from different points of view, the "social" meaning:

(1) social value creation and corporate social responsibility (henceforth CSR) studies;
(2) social enterprise (henceforth, SE) studies primarily focused on the issues of performance and accountability;
(3) environmental impact studies;
(4) public sector and impact finance studies;
(5) developing economies studies.

(1) The first avenue is rooted in CSR around the notion of "creating social value", as developed by Porter and Kramer [21], in order to explain a deeper relationship between business and society. Organisations should move beyond the traditional belief that their economic value is separate from, and in conflict with, their social value by assuming the perspective of blended value, as coined by Emerson [12]. Within the wider process of value creation, organisations need to be aware of the importance of quantification in unlocking new value and creating valuable opportunities for innovation and growth that would otherwise be missed [6,22,23].

(2) The most consistent field of study concerning SIA is related to SE performance and accountability. Social impact is described as a combination of resources, inputs, processes or policies that occur as a result of the real, implied or imagined presence or actions of individuals in achieving their desired outcomes [24–26]. In order to assess the performance of an SE, Clark and Brennan [27] developed the Balanced Value Matrix (henceforth, BVM), which concludes that separate and balanced indicators exist for outputs (enterprise actions), outcomes (the benefits associated with enterprise actions) and impacts (the results that enterprises desire) [28].

It is worth contrasting this approach with the contribution of Clark et al. [5], who introduced the concept of the impact value chain (henceforth, IVC). Since then, IVCs have been widely used to better understand the relationship between programme inputs and outcomes and to discover which mechanisms of change are involved in moving from inputs to desired results [29]. Bagnoli and Megali [30] suggested that measurement of SE performance should consider economic and financial performance, social effectiveness and institutional legitimacy. According to Dart [31], SIA promotes improved accounting practices, increasing the legitimacy of the organisation with its stakeholders and enhancing the relationship of trust with the organisation's funders. In a context of scarcity and competition for funds, the use of standard procedures for assessing and reporting social outcomes might encourage investment in an SE that adopts them [22,32,33].

Based on a study of five SEs in the UK, Nicholls [34] argued that evaluations and audits are used as a means by which to "enhance social mission rather than merely to respond to regulation". He suggested that "emergent reporting practices constitute a spectrum of disclosure logics that social entrepreneurs exploit strategically to support their various mission objectives with key stakeholders". Impact measurement is thus seen as a part of a negotiation process between stakeholders.

In another study, Nicholls [35] showed how a "flexible reporting format can be used strategically in various ways by companies according to their particular objectives and resource limitations". Therefore, SIA is seen as a strategic opportunity for SE development [34,36].

(3) Bakar et al. [17] consider SIA to be a subfield of Environmental Impact Assessment (henceforth, EIA). EIA refers to the assessment of impacts concerning the environment. Although EIA was intended as an all-inclusive framework for analysing environmental

and social issues, it failed to adequately address social issues [6], and, therefore, SIA was developed with a gradual extension of the items under consideration [37,38].

(4) Another field of study relates to the transformation of welfare systems and the role of impact finance. The increasing scarcity of public resources has led to innovation in economic relationships between public bodies and private organisations [39–43]. These changes present a challenge in the form of a hybrid market with unexplored potential, involving financial intermediaries and local bodies, small and medium-sized enterprises (henceforth, SMEs), large enterprises, SEs and civil society [44]. The Organization for Economic Cooperation and Development (OECD) report on "new investment approaches to meet the social and economic challenges" [45] stated that impact investing has declined as a result of the changing relationship between finance and philanthropy.

One of the issues addressed by this field of study is that the assessments are often under pressure to demonstrate short-term effects rather than to emphasise long-term impact. Although there are generally accepted accounting principles that support financial reporting, similar standards related to the measurement and communication of social impact have not been produced yet because it is difficult to arrive at a comprehensive definition of the concept of social impact, and the related measurement models often lack the rigour that characterises accounting approaches aimed at assessing financial returns [39].

(5) The last field of study is related to the "people aspect" of development-induced change by empowering communities with a voice in the EIA process [46]. Countries with emerging economies are especially affected by poverty, and SIA conducted within this context necessitates mitigation of both the direct impacts of development as well as the social legacies that can entrench poverty and inequality. Social development is seen as an approach that can be used to reduce poverty and inequality [46].

The proposed overview sheds light on a nebulous and confused approach to the topic of SIA. As highlighted by the OECD [1], the lack of a common language and understanding of the definition of "social impact" and the best way to measure it has hampered both academic debate and the adoption of SIA models amongst practitioners.

Within managerial studies are these five perspectives on the meaning of social impact. This heterogeneity is the reason why, in the literature, many models for assessing social impact have been developed over time. Therefore, some authors have dedicated their work to clustering, categorising and mapping SIA models.

3. Method

A systematic approach was applied in this study to search for articles about SIA models. We used the Web of Science and Scopus databases to find relevant articles. For both databases, the following keywords were used for article searching: "Social impact assessment" OR "Social performance assessment" OR "Nonfinancial performance assessment" OR "Social return assessment" OR "ESG assessment" OR "Impact investing assessment" AND "Model*". Table 1 shows the criteria used in searching and selecting articles.

Table 1. Searching and selection of articles from the Web of Science and Scopus databases, 1 December 2020.

Criteria for Searching and Selecting Articles	Web of Science Database	Scopus Database	Description
Searching articles using the keywords	101	245	The keywords used for searching are "Social impact assessment" OR "Social performance assessment" OR "Nonfinancial performance assessment" OR "Social return assessment" OR "ESG assessment" OR "Impact investing assessment" AND "Model*".
Selecting documents only in the article and review category	84	214	Documents in the article and review category were selected since those in other categories are not peer-reviewed or academic contributions.
Selecting articles written in English	82	207	We selected documents that are written in English.
Adding articles from both databases	289		82 articles from the Web of Science and 207 from Scopus databases were added to a single spreadsheet.
Removing duplicate documents from the lists in the databases	231		58 duplicates were removed.
Checking Title, Abstract and Keywords	187		The focus of 44 articles was not SIA models.
Adding more articles after checking the grey literature (NEF—New economic foundation; Tools and Resources for Assessing Social Impact—TRASI database)	43		An additional 43 articles coming from grey literature are focused on SIA models.
Finalizing the number of articles considered for this study	230		Finally, we reached 230 articles for consideration in this study.

For the Web of Science, our search was limited to searching titles, abstracts and keywords, resulting in 101 unique documents. After limiting the search by selecting only the article and review options, we arrived at 84 documents, which was further reduced to 82 by excluding articles not written in English. A list of these 82 articles was then downloaded as a comma-separated values (CSV) file and imported into a spreadsheet.

For the Scopus database with the same three keywords, 245 documents were found on the first search attempt. Limiting the search to the article's category brought this down to 214 articles and focusing further on articles written in English reduced this to 207 documents. Furthermore, we limited this search to the following five categories: Business, Management and Accounting Economics, Econometrics and Finance, Psychology, and Decision Sciences. We merged the 82 articles from the Web of Science and the 207 articles from Scopus into an Excel file. We were aware that some articles would be listed in both databases, so we removed 58 duplicates through spreadsheet filtering. Thus, we arrived at 231 unique articles. Upon checking the title, keywords and abstract of each article, we found 187 relevant articles for inclusion.

We decided to supplement the academic results by collecting 43 articles from the two most acknowledged practitioners' repositories: The Foundation Center (TRASI) and the NEF. We then had 230 articles from the searching process to include in this review. We read these papers with two main purposes:

1. Identifying previous studies that mapped the evolution of SIA models and then analysing those studies to verify whether they provided clusters or groups of SIA models;
2. Investigating the models already reviewed by previous studies and the new SIA models proposed since the last mapping study to highlight emerging patterns and to shape the future research agenda in this field of research.

During the period under review (1980–2020), scientific production on Social Impact Models started in 1980 and underwent changes in 2003 and 2010. The number of publications in journals on the topic increased significantly between 2015 and 2020 (Figure 1). The data confirm the above. This field of research is constantly evolving, and the horizons are becoming wider and wider.

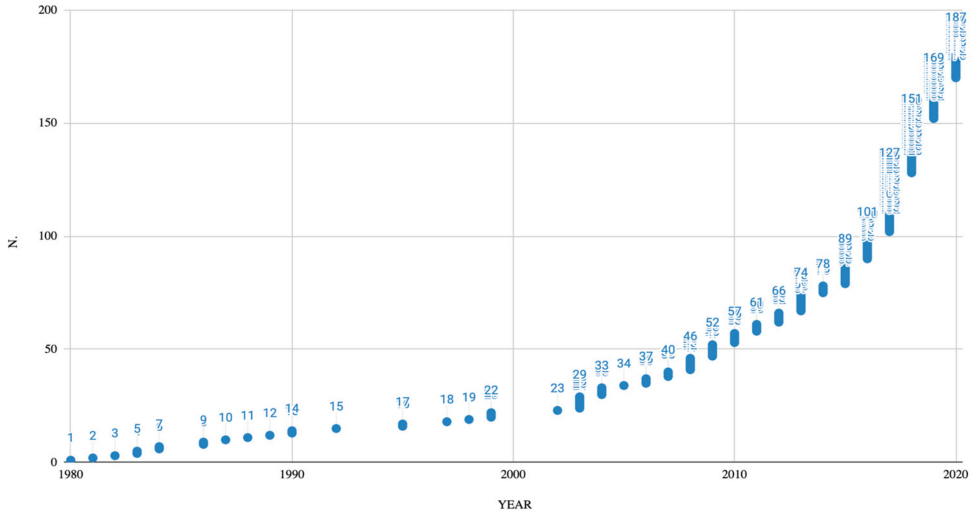

Figure 1. Articles per year.

4. Six Studies in the Search for SIA Models

First of all, we must clarify that we use the term "model" to mean a named, documented process that is used to assess either the actual social and/or environmental impact and that, in the literature we analysed, the terms "approach", "method" and "model" are used interchangeably.

Six main attempts at SIA model mapping were found from both academics and practitioners. Those doing the mapping have had different approaches to grouping the SIA models, and they have used a variety of sources. Table 2 shows how the authors grouped the models mapped. It is interesting to notice that the groups are presented ex ante in the description of the models—based either on the process or on the usage—while the last mapping from Grieco et al. [6] clusters them ex post using variables identified from previous studies. The authors use the terms models, methods and systems to mean "the ways" of assessing social impact.

Table 2. Clusters/groups of SIA models between 2004 and 2015.

	SIA Mapping					
Groups/clusters	Clark et al. [5]	Olsen and Galimidi [47]	Zappalà and Lyons [39]	Rinaldo [48]	Maas and Liket [13]	Grieco et al. [6]
	(1) Process models/methods	(1) Rating systems	(1) Social Accounting and Audit (SAA)	(1) Monitoring and evaluation tools	(1) Process methods	(1) Simple Social Quantitative
	(2) Impact models/methods	(2) Assessment systems	(2) Logic Models	(2) Quality tools	(2) Impact methods	(2) Holistic Complex
	(3) Monetisation models/methods	(3) Management systems	(3) Social Return on Investment (SROI)	(3) Outcome tools	(3) Monetisation	(3) Qualitative Screening
	-	-	-	-	-	(4) Management

Although the labelling of the SIA groups is different between authors, there are similarities, such as the emergence of models from quality systems, models based on monetisation and models from rating systems.

The first mapping study [5] aims to provide a measurability framework for the double bottom line approach. The authors tried to respond to the need for more tangible accountability for the social impact created for each invested or granted dollar. Their approach can be defined as "investor driven", and the groups that they identify are thought of as having a three-step scale: the models that provide information only on the process, the models that inform about the social impact and the models that enable the transformation of the social impact information into financial metrics in order to combine the social and financial dimensions into a blended evaluation. They consider four key aspects in order to identify coherent groups of SIA models (the authors refer to them as "models/methods"): the completeness of the IVC along the sequence input-activities-output-outcome-goal alignment, the purpose of the assessment, the data feasibility and the possible sectors of application.

While the first mapping study emphasises the monetisation capacity of the SIA models, the second one [47] intends to shed light on the function of each model. The three possible functional types are rating systems, which are models using a fixed set of indicators and the impact investment's quality or potential quality, summarised by a score or symbol; assessment systems, which are models that use a fixed or customised set of indicators at a point in time, evaluate characteristics, practices and/or results of portfolio investments but do not provide explicit tools to manage the tracking of operational data by the organisation over time; and management systems, which are models that provide tools for organisations to manage detailed operational information about drivers of impact. Olsen and Galimidi [47] used three variables provided by Clark et al. [5] (purpose, data feasibility and sector) and three new variables. The first of these new variables relates to the methodological approach adopted by the SIA model, the second investigates the types of data management required by the SIA models, and the third looks into the presence of verification criteria, thus improving the credibility of the results provided by the model.

The third mapping study provided by Zappalà and Lyons [39] identified three groups of SIA models under a different point of view related to the connections between the SIA process and conventional managerial processes. The first is connected to the accounting and auditing process, and it enables the understanding of the social impact on the surrounding community and beneficiaries and builds accountability by engaging with key stakeholders. The second is connected to a logical framework and project management processes, and it provides a systematic and visual way for individuals to present and share their understanding of the relationships among the resources available to operate their programme (inputs), the activities that they plan to do (strategies) and the changes or results that they hope to achieve (outcomes and impact). The third is explicitly named "social return on investment" and is connected to financial management and investor relationship processes, providing a single number that is the result of a ratio between the monetary value of the positive changes achieved through the activities and the budget invested. Zappala and Lyons [39] used eight variables, of which three are new compared with those used by Olsen and Galimidi [47]. The scope of the analysis here is split into two: clarity of purpose and scope. The presence of comparative impact data or information and the materiality analysis are the two new variables.

The fourth mapping study by Rinaldo [48] is focused on the tools provided by scholars and practitioners in order to improve the organisational capacity to measure and evaluate social impact. She identified three types of tools: monitoring and evaluation tools, quality systems and outcome tools. The monitoring and evaluation tools can inform about what data to collect, when to collect it and who will collect it. This information can provide proof that a performance goal has been met, or it can support social impact measurement. The quality tools focus on how things are done. They look at how an organisation is run, how staff are managed and customer care. A set of standards are defined and used to gauge areas for improvement. Some quality tools focus on how activities are carried out, and others also require evidence about the results of these activities. This evidence requirement would have the additional benefit of providing information for impact measurement. The outcome tools are used to measure and record the progress that a beneficiary makes and pinpoint

areas of future need. They make it possible to assess the changes made in a consistent and standardised way. Outcome tools provide information that can be drawn together to give an overview of the change achieved by a service or project. They are therefore a key part of the impact measurement process. The variables used by Rinaldo [48] are for investigating the usability of these tools in terms of cost-efficiency and cost-effectiveness, so they investigate the cost of each tool, its complexity, the time required to embed it within organisational processes, how demanding the tool is for the staff in terms of the training required to implement it and the provision (and its cost) of the support required to process it.

In the fifth mapping study, Maas and Liket [13] used the same groups provided in [5]. Nevertheless, they improved the analysis by considering a larger number of models (30 vs. 9 models) and a more consistent set of variables and by introducing the time frame variable in the analysis. The capacity to determine the time factor of the models opens new perspectives for the SIA, making the measurement and evaluation process circular: social impact forecasting as an ex ante evaluation of the expected results, social impact monitoring as an ongoing step for checking the intermediary data and the ex post evaluation for informing about the changes achieved and the improvement areas to stimulate as drivers for the next strategic planning cycle. Another relevant variable that Maas and Liket [13] added is related to the different perspectives that SIA models can assume. When they originate from business (micro perspective), for example, they include indicators that differ from the indicators used for assessing the impact on the urban/rural territory (meso perspective), and even more different are the indicators used when the perspective is wider and encompasses socioeconomic dimensions at the country or regional level (macro perspective). Depending on the perspective used, different indicators will be used, and therefore, different impacts will be measured.

The latest and most comprehensive mapping study [6] employed a combination of the variables used prior to 2015 to carry out a hierarchical cluster analysis. More specifically, Grieco et al. [6] integrated six variables with those identified by previous authors and added one more variable that refers to the developer of the SIA model (actors involved in the development of SIA models). Table 3 summarises the variables used and their references.

Table 3. Variables and references used by Grieco et al. [6].

Grieco et al. [6]	
Variables	**References**
(1) Data typology	Nicholls [14]
(2) Impact typology	Rinaldo [48]
(3) Purpose	Clark et al. [5], Rinaldo [48], Maas and Liket [13]
(4) Model complexity	Zappalà and Lyons [39], Maas and Liket [13]
(5) Sector	Olsen and Galimidi [47]
(6) Time frame	Maas and Liket [13]
(7) Developer	Identified by the authors [6]

Applying these variables to the SIA models mapped (i.e., 76) resulted in four clusters:

- Cluster 1 (Simple Social Quantitative) contains models based on quantitative indicators. These models are easy, applicable to any sector and intend to produce a quantitative measure of the social impact and of the impact on employees with a retrospective time frame.
- Cluster 2 (Holistic Complex) contains models characterised by a holistic purpose, and this explains the presence of both qualitative and quantitative variables. The aim of these models is to provide evidence to obtain funding, so they focus on reporting and

communication of the results achieved. These are also applicable to any sector, but in this case, the complexity is high.

- o Cluster 3 (Qualitative Screening) consists of models based on qualitative variables and are usually focused on holistic impacts. They are retrospective and have a basic level of complexity.
- o Cluster 4 (Management) contains models based on qualitative or quantitative variables that aim to measure different types of impacts. They are used for managerial or certification reasons. Usually, they are applied to ongoing activities.

5. Model Mapping

Previous mappings have used different approaches to grouping SIA models and a variety of sources, and therefore, they have analysed a variable number of models. It is important to underline that the purpose of some of the previous mapping was not to collect all models developed but to become a practical guidance for assessing social impact. These mappings aimed to become a reference point for those who have to choose what kind of SIA model to implement according to the purpose of the assessment. As already described, the very first list of models was developed by Clark et al. [5] and was based on grey literature and interviews with key stakeholders. Indeed, the interest in systematising SIA models emerged from practitioners and, over time, has gained importance in academic studies. As shown in Table 4, the number of models has varied over time, as well as the number of patterns identified. It is possible to observe a growing trend in the number of models listed, aside from Zappalà and Lyons [39], who decided not to count the models but to approach them directly by dividing them into groups based on their main characteristics.

Table 4. Summary of SIA mapping (source: authors' elaboration).

Authors	Year of Publication	No. of Models Analysed	Emerging Patterns (No.)	Sources
Clark et al. [5]	2004	9	3	GL + I
Olsen and Galimidi [47]	2008	25	3	GL + I
Zappalà and Lyons [39]	2009	N.A.	3	AL
Rinaldo [48]	2010	19	3	GL
Maas and Liket [13]	2011	30	-	AGL + I
Grieco et al. [6]	2015	76	4	AGL

Notes: GL: Grey literature; I: interviews; AL: Academic literature; AGL: Academic and grey literature.

Ninety-eight social impact measurement models were identified. Appendix A provides the names of the models mapped. In comparison with the latest mapping by Grieco et al. [6], 22 new models were found, 52 were confirmed, and 24 have been renamed but are coherent with the previous list. In addition, their study, as in former SIA mappings, does not include models that assess only the internal organisational efficiency, models that cannot be linked to an organisation (for instance, policy evaluation models are not listed) or models for which the information is too little to be included.

It is important to underpin that there is a semantic issue concerning SIA models; therefore, this mapping, as with the former ones, has to be considered as partial and not exhaustive. Aside from specific models that are establishing themselves as reference points, most of the models might have different names but actually reproduce the same process and consider the same variables to assess social impact. This is the reason why 24 of the latest mappings have been identified; even if the name of the model itself might have changed over time and with different research parameters (for instance, other databases), other names might be found. The most used model is social return on investment (SROI) and other monetisation models that have been developing around it. Another two very common models come from management systems and quality systems such as EMAS (Eco-Management and Audit Scheme) and EFQM (European Foundation for Quality Management Excellence Model).

It is interesting to observe a new category of models related to the issue of sustainability and finance. Among the 22 new models, 10 of them are related to the assessment of environmental, social and governance (ESG) performance [49], and 5 of them are associated with sustainable development goals (SDGs) and sustainability assessment. In terms of ESG, it is crucial to consider the latest OECD (2020) report that underlines the variety of ESG scores and ratings and the complexity of this kind of assessment. The OECD report cites many hundreds of indexes and ratings to assess ESGs that correspond to a similar number of firms providing this service, even though there are only three main market players. The ESG models listed in our mapping are just a small portion of the high number of rating systems that are rapidly developing in consultancy firms and investment funds. Those mapped are the ones that were already mentioned in academic or grey literature involving the discourse on SIA models. This opens up future research questions that could investigate the relationship between SIA studies, sustainability and finance. In particular, ESGs might have an important role in the development of "alternative" finance, since they are identified in the OECD report [50] as a measure for social impact investing and sustainable and responsible investing (SRI).

The other important topic of new models relates to sustainability and expands the already listed Global Reporting Initiative (GRI) type of model. There are five models that focus on the assessment of SDGs. SDGs are a global framework with a shared and specific set of targets; it is interesting that different types of SIA models are arising to assess if and how an organisation is contributing to the reaching of global targets.

The novelty of this mapping comprises the emergence of sustainability as a new keyword of SIA models in relation to both finance and enterprise assessment.

6. Discussion and Conclusions

6.1. Contributions to the Literature

The authors show that the analysis conducted consisted of two steps. First, six major mappings of SIA models between 2004 and 2015 were analysed. As a second step, 98 models were identified. The year 2015 was very important scientifically for the topic because the policy context of sustainability changed with the inclusion of the SDGs [51].

Until now, the research in this field has almost never led to shared solutions, and this finds direct evidence in the plurality of models adopted for social impact measurement and evaluation, representative of highly differentiated approaches and tools. This condition is generated by the fragmentation among SIA models and the variety is high, apart from the very few models that present a clear methodology and features, e.g., the SROI [8], most models are not standardized (at least in the process) [9]. This variety certainly covers a wider range of dimensions for assessing social value and accommodates the diversity of each entity (from for-profit companies to social enterprises, from benefit companies to non-profits), but at the same time, it has the limitation of making it much more difficult to scale assessments [52]. The fuzziness of SIA models also affects impact finance, which should be the system in which these news metrics are considered [53].

For this reason, the purpose of this paper is to provide a literature review of SIA models and an update of the latest mapping from 2015. The analysis of previous studies was critical to better understand how to interpret the mapping and to question how to expand this research study. In fact, the other six mapping studies revealed clusters, groups and variables. The model grouping or clustering usually consists of three main labels: (1) models that come from performance/management system studies, of which the most used is EMAS; (2) models that come from auditing/quality system studies, of which the most used is EFQM; and (3) models that aim to monetise the outcome, called monetisation models, of which the most known and used is SROI. In the 98 models analysed, we can identify these groups, although we cannot yet fully describe the characteristics and frequencies. The next step in this research study was to perform a cluster analysis of our group by selecting some of the variables from previous studies. From our perspective, it appears that a fourth group/cluster of patterns may emerge, and that is the one related

to sustainability. As mentioned in the previous mapping, the topic of sustainability was present through the inclusion of GRI among SIA models but did not have specific importance. From our mapping, sustainability seems to be the main driver of the 22 new models found. The meaning of sustainability is determined by the emergence of new systems in finance requiring specific metrics and in relation to the global agenda towards sustainable development. Further research should focus on the relationship between social impact studies and sustainability studies as two frameworks that could partially overlap and integrate. The integration of the two perspectives consists primarily of a theoretical problem [54].

This brings to light how impactful the grafting of global organisations is to provide a direction for innovation in terms of social impact.

6.2. Implications for Managers

As we have shown with this research, the SIA process is widely implemented and is capturing increasing interest from both scholars and practitioners. In this article, we analysed the models of SIA to understand their main characteristics and the emerging pathways that may determine the future research agenda on this topic [55].

In particular, we noted that the last academic work that attempted to summarise the scientific production on SIA is a 6-year-old paper [6], and since then, the number of publications on this topic has steadily increased, thus suggesting a need for a new systematisation of the literature.

The results show that the benefits of the SIA topic are growing, and without a doubt, companies need to equip themselves with good assessment tools. Managers must also anticipate the need for information by their stakeholders, and therefore, it is essential to identify an excellent reporting tool that may require dedicated efforts and procedures [56,57]. Based on this study's preliminary evidence, and if supported by further research, business decision makers can improve the effects of their actions internally and externally, even when reflection on best practices is not perceived as urgent. The findings suggest that these micro-processes can be supported by an entrepreneurial attitude that allows business managers to regularly take stock and be ready to act quickly by being aware of their company's financial and non-financial data, especially in a language that is clearly accessible. Too often, smaller companies entering the market do not have the time or resources to make these assessments, and this can lead to inefficiencies that last longer than necessary, resulting in wasted resources and poor returns, as well as reduced opportunities for learning and adapting practices.

As mentioned earlier, the OECD report discusses many hundreds of indices and ratings to assess ESGs that correspond to a similar number of companies providing this service, although there are only three main players in the market. The ESG models listed in our mapping are only a small part of the large number of rating systems that are rapidly developing in advisory firms and investment funds. It is therefore crucial for managers to equip themselves with professionals who know how to anticipate problems and manage this type of know-how.

6.3. Limitations and Future Research

The scenario demonstrated has strong illustrative and exploratory potential, and the steps identified in this study can be adapted to other contexts [58].

The purpose of our exploratory study is to provide insights that other scholars can draw upon and explore further in the theory development process. Therefore, this study invites scholars to investigate the transferability of our insights and provides several promising avenues for future research.

Our contribution has some limitations. First, SIA models have a fragmentation problem in their taxonomy, so it is possible that some models may not have been found, or others may have been created and not intercepted through the four databases searched.

Particularly with regard to the grey literature, it is very difficult to capture the continued innovation around SIA models [59,60].

These findings provide the basis for providing support to the scientific research sector, third sector agents, investors and all stakeholders working with social entrepreneurs to better understand what research and SEs will need to focus on to generate social impact [61–63]. Researchers question whether the focus on social impact can generate transparency and accountability in all non-profit [64] but also for-profit contexts, as the current literature provides us with additional distinctions in this category: for impact and without impact.

Second, the listed models have not yet been investigated through a cluster analysis to identify key characteristics. Furthermore, the methodology adopted may be a limitation in that it requires some discretion on the part of the researchers and, consequently, introduces the potential for bias in conducting the analysis.

However, this paper offers quantitative results on the SIA model, whereas most studies focus on qualitative insights. Limitations arising from the methodology can be addressed in future research by, for example, extending the analysis to a different sample of reports or, even more importantly, supplementing the cluster identification with a field analysis that would allow for a deeper understanding of actual practices [4].

The findings highlight this study as an opportunity to direct future research to fill gaps in the literature. Since the SDGs are goals to be achieved by 2030 (2030 Agenda), evidence of these gaps can increase awareness of scientific production and thus facilitate the achievement of the goals. In this sense, the literature places SIA at the centre of social innovation [4].

Third, to reach more general conclusions, the 2030 goals towards which the world is racing seem to be set by large institutions and public bodies. This brings to light how impactful the work of global organisations is in providing direction for social impact innovation [65].

The generation of social impact creates a need for reporting on this data and thus for identifying good reporting tools on the global goals that humanity must now aim for.

In conclusion, with the aim of mapping SIA models, addressing these issues contributes to the achievement of sustainable goals, crystallises the academic studies in this field and demonstrates the evolution of the perception of assessment models in the literature. This research confirms that it plays a central role in the topic of the innovation-oriented social impact of the entire ecosystem. This condition increases accountability, transparency and stakeholder engagement. Stakeholders will be able to better understand the strong values of the company itself and all the partnerships that are normally created to achieve its goals, in line with SDG 17.

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Appendix A

	SIA MODELS		
1	AA1000AP	47	Logic model builder
2	Acumen Lean Data	48	LuxFLAG ESG Label
3	Acumen scorecard	49	Measuring impact framework
4	Anticipated Impact Measurement and Monitoring (AIMM)	50	Methodology for impact analysis and assessment
5	AtKisson compass assessment for investors	51	MetODD-SDG
6	Best available charitable option	52	MicroRate
7	Bridges Ventures Impact Radar	53	Movement above the US$1 a day threshold
8	CERISE-IDIA	54	MSCI ESG Ratings Methodology
9	Charity analysis framework	55	Ongoing Assessment of Social Impacts (OASIS)
10	Cost per impact	57	Outcome star
11	Cradle-to-cradle certification	58	Practical quality assurance system for small organisations (PQASSO)/Trusted Charity
12	Dalberg Approach	59	Progress out of poverty index
13	DTA Fit for purpose	60	Prove it!
14	Eco-mapping	61	Public value scorecard
15	EFQM	62	Quality first
16	EMAS	63	RobecoSam 3 step SDG Framework
17	Environmental, Social and Governance (ESG) Scores	65	SASB Standard
18	EPIC	67	SDG Impact Practice Standard
19	ESG Disclosure score	68	Social accounting and audit
20	ESG Relevance Score	69	Social Business Scorecard
21	ESG Risk Rating	70	Social enterprise balanced scorecard
22	European Impact Investing Luxembourg	71	Social enterprise mark
23	Expected return	73	Social Impact Measurement for Local Economies (SIMPLE)
24	Family of measures	74	Social rating
25	Finance Initiative Impact Radar	75	Social return assessment
26	FMO ESG Toolkits	76	Social return on investment
27	FTSE ESG Ratings	77	Social Value Maturity Index
28	Global Alliance for Banking on Values (GABV)	78	Social value metrics
29	Global Impact Investing Rating System (GIIRS)	79	Sopact-tool
30	GOGLA Impact Metrics	80	SPI4
31	GRI sustainability reporting framework	82	Standard Ethics Rating (SER)
32	HIP Rating	83	Star social firm
33	HIPSO Harmonized Indicators for Private Sector Operations	84	Success measures data system
34	VALORIS method	85	The B impact rating system
35	Impact Analysis for Corporate Finance & Investments (Tool prototype)	86	The big picture
36	Impact Due Diligence Tools	87	The Committee on Sustainability Assessment (COSA) Methodology
37	Impact Management Project (IMP) Five Dimensions	88	The FINCA client assessment tool
38	Impact Multiple of Money (IMM)	89	The Impact Due Diligence Guide
39	Impact Risk Classification (IRC)	90	The SRI LABEL
40	Impact-Weighted Accounts	91	Third sector performance dashboard
41	Inrate ESG Impact Rating Methodology	92	TIMM
42	Inventory of Business Indicators (SDG Compass)	94	Trucost
43	IRIS + (and IRIS)	96	Volunteering impact assessment toolkit
44	ISS ESG Corporate Rating	97	Wallace assessment tool
45	ISS SDG Impact rating	98	Y Analytics
46	LM3		

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The Principle of Sustainable Development as the Basis for Weighing the Public Interest and Individual Interest in the Scope of the Cultural Heritage Protection Law in the European Union

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Abstract: The concept of sustainable development is widely used, especially in social, environmental and economic aspects. The principle of sustainable development was derived from the concept of sustainable development, which appears in legal terms at the international, EU, national and local levels. Today, the value of cultural heritage that should be legally protected is indicated. A problematic issue may be the clash in this respect of the public interest related to the protection of heritage with the individual interest, expressed, e.g., in the ownership of cultural heritage designates. During the research, scientific methods that are used in legal sciences were used: theoretical–legal, formal–dogmatic, historical–legal methods, as well as the method of criticism of the literature, and legal inferences were also used. The analyses were carried out on the basis of the interdisciplinary literature on the subject, as well as international, EU and national legal acts—sources of the generally applicable law. Research has shown that the interdisciplinary principle of sustainable development, especially from the perspective of the social and auxiliary environmental aspect, may be the basis for weighing public and individual interests in the area of legal protection of cultural heritage in the European Union. It was also indicated that it is possible in the situation of treating the principle of sustainable development in terms of Dworkin's "policies" and allows its application not only at the level of European Union law (primary and secondary), but also at the national legal orders of the European Union Member States.

Keywords: principle of sustainable development; public interest; individual interest; cultural heritage; law

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1. Introduction

At the basis of the formulation of the concept of sustainable development, which the principle of sustainable development derives from, was an issue of protection of the environment from broadly perceived human activity, including the activity contributing to economic development [1] (p. 81). The very idea of sustainable development can already be noticed in the views expressed by M. Sommeville [2]. Reflections over the human impact on the natural environment led to a formulation of a concept of sustainable development. A concept, which initially concerned mainly environmental issues, is of an open character, since sustainable development may refer to many aspects of social, political, economic and cultural life. The concept of sustainable development, and *sensu stricto* its elements, has been gradually implemented in the international, national and local law. Next, it turned into the principle of sustainable development formulated in various legal acts. However, for the implementation of the principle of sustainable development to be effective, it is necessary to introduce the appropriate legal instruments at the international, European Union, national and local level, especially in the branch of administrative law [3]. The cultural heritage protection law, and more narrowly perceived historic buildings protection law, derives

from the administrative law. However, the cultural heritage protection requires taking into account on the legal level numerous branches of law, such as, for example, administrative, civil, criminal constitutional, international, European union law. Moreover, in professional literature, a separation of a branch of the cultural heritage protection law is postulated [4] (pp. 23–33). Protection of cultural heritage appears on the international, European Union, national and local level, and a form of historic heritage protection is subject to a process of continuous evolution [5] (pp. 219–243). Cultural heritage as a carrier of cultural identity is one of the key elements of the state and social life, so, therefore, its protection also has its public and legal dimension, especially that the preservation of heritage, and its transfer to future generations is included into the public best interest from the perspective of administrative law. At the same time, the designates (objects assigned to the given name) of cultural heritage, such as, for example, historic buildings or objects, may belong to various entities of public and private law. As a consequence, a dilemma may appear of weighing the public interest and individual interest in cases connected with designates of cultural heritage in situations in which there is a conflict between the right of ownership or the rights arising from contracts and the necessity of preservation of authenticity and integrity of designates of cultural heritage [6] (pp. 187–210), [7] (pp. 21–31). In the contemporary globalized world in which the state borders become blurred, the existence of sui generis clauses at the international level is necessary, which would allow for the solution of conflicts between public and individual interest. A principle of sustainable development, also in some legal acts and professional literature, is connected with cultural heritage issues [3,8], so, therefore, one should ponder whether the principle of sustainable development, as a principle present in numerous acts of international law, especially in the European Union law, could become the basis of weighing public interest and individual interest in issues connected with designates of cultural heritage.

The goal of this paper is an analysis of the possibility of using the principle of sustainable development derived from the concept of sustainable development to weigh public interest and individual interest in the scope of protection of cultural heritage in the European Union, as well as formulation of appropriate remarks de lege ferenda for the European Union legislator. As a preliminary research hypothesis, it was assumed that the principle of sustainable development is important and may be the basis for weighing the public and individual interest in the field of cultural heritage designations in the European Union. Cultural heritage designations, both movable and immovable, are often owned by bodies governed by public or private law. In this respect, these entities have a wide power over these designations, but its implementation may not necessarily coincide with the public interest, which is to preserve the designations of cultural heritage in the richness of their authenticity and integrity. As a consequence, it is often necessary to weigh the public and private interests in individual cases. Traditionally, this weighing may be based on the principle of proportionality, but it is not always effective to rely on it and, consequently, may lead to an ultimate advantage of one interest over the other. This problem, instead of the proportionality principle, could be solved using the principle of sustainable development. It is worth emphasizing that the concept itself, as well as the principle of sustainable development, has an interdisciplinary character, and the issues of protecting cultural heritage are also of a similar nature. As a consequence, the application of the principle of sustainable development as the basis for weighing public and individual interests would make it possible to find a certain compromise in specific situations and, to the greatest possible extent, enable the implementation of both public and individual interests. The application of the principle of sustainable development seems to be expedient also because it is present in the law of the European Union and, therefore, in all Member States of the European Union, which is important because nowadays the issue of protection of cultural heritage is often not international in nature only from the theoretical perspective (world or European cultural heritage), but also from a practical perspective, especially since the boundaries between the Member States of the European Union are becoming blurred, especially in the economic, social and cultural areas.

2. Methods of Research

During the analyses, the scientific methods characteristic for legal sciences have been employed. In order to analyze the principle of sustainable development based on the concept of sustainable development, as well as the issues of weighing legal and public interest in reference to the protection of cultural heritage in the perspective of theory of law, as well as axiology of law, a theoretical and legal method was used. The theoretical and legal method in the context of this article is used to analyze legal institutions in the field of administrative law, civil law and European Union law on the basis of legal acts and literature on the subject and also enables the analysis of tools and bases for the operation of public and private law entities. The area of the theoretical–legal method also includes considerations based on legal logic by identifying a set of referents of given concepts, analyzing the range relations of given concepts, analyses of functions and features of given concepts, taking into account the categories of syntactic names and functors, semantics of names, theory of definition, as well as the theory of relations between particular designates and notions. In order to analyze legal acts, which are relevant from the perspective of the subject of research, the formal and dogmatic method was used. The formal–dogmatic method in relation to this article is based on the analysis of legal acts and, as an auxiliary, legal doctrine. As far as the analysis of legal acts is concerned, it is based on normative material, as well as on the reconstruction of legal norms from various legal provisions. These legal provisions, which are in different hierarchies and degrees of interdependence, are then verified by applying conflict of laws rules (hierarchy, chronology and detail). Moreover, the normative material itself, after reconstruction, is analyzed and interpreted in the process of law interpretation, first at the semantic level (linguistic analysis), then at the system level (reference and verification of linguistic analysis in the context of a given branch or legal system) and, finally, the purposeful level (reference previous considerations for the purposes of a given regulation). The goal of the analysis of the subject of research in legal acts previously in effect, the historical and legal method was used. The historical–legal method in the context of this article made it possible to analyze previous legal regulations from the perspective of definitive issues, as well as the location of given concepts in the legal system in the past legal acts. This was of particular importance in the context of the analysis of the primary law of the European Union, which is no longer in force, but was the basis for the creation and shape of the current primary law of the European Union, also taking into account the issues of sustainable development and cultural heritage. In the scope of interdisciplinary analysis of professional literature from the scope of management science, economic science as well as legal sciences, the method of literary criticism was used. The analyses have been based on interdisciplinary professional literature as well as legal acts—international European Union law and national sources of the generally applicable law. The method of literary criticism was applied taking into account the selection of basic literature, its query, selection, preparation of the publication database, analysis of the content and, on this basis, the preparation of a report, which is the basis for the theoretical considerations of this article, as well as the formulated conclusions. The applied methods and legal conclusions are the means enabling for the implementation of the scientific output of economic science and management science in the scope of the concept of sustainable development into law, and specifically the cultural heritage protection law.

The research methodology of the article was based on the following stages:

1. Identification of the research problem and research gap.
2. Formulating the aim of the research and the initial research hypothesis.
3. Identification of the state of knowledge through the analysis of the literature on the subject and legal acts (normative material) of the ius cogens, ius dispositivum and soft law nature.
4. Collecting text and normative data.
5. Data analysis, coding and interpretation.
6. Development of research results.
7. Formulating conclusions.

3. Results

3.1. Assumptions of a Concept of Sustainable Development

A concept of sustainable development as a response to the effects of human activity in the natural environment, but also numerous crises of the political, military, economic, social and environmental character, appeared in the 20th century, although its ideas had already been visible already in the 19th century. Most frequently, referring to the concept of sustainable development, the issue of development is indicated; however, from a historical perspective, the key issue was a concept of conservation presented by M. Sommerville, but also by G.P. Marsch and G. Pinchot [9] (pp. 2–3), postulating the preservation of the environment in the best possible condition for future generations [1] (p. 83). G. Pinchot acknowledges the necessity of preserving the environment and its benefits for future generations comparing this activity to the operations of an enterprise [10] (p. 136), which is connected strictly with the intergenerational justice principle [11] and the necessity of preservation and transferring the environment and its benefits in the best possible condition for future generations. M.C. Cordonier Segger notices that a concept of sustainable development should be treated as a compromise to preserve the natural environment for future generations [12] (p. 2). The significant economic growth impacts the environment as well as its natural surroundings, especially since some of them are non-renewable [13] (pp. 12–13). Economy in principle had been tackling the issue of economic benefits; however, currently, it is necessary to present responsible economic approach, which will also take into consideration ecological benefits [13] (p. 13), as well as social issues. In economy the problems of long-term and sustainable economic growth is analyzed in the perspective of the following theories of development:

1. Neoclassical theory of growth, subsequently connected with the liberal growth policy and the economic development.
2. New theory of growth (endogenic growth).
3. Theory of real business cycle.
4. Theory of sustainable development [13] (pp. 13–14), [14].

However, in principle, only in the sustainable development theory the condition of sustainability of growth is the sustainable development [13] (p. 14). Additionally, the fact must be emphasized that the concept of sustainable development is not only the economic theory but the ethical and philosophical theory as well [13] (p. 14); therefore, it has become possible to implement it into the generally applicable law. The interdisciplinary character of the concept of sustainable development is well described in the approach presented by D. Pearce and R.K. Turner who had stated that sustainable development "means the maximization of the net profits from the economic development, at the same time protecting and securing the reproduction of usability and quality of natural resources in a long term. Economic development then must mean not only the growth of per capita income, but also the improvement of other elements of social wellbeing. It must also include the necessary structural changes in economy, as well as in the entire society" [15], [13] (p. 17). W. Pearce, E. Barbier and A. Markandya think that the sustainable development means the implementation of defined goals, which are socially desirable, among which one must mention:

1. growth of the actual *per capita* income;
2. improvement of the health condition of the society;
3. fair access to natural resources;
4. improvement of the level of education." [13] (p. 17), [16] (p. 2)

T. Tietenberg acknowledges the formation of an individual's wellbeing in time as a starting point for sustainable development [17].

R. Carson noticed the relationship of economic development with the natural environment and social wellbeing [18]. One can notice, though, that in a concept of sustainable development one may differentiate three basic aspects, complementary towards one another, so, therefore, the environmental, social and economic aspects. They are of a character

of primary aspects, which form a concept; however, the elements of a concept began to be gradually implemented to the generally applicable law, and next, a principle of sustainable development was formed, which is present in some acts of international, European Union and the national law. The principle is of a general clause character, so it may refer to various aspects of social life; therefore, one should indicate secondary aspects, arising directly from the principle of sustainable development, and indirectly from the concept of sustainable development, which may include, inter alia, the political, legal, cultural aspects, related to the rights and freedoms of a human being and a citizen, and also safety. In the perspective of reflections over the weighing of the individual interest and the public interest, it is worth noting that taking into consideration the social aspect of economic development, which is compliant with sustainable development as an evolution could be perceived—from the wellbeing of an individual towards the social wellbeing, as well as an attempt to find a compromise between these interests [13] (p. 14). As a consequence, it should be stated that the necessity of prioritizing the social best interests should not be imposed immediately, but development of an individual and his/her wellbeing should be made possible, so that next, an individual should be gradually persuaded to reject one's own egoism and turn towards the social milieu—the communities. In professional literature, it is indicated that the connection of social interests and individual interests may be a concept of a "visible hand", which according to A. Chandler, should be based on undertaking actions at various decisive levels in order to harmonize individual interest with social interest [19].

The above review of various approaches to the concept of sustainable development, and also the presentation of basic assumptions, does not have an exhaustive character, since due to its capacity and a broad scope of the notion, sustainable development in professional literature, one can notice various approaches and interpretations, especially in the concept of economic aspect and social aspect of the concept of sustainable development [1,9,12,20–23]. Analyzing the views and interpretations of the concept of sustainable development in the professional literature, one may notice that it is not homogenous, and even in some places, it is internally contradictory, which may particularly hinder its implementation into the generally applicable law, which should be internally cohesive [24].

3.2. A Concept of Sustainable Development as the Basis of Formulation of the Principle of Sustainable Development

The problem regarding the relations of human activity in relation to the environment was a subject of various analyses at the scientific, organizational, political and legal level in the 20th century. In 1968, during the first Intergovernmental Conference of UNESCO Scientific Experts, during which an issue was dealt with of interconnections between the environment and the development, an interdisciplinary program (MAB) [25] was formed. One of the conferences, which also significantly impacted the further development of sustainable development in the political, social and legal perspective, was the United Nations Conference on the Human Environment (the so-called Stockholm Conference) in 1972, which tackled the issue of environmental protection and its relationship in reference to economic and social aspects [1] (p. 88). It is worth quoting Principle 8 of the Declaration of the United Nations Conference in the Human Environment: "Economic and social development is essential for ensuring a favourable living and working environment for man and for creating conditions on earth that are necessary for the improvement of the quality of life" [26]. In the same year, the Club of Rome published "The Limits to Growth" [22], undertaking the issue of sustainable development. The issue of sustainable development, especially in a perspective of environmental protection, was subsequently referred to in the Brandt Report titled: "North: South—A Programme for Survival", written within the scope of the Independent Commission on International Development Issues [1]. The requirements of the environmental protection were undertaken in the World Conservation Strategy [27] document of 1980, where for the first time in an official document a notion of sustainable development was used [28] (p. 28). A key document concerning sustainable development "Our Common Future" [29], i.e., the so-called Brundtland Report of 1987, contains the

following definition of sustainable development: "In essence, sustainable development is a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development; and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations" [29]. The definition of sustainable development in the Brundtland Report has a character of a program [24], which from the legal perspective may create difficulties connected with inaccuracy of a notion and heterogeneity of a concept, and which follows the principles of sustainable development; however, from the other side, the flexible definition of program gives the possibility of adjustment to the dynamically varying social–economic–political situation in the world, and also, it enables the vast application of a concept in various fields of social life. Further development of the concept was continued during the Earth Summit in Rio de Janeiro, which took place in 1992. Its important output from the legal perspective is the Declaration Rio and the Agenda 21 [30,31]. Another important Earth Summit from the perspective of the concept of sustainable development formation was the Earth Summit in Johannesburg in 2002, during which the Johannesburg Declaration on Sustainable Development was adopted [32]. Additionally, a fact needs emphasizing that many international conventions, especially in the scope of environmental protection, are based in a defined measure on the concept of sustainable development. At the same time, one of the views in the doctrine of international law indicates that the concept of sustainable development is too general to be treated as a principle or a rule of common law [33] (p. 78); however, another view in this matter—just to the contrary—emphasizes the normativity of the concept and also allows us to declare that currently a concept of sustainable development law already exists [34]. It is worth emphasizing that the concept of sustainable development increasingly often has impact on the international but also on the European Union, national or local legislation, especially in the branches of public law, including administrative law [3].

In the European Union law, both primary and secondary, one may perceive a certain impact of the concept of sustainable development, especially in the scope of the protection of the environment. At the level of the European Union law, sustainable development is of a character of a political system founding rule. In the doctrine of European Union law, it is indicated that the European legal system does not consist only from the written law norms [35], but it is supplemented by general principles of law, which are a part of the legal order, which also finds a confirmation in the jurisdiction of the European Court of Justice. These principles from the perspective of the normative character are imposed by appropriate legal decisions of creators of policies, as well as the court jurisdiction [35]. J. Bengoextea, in the classification of the principles constituting the European Union law, distinguished as the last ones such principles, which allow it to measure up to the arising new social problems among which, next to such notions as subsidiarity, environmental protection, proportionality, a principle of sustainable development appears [36] (p. 100–110). It is worth noting, though, that in this division the principles and values have been combined [35] (p. 106), [37] (p. 29). J. de Cendra Larragan distinguishes principles from values. In this respect, the principles should be treated as directing the actions, which they are a source of onto a goal, and also, they provide guidelines for a legislator and allow the courts to issue verdicts based on them in a situation of any gaps appearing in the law, whereas the values are the goal in themselves [35] (p. 106–107). In principle in the primary law of the European Union, one may notice the literal approach to the issue of sustainable growth (not yet development) only in the Treaty of Maastricht of 1992, through which, inter alia, the amendment of art. 2 was introduced of the Treaty establishing the European Economic Community, which formed the following wording: "The Community shall have as its task, by establishing a common market and an economic and monetary union and by implementing the common policies or activities referred to in Articles 3 and 3a, to promote throughout the Community a harmonious and balanced development of economic activities, sustainable and non-inflationary growth respecting the environment, a high degree of convergence of economic performance, a high level of employment and of

social protection, the raising of the standard of living and quality of life, and economic and social cohesion and solidarity among Member States" [38]. Sustainable development was already recorded as a political system founding rule in art. 2 of the Treaty of Amsterdam of 1997 in the following wording: "The Community shall have as its task, by establishing a common market and an economic and monetary union and by implementing common policies or activities referred to in Articles 3 and 3a, to promote throughout the Community a harmonious, balanced and sustainable development of economic activities, a high level of employment and of social protection, equality between men and women, sustainable and non-inflationary growth, a high degree of competitiveness and convergence of economic performance, a high level of protection and improvement of the quality of the environment, the raising of the standard of living and quality of life, and economic and social cohesion and solidarity among Member States" [39]. The European Union legislator changed the narrower notion of sustainable growth to the wider scope of a notion of sustainable development derived straight from the concept of sustainable development.

In the currently applicable Treaty of Lisbon, which consists of the Treaty on European Union (TEU) and the Treaty on the Functioning of the European Union (TFUE) [40], the notion of sustainable development appears mainly in reference to environmental issues, but also to social and economic issues. In the Treaty on the European Union the principle of sustainable development treated as a political system founding rule [1] (p. 39), [41] (p. 282) appears in the Preamble of the Treaty on European Union: "Determined to promote economic and social progress for their peoples, taking into account the principle of sustainable development and within the context of the accomplishment of the internal market and of reinforced cohesion and environmental protection, and to implement policies ensuring that advances in economic integration are accompanied by parallel progress in other fields" [40]. One could analyze, though, whether from the text of the Preamble one could conclude on the existence of principles, especially that the Preamble should rather indicate the directions of interpretation of a given act of law. However, regardless of these reservations of a normative character, one must emphasize that the European Union legislator expanded the use of a principle of sustainable development basically to many fields of social life. On the grounds of the Treaty on the European Union the sustainable development appears in:

Art. 3 section 3 paragraph 1 TEU among the European Union goals in the social, economic and social context: "The Union shall establish an internal market. It shall work for the sustainable development of Europe based on balanced economic growth and price stability, a highly competitive social market economy, aiming at full employment and social progress, and a high level of protection and improvement of the quality of the environment. It shall promote scientific and technological advance" [40].

Art. 3 section 5 TEU, in which the European Union legislator decides that the goal of the European Union is the contribution to "the sustainable development of the Earth" [40].

Art. 21 section 2 letter d TEU and art. 21 section 2 letter f [40], which in principle transfer the European Union laws onto the level of its international cooperation with other states [24].

It is worth emphasizing a consequence of the European Union legislator who adopts sustainable development among the goals, not the values of the European Union, which from the axiological perspective and the nature of a concept of sustainable development is a correct approach [24]. The sustainable development was also undertaken on the grounds of a Treaty on the Functioning of the European Union in the following legal regulations:

Art. 5 TFEU—a principle of subsidiarity, which is strictly related to the principle of sustainable development.

Art. 11 TFEU, which states that "Environmental protection requirements must be integrated into the definition and implementation of the Union's policies and activities, in particular with a view to promoting sustainable development" [40]. Art. 11 can be found in Title II containing the EU principles. Analyzing art. 11 TFEU one can indicate, firstly, the principle of integration and, secondly, the principle of sustainable development. At the

same time, it must be pointed out that in principle they refer to environmental issues, so, therefore, they narrow down the principle of sustainable development.

Title XX named: "Environment", which is based on the concept of sustainable development implements it to environmental issues. It is especially perceivable in the scope of the goals of the European Union environmental policy—in art. 191 section 1 TFEU: "preserving, protecting and improving the quality of the environment, protecting human health, prudent and rational utilisation of natural resources, promoting measures at international level to deal with regional or worldwide environmental problems, and in particular combating climate change" [40], as well as the principles of the European Union environmental policy (especially art. 191 section 3 TFEU).

Art. 309 TFEU in principio, constitutes that "The task of the European Investment Bank shall be to contribute, by having recourse to the capital market and utilising its own resources, to the balanced and steady development of the internal market in the interest of the Union" [40], which can be perceived as sensu largo a reference to the economic aspect of a concept of sustainable development in conjunction with art. 3 TEU.

Declaration on Article 126 of the Treaty on the Functioning of the European Union, paragraph 5, constitutes that "The Union aims at achieving balanced economic growth and price stability. Economic and budgetary policies thus need to set the right priorities towards economic reforms, innovation, competitiveness and strengthening of private investment and consumption in phases of weak economic growth. This should be reflected in the orientations of budgetary decisions at the national and Union level in particular through restructuring of public revenue and expenditure while respecting budgetary discipline in accordance with the Treaties and the Stability and Growth Pact" [40]. In this Declaration one can also notice a reference to the economic aspect of the concept of sustainable development with the phrase "balanced economic growth", which is derived from the concept of sustainable development; however, this Declaration refers to the issues connected with the budget deficit, so, therefore, this is a very narrowly defined economic perception.

In the primary and secondary law of the European Union, there is no definition of sustainable development, so, therefore, pursuant to the views of L. Kramer and D. Pyć [41,42], it should be stated that in the European Union law a definition of sustainable development is identical with the definition existing on the basis of the international law and, therefore, adopted in the Brundtland Report, pursuant to which "Humanity has the ability to make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs. The concept of sustainable development does imply limits—not absolute limits but limitations imposed by the present state of technology and social organization on environmental resources and by the ability of the biosphere to absorb the effects of human activities. But technology and social organization can be both managed and improved to make way for a new era of economic growth" [29]. A problematic issue is the implementation of the heterogenous concept of sustainable development onto the legal grounds, as well as its effectiveness [43]. In the professional literature, inter alia, the following approaches to sustainable development in the European Union law are indicated:

A concept of sustainable development as the political system founding rule of the European Union [41] (p. 282).

Art. 191 of the TFEU, undertaking an environmental aspect of a concept of sustainable development is the treaty basis to issue the acts of the EU law in a situation when the main goal of the given act of law is environmental protection [44] (pp. 10–11).

Principles that may be interpreted based on art. 191 TFEU are the guidelines in the scope of the environmental protection policy [42].

The principle may be transformed into law in a situation when it is contained in the legal regulations; however, the policies cannot become the generally applicable law, and a concept of sustainable development should be treated as a policy [45] (p. 13).

Sustainable development is legally effective in European Union law [46].

Legal significance of a concept may be referred only to art. 11 TFEU (the environmental aspect) [47].

J.H. Jans indicates that the sustainable development is a guideline connected with political activity, and not the normative character [48] (p. 496).

A concept of sustainable development should be treated as an idea or a policy [49] (p. 19).

The analysis concerns European Union law, but it is worth noting that a principle of sustainable development also appears in national and local legal acts of various countries. As an example, it can be pointed out that in the Constitution of the Republic of Poland, the constitutional legislator in art. 5 decides that "The Republic of Poland shall safeguard the independence and integrity of its territory and ensure the freedoms and rights of persons and citizens, the security of the citizens, safeguard the national heritage and shall ensure the protection of the natural environment pursuant to the principles of sustainable development" [50]. On the grounds of this article, a dispute arose in the doctrine of law, whether the principle of sustainable development clearly pointed out by the Polish constitutional legislator refers only to the environmental protection or the issue of territorial sovereignty, human freedoms and rights, security of citizens and national heritage. In case of broad interpretation, it should be pointed out that the Polish constitutional legislator not only holistically implemented the principle of sustainable development, but also expanded its conceptual range as well, referring it also to the issue of national heritage protection. I. Niżnik-Dobosz and P. Dobosz state that "The principle of sustainable development belongs to the so-called programmatic norms of the Polish Constitution which—under the theory of the national law—outline only the general direction of operation for the state bodies, at the same time constituting the legal basis for formulation of specific norms, defining possibly unambiguously the addressee's behaviour" [8]. One should lean towards the voices in professional literature, which point out to the broad implementation of the principle of sustainable development to the Polish law and, therefore, also to the issues connected with the protection of cultural heritage [8]. It can also be confirmed in the case law of the Polish Constitutional Tribunal, which had stated that "the principle of sustainable development includes not only the environmental protection or development of spatial planning, but also sufficient care for social and civilizational development, connected with the necessity of building the required infrastructure, necessary for human life and life of particular communities—taking into account the civilizational needs. Therefore, the idea of sustainable development includes a need to consider various constitutional norms and their appropriate balancing out" [51]. I Niżnik-Dobosz and P. Dobosz, developing the analysis of the principle of sustainable development in reference to the cultural heritage pursuant to the Polish Constitution, distinguish three meanings (qualifications) of the principle of sustainable development: "firstly—the sustainable, harmonious development of a given sphere of social relations: business, economic, spatial, regional, secondly—is to be at the same time cohesive, friendly, corresponding to the principles of environmental protection. It is also possible to deliberate upon triple qualification, according to which the idea is about the sustainable development of harmoniously developing spheres of social relationships referred to above, which are compliant at the same time with the principles, notions and institutions of the Environmental Protection Law" [8]. I. Niżnik-Dobosz and P. Dobosz deem the adoption of double qualification as appropriate, which eventually, however, leads them to adopt the triple qualification as well [8].

3.3. Cultural Heritage as an Element of a Concept of Sustainable Development

Prima facie, it would seem that the protection of cultural heritage does not become an inherent part of the concept of sustainable development; however, the very concept, as it had already been presented above, consists of three basic cornerstones: economic, social and ecological [13] (pp. 16–17), [52] (p. 148). The environmental aspect seems to be the most developed one. The social aspect of the concept has a broad conceptual range, so, therefore, its scope may contain an issue of cultural heritage protection. It has a particular justification from a perspective of the principle of intergenerational justice, which stands at the base

of social and environmental aspects of the concept of sustainable development. Cultural heritage is also frequently connected to the environmental milieu, in which it appears. The concept of cultural heritage is defined differently in different scientific disciplines. For example, one can mention the definition of J. Pruszyński, who considered cultural heritage as "the stock of movable and immovable things along with the related spiritual values, historical and moral phenomena, considered worthy of protection of the law for the good of society and its development and passing on to the next generations, due to understandable and accepted historical values, patriotic, religious, scientific and artistic, important for the identity and continuity of political, social and cultural development, proving the truths and commemorating historical events, cultivating a sense of beauty and civilization community" [53] (p. 50), and K. Zeilder treats cultural heritage as "the entire material and spiritual heritage of a given social group" [54] (p. 26). Pursuant to the acts of international law [55,56] and the professional literature, tangible and intangible cultural heritage can be distinguished; however, in principle the connection of tangible and intangible heritage creates a certain entirety and the complete dimension of cultural heritage. According to Art. 1 Convention Concerning the Protection of the World's Cultural and Natural Heritage [55], the concept of cultural heritage (especially in relation to tangible cultural heritage) covers:

- "monuments: architectural works, works of monumental sculpture and painting, elements or structures of an archaeological nature, inscriptions, cave dwellings and combinations of features, which are of outstanding universal value from the point of view of history, art or science;
- groups of buildings: groups of separate or connected buildings which, because of their architecture, their homogeneity or their place in the landscape, are of outstanding universal value from the point of view of history, art or science;
- sites: works of man or the combined works of nature and man, and areas including archaeological sites which are of outstanding universal value from the historical, aesthetic, ethnological or anthropological point of view" [55]. On the other hand, when looking for a legal definition of intangible cultural heritage, art. 2 clause 1 sentence 1, which states that: "The »intangible cultural heritage« means the practices, representations, expressions, knowledge, skills—as well as the instruments, objects, artefacts and cultural spaces associated therewith—that communities, groups and, in some cases, individuals recognize as part of their cultural heritage" [56].

Moreover, a fact of strong connection of heritage with religion and values needs emphasizing. In Europe, heritage has a religious dimension [57], and it is connected with Christianity and its values. In reference to the reflections over the cultural heritage in the context of the principle of sustainable development it is worth quoting J. Purchla's view that "Relationship between the past and the future is not limited today to the issue of historic buildings and their protection. A notion which has been enjoying spectacular career lately, is the cultural heritage (cultural heritage). More and more often it replaces the classical notion of a historic building. Here one should absolutely state that although the historic building belongs to the past, the heritage serves contemporary goals, whereas this heritage is not limited only to tangible cultural assets, but also our memory and identity. Cultural heritage is a process with its own dynamics. It reflects both the relationship of the society to the world of values, but also a process of reinterpretation of values in itself. Herein lies also the growing significance of cultural heritage. Because the heritage belongs to all of us, and access to it is one of the most fundamental human rights. Therefore, the heritage always has the human dimension. From this fact the key significance of social capital stems from—not only for the dynamic process of continuous creation and reinterpretation of heritage, but also for its effective defense" [58] (p. 44). Therefore, one can state that the heritage has dynamic character when it is a certain process. The dynamics of changes and also a definite process of changes is also entered into the concept of sustainable development, and implementation of the principle of sustainable development allows for flexible adjustment to dynamically changing conditions of the social, economic and environmental milieu,

respectively. It is also worth noting that contemporary literature is concerned with the issue of sustainability in various contexts related to cultural heritage [59–61]. Connection of a principle of sustainable development with the protection of cultural heritage also allows for a multi-aspect approach to the issue of protection of cultural heritage, which should also contribute to the increasing the effectiveness of cultural heritage management, especially that in contemporary times the heritage must be appropriately managed [62,63]. The only problem can be the fact that the concept of sustainable development has not been holistically implemented to any legal order, which may cause a decrease in the effectiveness of the principle of sustainable development [24,43]. On the other side, however, on account of heterogeneity of a concept at the normative level, it is not possible to implement it holistically, so, therefore, perhaps, it should be treated as a sui generis programmatic norm or even the policy as well, which although, from the international perspective may be easier to introduce, and which also follows then to use in defining specified standards of policy in a given scope.

As a consequence, it can be noted that cultural heritage with all its material and non-material wealth, as well as taking into account the principle of intergenerational justice, which is the basis of the concept of sustainable development, as well as the protection of cultural heritage, is part of the concept of sustainable development, especially in the social aspect, but also environmental. In addition, the protection of cultural heritage should be subject to the processes of sustainable development and is part of them through the necessity to preserve the cultural heritage of the past and the present generation for future generations.

3.4. Weighing the Public Interest and Individual Interest in the Scope of Protection of Cultural Heritage

Protection of cultural heritage requires from the legislator the introduction of certain restrictions of individual freedoms. Usually, these restrictions pertain mainly to the issue of the right of ownership, as well as the freedom of business activity. Protection of cultural heritage is connected with public interest, so, therefore, the necessity of preservation and transfer to future generations of the heritage of present and future generations, whereas the issues connected with individual freedoms, so, therefore, inter alia, the right of ownership and the freedom of business activity, relate to an individual's best interest. Public (social) interest is a diverse, variable and connected with a specific factual status [64] (p. 137). Evaluating the justifiability of protection of public interest in a given case one should consider numerous factors such as, inter alia, the ratio legis of a given legal act, its objectives and tasks, as well as the general principles of law [64] (p. 137). In the doctrine of administrative law, sometimes the public interest is identified with public welfare [65] (p. 106), which may include, inter alia, cultural heritage. Public interest is not the sum of private interests, either [65] (p. 107), but something above the private interest, because it includes various entities of public and private law. Public interest as an undetermined notion should be reviewed in a perspective of the values of the generally applicable law (especially legal rights, which are given the highest position in the hierarchy) [65] (p. 109). A notion of the public interest is flexible and is of dynamic character, allowing for adjustment to the changing political, social and economic conditions, with the concurrent preservation of legal foundations based on legal values and principles in a given legal order. Public interest on one side allows for effective protection of an individual's freedoms, which lies in the public interest, but at the same time, this notion often stands at the basis of restriction of an individual's freedom on account of the public interest [65] (p. 110), [66] (p. 34). Individual interest is the interest of an individual person, perceived very broadly, because also in the context of the factual interest [64] (p. 138). It is also worth emphasizing that legislators sometimes use terms qualifying this interest, such as for example a principle of equity, which indicates that the equitable interest of an individual cannot be illegal and principle of social coexistence [64] (p. 138).

Taking into account the public and individual interest, two underdefined general clauses, one should consider a situation in which the conflict of both of these interests

occurs [67] (p. 39–40). Therefore, one can present the following possibilities of solution to this conflict [67] (p. 40–41):

a. In a situation of conflict, one should firstly implement the public interest.
b. One should protect individual interest as far as the border of conflict with the public interest.
c. Both interests should be balanced out and, bestowing the principle of equity to the individual interest, indicate the lack of protection of any subjective individual interest.
d. The theory of sustainable development [13] (pp. 13–14).

The first of the possibilities is a characteristic for non-democratic states, for which the overriding goal is the public interest, even though de facto, it was of an individual character (public interest is equal to the interest of persons exercising power and authority). The other possibility de facto also in principle prejudges on the primacy of the public interest. The third presented possibility assumes balancing out the interests and restricts the subjectivism of an individual interest. It seems to be the most matching to balancing out the public and individual interest in the scope of the cultural heritage protection. Balancing out is also entered in a certain sense into the principle of sustainable development. Therefore, it is necessary to review this possibility from the perspective of the principle of sustainable development. As a consequence, reviewing a specific case using the principle of sustainable development, one should first reflect on the basis of analysis of various factors (legal, social, economic, environmental, cultural) upon the necessity of protection of a given designate of cultural heritage and, next, considering the scope of action that an owner of a given designate of cultural heritage wishes to undertake towards it, using the principle of balancing out the interests, make a decision regarding how much the protection of public interest is necessary and to what extent. Balancing out the interests based on the principle of sustainable development will also allow us to find a compromise between the protection of public interest and fulfillment of the individual interest by, for example, indicating certain elements, which have to be preserved, and allowing for modification/adjustment of elements less significant from the perspective of a given cultural asset in order to allow for exercising, for example, the right of ownership.

4. Discussion

The principle of sustainable development, expressed in European Union law, is of interdisciplinary character and may be used in order to solve conflicts of legal interests supportively towards the principle of proportionality, which is of the primary and more general character. Although sustainable development is identified in majority with environmental issues, one should clearly emphasize that the assumptions of the concept significantly extend beyond the environmental protection, because they refer to broadly perceived social, economic and environmental aspects, and moreover, they are strongly connected with the principle of intergenerational justice, which also stands at the foundation of the cultural heritage protection. It is also worth noting that the concept of sustainable development derives also from the concept of conservation, a notion that is particularly related to the conservation of historic buildings. Protection of cultural heritage is entered into the social aspect of a concept of sustainable development. It should also be noted that the protection of cultural heritage may be also connected with conservation of greenery, entering into the wholeness and integrity of a given designate of cultural heritage. In a particular way, it concerns historic buildings, and especially the palace and park complexes, and protection of a given landscape is of significance to cultural heritage. It can be confirmed, though, that in specific cases the implementation of the principle of sustainable development in reference to the conservation of designates of cultural heritage is not even proper, but necessary indeed, because it also refers to the environmental aspect of the subject principle. Various approaches in professional literature presented in item 3.2 of this article to the principle of sustainable development at the level of the European Union law arise from heterogeneity, multi-dimensionalism and multilevel character of the concept of sustainable development, being the foundation of forming the principle of sustainable development. Vast interpreta-

tional possibilities of this concept may lead to the danger of a lack of cohesiveness of the principle of sustainable development at the normative level, and this is the cohesiveness and clarity of law, which is necessary from the perspective not only of the very nature of law, but of the effectiveness of law as well. The European Union legislator, perceiving these problems, entered sustainable development into the European Union goals, and not values. The author thinks that at the level of European Union law, sustainable development cannot be treated as a political system founding rule and also as a legally binding one; the differentiation of using the principle of sustainable development should not be applied depending on which aspect it refers to. Additionally, it is difficult to treat the sustainable development only as an European Union/international idea or policy. As a consequence, in the author's opinion, it is worth invoking R. Dworkin's [68] concept, and it should be declared that the principle of sustainable development cannot be a legal rule but a standard, and specifically one of the "policies", outlining general goals, in this case referring to social, economic and environmental issues. One should emphasize, though, that Dworkin's "policies" are a part of the legal system, and they are not a sole result of the current international, European Union, national or regional policy. Taking the above into consideration, it seems fair to state that the principle of sustainable development should be treated as the principle outlining the goal, and also indicating the directions of interpretation of given legal provisions (legal regulations on the normative contents). As a consequence, then, a given legal interest should be interpreted in the context of the implementation of sustainable development. The principle of sustainable development should also be used in a situation of conflicts of common good and legal interests. In case of a conflict of common goods, it may be used supportively next to the principle of proportionality; whereas, in case of a conflict of interests within the environmental, economic or social aspects, the principle of sustainable development may fulfil a function of weighing the individual and public interest in a situation of their conflict. The linking of sustainable development with the individual and public (social) interest, especially in the context of harmonizing the individual interest with the social interest, is also perceivable in the professional literature [19], which had already been indicated in the course of reasoning contained in item 3.1. The concept of sustainable development is interdisciplinary, just like the approach to cultural heritage should be of such nature. Paying attention to the fact that cultural heritage is part of the concept, and thus the principle of sustainable development, should make it possible to look at the issue of cultural heritage protection not only from a legal or conservation perspective, but also from a social, environmental and even economic perspective. In principle, each person is responsible for some designations of cultural heritage, which are either in the public space, and then naturally belong to the entire society, or belong to individual bodies of public or private law. The necessity to weigh the public and private interest in the context of cultural heritage may, therefore, appear at any time, e.g., during construction, renovation, extension, reconstruction, sale, rental, maintenance and running a business. From the perspective of the protection of cultural heritage, it is also crucial to protect the authenticity and integrity of the designates of this heritage [6,7]. A holistic view of the issues of heritage protection shows many similarities in environmental protection; therefore, the choice of the principle of sustainable development seems to be purposeful. The above analyses have shown that the principle of sustainable development can be the basis for weighing public and individual interests in matters related to cultural heritage at the level of European Union law; however, the consequences of such an approach should also be indicated. So far, the principle of proportionality has been largely based on the necessity to choose between the individual interests of the owner of monuments and their expectations, and the public interest of the state or society and their expectations regarding the protection of a given heritage designate. However, the principle of proportionality is general and fundamental. The principle of sustainable development would allow for a more detailed and systematic approach to this type of issues and would also allow for an interdisciplinary approach, taking into account, apart from social issues, also environmental and economic issues. In addition, the principle of sustainable development in terms of Dworkin's "policies" would

allow to provide certain general rules and guidelines in such situations and would indicate the directions of solving this type of issues so as to reconcile the public and individual interests as much as possible. In addition, the principle of sustainable development occurs throughout the European Union and, therefore, would be a common determinant and direction for actions of public administration bodies and courts in this type of cases and, therefore, would enable more effective protection of cultural heritage and ensure uniformity and certainty of legal transactions in the European Union. In consequence, one can state then that the principle of sustainable development may be used in reference to the cultural heritage protection at the level of the European Union law, because it becomes an inherent part of the social aspect of the concept of sustainable development, which the principle of sustainable development is based on. Moreover, the principle of sustainable development may be the basis for weighing the public and individual interest in reference to the cultural heritage protection also at the level of the European Union, which confirms the adopted research hypothesis as well.

5. Conclusions

In summary, one should state that the principle of sustainable development, present in the European Union law, deriving from the broad, interdisciplinary, multi-aspect and multi-level concept of sustainable development, may be used in reference to the broadly perceived problems of cultural heritage protection in its social aspect, especially taking into consideration the principle of intergenerational fairness. Moreover, the principle of sustainable development treated in the categories of Dworkin's "policies", being a part of the European Union legal system may be used as the foundation of weighing public interest and individual interest in the scope of protection of the cultural heritage, enabling more effective exercising of law in specific situations. Using this principle in this context should include not only the level of the European Union law (primary and secondary), but also the level of national legal frameworks of the European Union Member States, which rather should not be a problematic issue, especially that many countries in a specific scope use the concept of sustainable development—or more specifically—the principle of sustainable development in their legal framework. Ultimately, the application of the principle of sustainable development to weighing public and private interests in matters relating to cultural heritage would contribute to increasing the effectiveness of protection, uniformity and certainty of legal transactions, as well as cooperation in the European Union, as well as public trust in state and EU bodies.

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Information Modelling Management and Green Public Procurement for Waste Management and Environmental Renovation of Brownfields

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Abstract: Information Modelling and Management (IMM) methods for Most Economically Advantageous Tender (MEAT) can promote the adoption of environmentally sustainable practices. Despite the wide regulatory framework and existing drivers, Construction and Demolition Waste (CDW) trends are still growing. The literature review analyzed IMM and CDW management implementation during design phases although few studies focused on Green Public Procurement (GPP) and CDW management integration from the Public Client's point of view. This research aims at investigating the integration and efficiency of MEAT and IMM to promote the application of sustainable strategies focused on waste reduction and resource valorization. The study investigates the Public Client's role in promoting sustainable practices, introducing digital material inventory and BIM during the design phases, and including environmental award criteria in the call for tender documents. A Design Build (DB) procurement model was considered in the case study of a brownfield renovation and the construction of a new school in northern Italy. The methodology provided the Public Client and included a method to evaluate the environmental impact of the bids, allowing for proper selective demolition planning, CDW decrease, and organization while promoting their integration in companies' expertise and procedures. The replicability of the methodology is demonstrated by positive results of present and previous case studies.

Keywords: building information modelling (BIM); construction and demolition waste (CDW); design build (DB); environmental assessment; public client; waste minimization

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1. Introduction

The construction sector is an industry with a high intensity of raw material consumption, corresponding to about a half of the Earth's raw materials [1,2]. In addition, over one half of annual material input returns as waste in the industrialized countries every year [3]. Construction and Demolition Waste (CDW) accounts for one third of the total amount of waste by volume in the EU, as reported by the EUROSTAT 2019 Waste Statistics [4]. Considering the high consumption of raw materials and the high level of discard production, the CDW management process must be reengineered to reduce scrap and to take advantage of the high potential for reusing and recycling materials when construction waste is correctly identified and separated through selective demolition procedures [5]. Waste management in the Architecture, Engineering, Construction, and Operations (AECO) industry requires adopting a 'cyclic' rather than a 'linear' approach [6]. The transition toward a circular economy approach in the AECO sector is aligned with the global framework to avoid dangerous climate change effects set by the Paris Agreement [7].

Most of existing studies adopted Building Information Modelling (BIM) approaches to introduce environmentally sustainable practices, specifically to the AECO industry, in the building design phase from the designer and contractor's points of view [8]. Few studies have analyzed the integration of BIM and Green Public Procurement (GPP) in construction procurement to evaluate the environmental impact of the bids [9]. However, a comprehensive application of Information Modelling and Management (IMM) methods and GPP from the Public Client's point of view, aiming to evaluate and reduce the environmental impact of a building related to resource and waste management during design and call for tenders phases, represents a gap in the literature. This can be critical considering the high purchasing power of public organizations and institutions [10] and the poor competences in the Italian context in drafting calls for tender documents including environmentally sustainable criteria [11].

The goal of the presented research is to fill this gap by defining a replicable model that adopts IMM and GPP for a sustainable use of resources and CDW minimization and management in AECO sector. The methodology covers the design phases and the call for tenders phase of a public construction process.

During the preliminary design phase, digital techniques for field surveys and data management are applied by a defining waste audit and a related digital inventory of materials. This supports proper selective demolition planning and demolition waste management. During the design phase, the creation of BIM models for the designed facilities enables construction waste management and the definition of on-site reusing and off-site recycling strategies for demolition waste materials.

During the call for tenders phase, GPP is adopted to a Most Economically Advantageous Tender (MEAT) procedure by introducing award criteria to evaluate the bids in terms of their environmental impact and integration of sustainable practices. All of the data and information from the design stages performed via IMM approaches support the definition of the tender documents and award criteria. The BIM model allows the management of waste and the related recycled and reused quantities for construction site planning.

This research will provide the Public Client a method to integrate and evaluate CDW minimization and selective demolition criteria from the design phase to the call for tenders phase of a public construction process, thus encouraging construction companies to propose and apply sustainable practices. This will also help companies to embrace circular economy principles and processes by renewing and enhancing their own business models. The efficacy of the proposed methodology is evaluated through the analysis of the responses from construction companies during the call for tenders, and in particular, the responses from the winning one.

In previous studies, the described methodology was tested on a green field of a new construction project, namely a public school facility in Melzo, Italy [12]. In the present research, the model is applied to a brownfield renovation, including an extensive demolition phase and the final design and construction of a new public school complex in Inveruno, Italy. The selection of the case study aims to demonstrate the positive outcomes of the model application to support the proper renovation of brownfields, thus promoting renovation processes to recover the quality of community land. Furthermore, the application of the model on a case study that is more complex than the previous one mentioned above can demonstrate the replicability of the proposed methodology.

2. Regulatory Framework and Guidelines

The main regulatory frameworks regarding GPP and waste management are hereafter investigated as the foundation of the proposed methodology. This section aims to analyze the topics describing global goals and directions while presenting the Italian position on the issues. In addition, soil protection and brownfield regulations are briefly analyzed since the case study is a brownfield revamp for new construction. The analyses are performed at the (Figure 1):

1. International/global level: identifying global strategic goals and actions in order to define the direction and guidance toward sustainable practices;
2. European level: describing the general framework and the main guidelines;
3. National level: analyzing Italian regulations and, if existing, regional specifications and requirements.

Figure 1. Regulatory levels.

Finally, at the end of each of the following sub-sections, the key aspects that the proposed methodology aims to address are presented.

2.1. Green Public Procurement

Green Public Procurement integrates requirements and criteria in order to achieve value for money in the whole lifecycle of a project while supporting resource protection [13] and reducing environmental impacts [14]. Since public organizations and institutions wield a purchasing power of 15 to 30% of the national gross domestic product [10], GPP is supported and promoted at the international level as a means of driving the market towards innovative and sustainable practices [15].

At the European level, the Directive 2014/24/EU introduced the possibility of including tender clauses related to environment protection, the minimization of negative impacts, and waste management by promoting and monitoring the implementation of GPP [16,17]. In addition to that, the Directive 2014/24/EU emphasizes the critical role of public procurement in reaching a smart, sustainable, and inclusive growth [17].

Concerning the Italian regulatory framework, the Legislative Decree 50/2016 was a turning point for national procurement regulations, making GPP mandatory in public tenders and introducing the Most Economically Advantageous Tender (MEAT) approach, which aims to achieve value for money on a basis of the lifecycle of a construction project [18]. However, only around 20% of the Italian Provinces have adopted GPP including sustainability criteria so far, while around 50% of municipalities have very poor knowledge of GPP. The main causes, especially when considering smaller municipalities, are the lack of staff training and competences regarding GPP, and issues in drafting tender documents that include sustainability criteria [11].

Concerning GPP implementation, the presented research aims to:

- provide Public Clients a method for GPP and environmentally sustainable criteria integration that can be further applied and adapted by municipalities;
- test the effectiveness of the proposed methodology through the presented case study.

2.2. Waste Management

Fundamental objectives to achieve a sustainable development, which are set at international level, are the efficient use of natural resources and the 3Rs approach, i.e., reduce, reuse, and recycle, for waste minimization and management [19,20]. A critical step for waste management regards the definition of the concept of Extended Producer Responsibility (EPR) [21]. The focus is shifted from the phase in which waste already exists to the entire product lifecycle to the responsibility of manufacturers in terms of waste generation and to the need for the sustainable use of resources and waste minimization [22].

In the European framework, attention to both the design phase supporting the EPR approach and the conscious choices of materials, i.e., recyclable, recycled, durable, non-hazardous, and local materials and products, and the concept of waste as a resource, is stressed [23,24]. The definition of selective demolition is also proposed, highlighting the need to integrate it in standard design procedures [23]. Furthermore, in 2018, the EU Commission released guidelines for the definition of waste audits: they have a central role to ensure the proper identification and separation of demolition materials, thus facilitating the application of selective demolition and reusing and recycling practices [5]. Waste audits exploit their major potential if performed during the design phase since they enable a detailed estimation of the costs of the selective demolition, separation, recycling, recovery, and landfilling of materials. Consequently, a correct estimation of costs can be encompassed in the total budget for the call for tenders, supporting a successful accomplishment of the process [25].

Concerning the Italian regulatory framework, Legislative Decree 50/2016 introduced the requirement for Public Clients to purchase products and services that are compliant with the national document called the Minimum Environmental Criteria (CAM—Criteri Ambientali Minimi) [18], which requires the reuse, recovery, or recycling rate of about 70% by weight of non-hazardous waste in cases such as renovation, maintenance, and demolition. Methodological hints and principles for demolition and material removal and requirements to conduct a pre-demolition audit were also defined in 2017 by a specific Ministerial Decree [26].

Concerning CDW management implementation, the presented research aims to:

- define a waste audit method for the preliminary design phase;
- integrate CDW management in the entire construction process with increased interest on the design phase, on sustainable resource use, and on waste minimization.

2.3. Soil Protection and Brownfield Rehabilitation

Brownfields are defined as polluted and abandoned sites where urban transformation interventions combine remediation and reuse [27,28]. At international level, soil protection, reducing land degradation and consumption, and strategies for regreening city spaces are among the 2030 Agenda Goals for Sustainable Development [14,29].

The EU targets to achieve zero net land take by 2050 [30]. In fact, soil is fundamental for life on Earth and is a non-renewable resource [31]. Spatial planning strategies for urban expansion cause most of soil sealing. The EU Commission emphasized the need to implement good practices to reduce the negative effects of soil consumption and, in particular, to reduce soil sealing [32,33], identified as major threats to the environment [31].

Given the condition of fragility and criticality of the territory, soil protection, the sustainable management of natural resources, and arrested land consumption and desertification are crucial for the Italian context [34]. The Italian brownfield regulation falls under waste regulations, in which brownfield redevelopment is divided into site environmental remediation and subsequent urban redevelopment [35]. At the regional level, Lombardy Regional Law 16/2017 defined a digital catalogue of brownfields and introduced the con-

cept of 'ecological soil balance' and economic incentives for brownfield renovations and limitations on green fields use for new construction projects [36,37]. In addition, at project level, CAM introduced the need and indications to reduce land use and sealing, prioritizing the recovery of existing abandoned buildings and brownfields [26].

Concerning brownfield renovations, the presented research aims to:

- test the proposed methodology on a brownfield renovation;
- evaluate the advantages of proper waste audit definition and CDW management for the extensive demolition phase planning of an abandoned industrial area.

3. Background

As presented in the previous section, CDW management and minimization as well as GPP adoption in the construction sector are promoted and sustained both at the international, European, and national level. Nevertheless, the level of waste generated by the AECO sector is still growing. EUROSTAT 2019 Waste Statistics compared waste generation trends in European industrialized sectors in the period of 2004–2018 [4]. While other industrialized sectors had reduced their waste generation by over 20%, the construction sector had increased its waste production by about 20% since 2004 (Figure 2) [4].

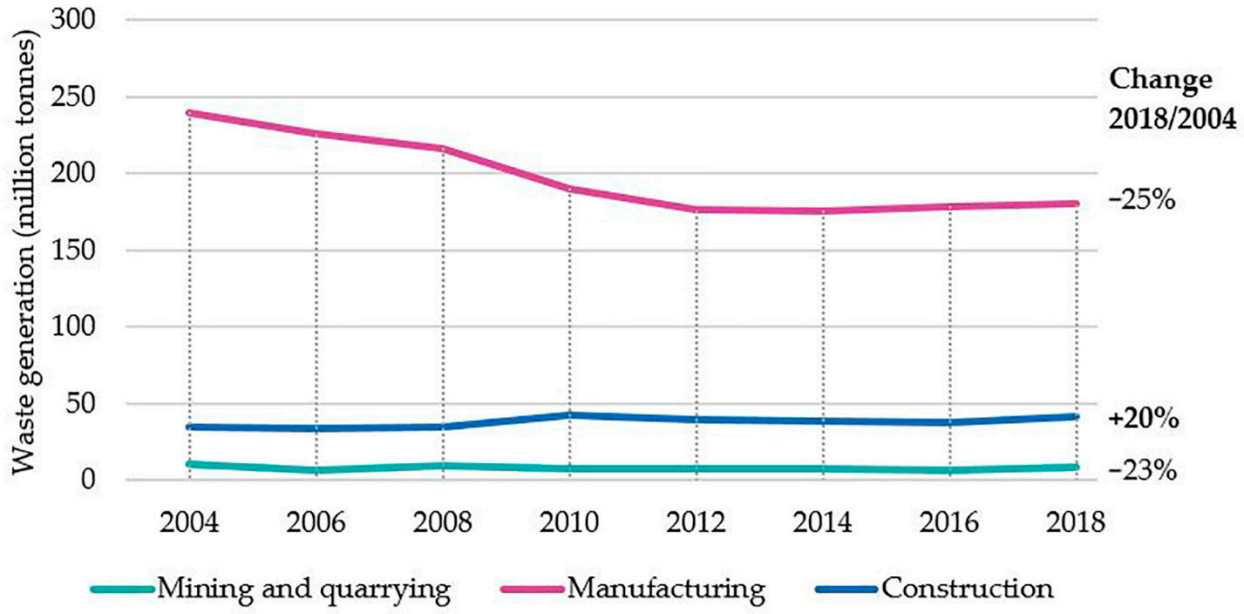


Figure 2. Comparison of current waste generate trends in the construction, mining and quarrying and manufacturing sectors, excluding major mineral wastes, EU-28, 2004–2018. Data source: EUROSTAT 2019 (env_wasgen).

The following sub-sections investigate the barriers that currently limit the introduction of sustainable practices in the AECO sector and drivers that can promote and guide the adoption of CDW management and minimization strategies.

3.1. Barriers to Waste Management Adoption in Construction Sector

The main barriers to the reduction of waste generation are represented by socio-economic factors [38,39], and these are described in Table 1.

Table 1. Barriers for the implementation of sustainable practices in AECO industry.

Barriers	Effects on the Construction Process
Incomplete design documents and information asymmetry between designers and contractors	Causes most errors and rework during the construction phase [40], consequently triggering waste generation [41,42] and increasing the risk of project time and cost overruns.
Non-collaborative culture	One of the main causes of waste generation [43], producing an unclear definition of responsibilities and inconsistent tender documents [44]. The contractor is usually not involved in design choices, increasing the risk of waste generation during the construction phase [45].
Blame culture	Actors of the different stages blame other specialists for generating waste [46,47] with a consequent shift in the responsibility for waste generation.
Waste inevitability culture	All actors see waste generation as unavoidable [6]. In standard practice, owners and contractors have usually already paid for waste treatments, transportation, and landfilling; therefore, selective demolition and the adoption of the 3Rs approach are seen as burdens.
Difficulty of innovating	Difficult replication of good practices and innovative applications in future projects due to the temporary relationships between the construction process parties [48].
Lack of training in applying innovative methods and technologies	Difficult application of innovative methods and technologies by the contractor [6].

The proposed methodology aims to overcome the identified barriers by:

- promoting and demonstrating the concept of waste as a resource and as a possible source of income;
- involving the contractor in the design phase to enhance the collaboration and to enable the proper application of CDW management and minimization strategies by adopting the Design Build (DB) tender model;
- providing a replicable methodology to support the adoption of sustainable strategies and innovative methods by construction companies.

3.2. Drivers to Waste Management Adoption in Construction Sector

The main drivers for CDW management and minimization strategies and GPP implementation in the AECO sector are:

- Legislative drivers: as presented in the Regulatory framework section, the implementation of environmentally sustainable practices is promoted at all levels. Consequently, Public Clients can encourage the introduction of sustainable practices by implementing GPP tender processes and by using their purchasing power to opt for environmentally friendly goods, services, and works. In addition, positive public applications can highlight the advantages and possible income deriving from selective demolition, waste separation, and the recycling as secondary raw materials, such as, as an example, the high-quality recycling of aluminum.
- Business drivers: companies are facing the need to adopt sustainable strategies in order to maintain and enhance their competitiveness. In addition, companies are starting to focus not only on economic value but also on the company's social responsibilities and stakeholder engagement [6].
- Managerial and technological drivers: Information Modelling and Management (IMM) approaches can allow companies to overcome the barriers of sustainable practice integration by reducing design errors and information asymmetry, improving collaboration, and supporting waste quantity measurement and control [39].

4. Literature Review

This section aims to investigate previous applications of IMM approaches to support the integration of environmentally sustainable practices in the AECO sector. The literature review briefly analyzes:

- digital survey techniques for the preliminary analyses of existing areas;
- the integration of BIM and CDW management during the design phase;
- GPP implementation supported by IMM approaches.

4.1. Digital Techniques for Field Surveys

One of the critical steps when dealing with existing buildings is collecting real-world data about the to-be-demolished structures. There are two different approaches for digital field surveys that are investigated: photogrammetry and laser scanning.

Photogrammetry is a well-established digital image-based survey technique that extracts data from 2D pictures, and places them in 3D spaces [49], providing 3D measurements and producing points clouds for several engineering fields [50]. Close-range photogrammetry considers measurement distances within 300 m between cameras and buildings [51]. Photogrammetry allows the safe and easy analysis of unsafe buildings [52] with a reduced number of on-site field surveys, and enables further analysis of the buildings in remote mode. In addition, it is less expensive than laser scanning techniques [53], and non-experts can conduct surveys using common, portable, and lightweight digital cameras [54]. However, photogrammetry cannot provide automatic modelling of BIM objects; the points cloud can be used as a basis for the creation of the BIM model.

Laser scanning can be considered as one of the most innovative approaches in the field, and aims to convert real objects into information-rich BIM objects. Modern laser scanning techniques are less expensive than traditional ones, such as terrestrial or aerial laser scanning [55]. However, the conversion process from the points cloud to a 3D plain model and then to an information-rich BIM model is still a time-consuming and expensive task [56]. Recent studies have tested Artificial Intelligence (AI) techniques to achieve an automatic or semi-automatic and therefore faster and less expensive conversion [57,58].

In summary, photogrammetry enables safe, low-cost field surveys but lacks automatic BIM object modelling capabilities. On the other hand, laser scanning enables the conversion from points clouds to BIM models, but it is more expensive and is still a developing technique.

4.2. BIM Methods for Waste Management

Better data and information flow means improved decision-making processes and, in addition, enhanced capacity to manage and decrease CDW streams. IMM methods play the double role of managerial and technological drivers [6], supporting the implementation of sustainable strategies and waste management practices during all stages of the construction and demolition processes [39,42]. Digital methods and techniques are demonstrated to guarantee the consistency of the information flow during the entire construction and demolition process through several applications [59–62]. Regarding the integration of BIM and CDW minimization and management, most of the existing studies focused on CDW reduction and management during the design phase. Cheng and Ma [63] proposed a BIM-based system for estimating and planning demolition and reconstruction activity by reducing the waste stream. They proposed an automated and accurate waste estimation methodology using the quantity take-off enabled by a BIM-model with a fast and more cost-effective approach. The authors addressed the lack of data and information that afflicts the estimation task during the demolition planning and reconstruction activities [64] in order to support the decision-making process. The correct quantification of waste, which must provide waste typology and dimensions, is in fact critical for effective and proper waste management [65]. Cheng et. al. [66] investigated how BIM implemented during the design phase could support CDW reduction during the construction phase by eliminating the root causes of waste generation through clash detection, quantity take-off, phase

planning, site utilization, and digital prefabrication. The study aimed to maximize the homogeneous fractions of mono-materials by using BIM, and they proposed a BIM-based waste management planning and execution system to monitor the minimized and disposed waste [66]. Akinade et al. [67] proposed a BIM-based Deconstructability Assessment Score system (BIM-DAS) to compare several design options by identifying the best technological solution for deconstructability purposes and the most influential design factors influencing deconstructability. Deconstruction is defined as the possibility of disassembling a whole or a single element of a building, enhancing the technical component of reuse and recycling [68], leading the sector to reach a zero-waste economy [69–72]. Liu et al. [73] investigated a BIM-aided construction waste minimization framework, aiming to support designers in addressing waste causes during the decision-making processes of the design stages. Guerra et al. [74] investigated an automated waste estimation system, aiming to streamline the waste estimation process and support more efficient waste management during the design phases. The authors implemented their research for the visual planning of construction waste, discretizing waste generation in quantities for on-site reuse and off-site recycling, and identifying specific activities in the construction schedule where reuse is possible [75].

The literature review highlighted the extensive implementation of BIM methodologies to support CDW management during the design phases through the parametric modeling, visualization, and simulation capabilities of BIM. Existing studies showed promising results, with possible waste reduction of 4–15% by using BIM during the design phases [76]. However, the application of BIM methodologies for CDW minimization and to manage the demolition or reconstruction of existing buildings that had not been designed following deconstructability principles is a less investigated topic [8].

4.3. IMM Approaches for Green Public Procurement Implementation

Green Public Procurement aims to purchase goods at a good value for money during the whole product lifecycle, while supporting environmental protection and reducing negative environmental impacts [14]. For that reason, green purchasing criteria are fostered by global, European, and national regulations. Despite this, the topic of IMM approaches for GPP implementation is not often investigated, and few applications in the construction sector can be found in the scientific literature. Palmujoki et al. [77] stated that environmental requirements are considered as contract award criteria, but the majority of purchasers still tend to favor past practices to avoid violating the legal principles of free competition and transparency, and possible legal disputes. Wong et al. [78] highlighted the importance of the Public Client in taking a proactive role in pushing green procurement adoption in the AECO sector. Through questionnaire surveys and interviews, the study identified environmental government regulations and client requirements in tendering as main factors to enhance GPP in the construction process. In addition, the use of IMM approaches was identified as a facilitator for the adoption of green design approaches in the construction process [78]. Barbini et al. [9] proposed a system to integrate life-cycle data in a BIM library to support Green and Digital Pubic Procurement processes in the Italian context. The research emphasized the positive outcomes of using digital technologies to achieve environmental sustainability objectives in a virtuous circle between green and digital approaches.

According to the literature review, little investigation has been conducted on the integration of IMM approaches and GPP. However, the definition of a method for the Public Client can be critical considering the high purchasing power of Public Administrations [10] and the poor competence in the Italian context in drafting tender documents that include environmentally sustainable criteria [11].

5. Methodology

The proposed methodology is divided in the following sub-sections:

4. Discussion on the literature review findings and the resulting goals of the research project, and choices for the definition of the proposed methodology;
5. Methodology for the preliminary design phase focusing on the analyses needed to plan appropriate selective demolition activities and involving the definition of a waste audit with a digital material inventory;
6. Methodology for the design phase focusing on the use of BIM models for CDW management and sustainable resource use;
7. Methodology for the call for tender phase focusing on the integration of sustainable award criteria, including CDW management, resource management, waste minimization, and selective demolition criteria, in the GPP tender documents in order to promote their application during the final design and construction phases.

5.1. To BIM, or Not to BIM?

The literature review highlighted the successful applications of BIM for sustainability and during the design phase in particular. However, less investigated topics are the application of digital methods to optimize the planning of the demolition phase of existing buildings and to support the Public Client during the call for tenders phase, including environmentally sustainable criteria.

Regarding BIM adoption for the demolition phase planning, the creation of a BIM model exclusively for demolition purposes shall be carefully evaluated. The availability of a BIM model of the to-be-demolished building is an undoubted advantage for CDW management [67], supporting deconstruction, and reusing and recycling activities [68]. However, most of the existing buildings do not have a BIM model, and creating one is challenging [79]. In addition, when generating a BIM model that is exclusively for the demolition phase, many benefits and optimizations that justify the effort of producing a BIM model are invalidated [25]. In general, the IMM approach aims to support decision-making processes by focusing on organizing and digitizing data and information in a structured form. Data and information must be available, up-to-date, precise, and provided to the right person, at the proper time, and in the correct format [80,81], in a concurrence with process and information management [82]. Therefore, data should accomplish two fundamental pre-requisites: (I) information readiness and (II) information processability [83]. Databases are comparable to BIM models in fulfilling the two above-mentioned pre-requisites since BIM models can be assimilated to the relational databases that are required for 3D geometrical visualization [73]. In addition, the creation of a digital database is less time and effort consuming than producing a full BIM model.

Consequently, the presented methodology proposes the adoption of IMM approaches by using a digital database to manage CDW and for the proper planning of selective demolition activities. The creation of a BIM model, on the other hand, is proposed for the design phase, supporting sustainable resource use and waste minimization strategies. Concerning the call for tenders phase, the methodology proposes a framework for the introduction of award criteria regarding sustainability aspects in the tender documents, and for the evaluation of the environmental impact of the bids (Figure 3).

In summary, the research aims to provide the Public Client with a model to adopt sustainability practices focusing in particular on CDW management and minimization and selective demolition practices, that are supported and managed via IMM approaches during the design and call for tenders phases.

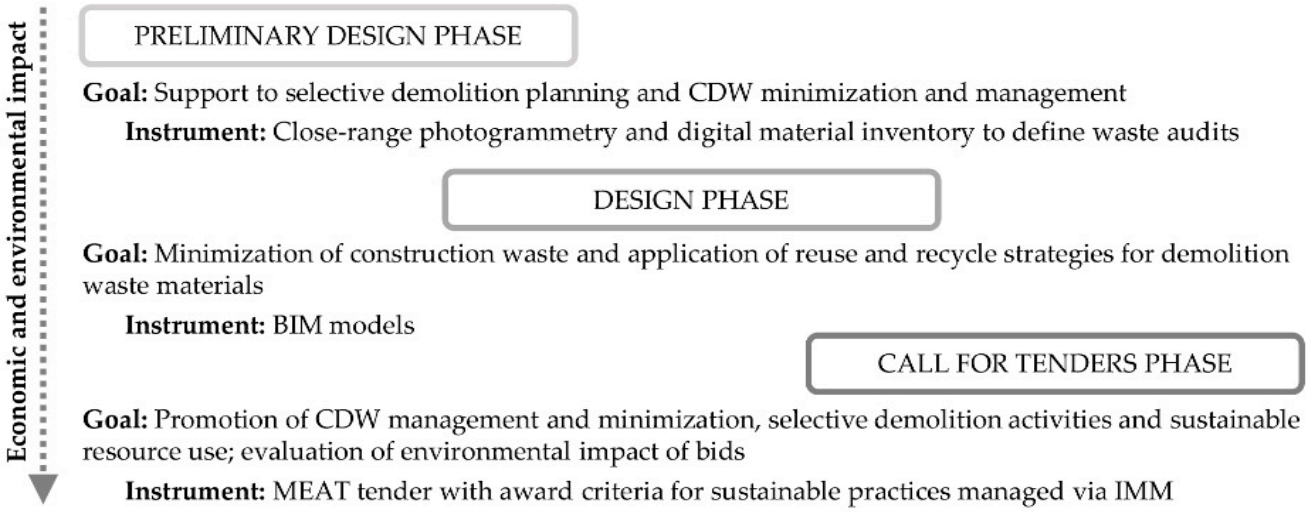


Figure 3. General scheme of the model's objectives and instruments.

5.2. Preliminary Design Phase: Waste Management and Selective Demolition Planning within a IMM Approach

During the preliminary design phase, the methodology proposes the creation of a digital material inventory, i.e. a digital database, for waste audits to plan and manage CDW streams and the selective demolition activities of existing facilities. A general scheme of the methodology is presented in Figure 4.

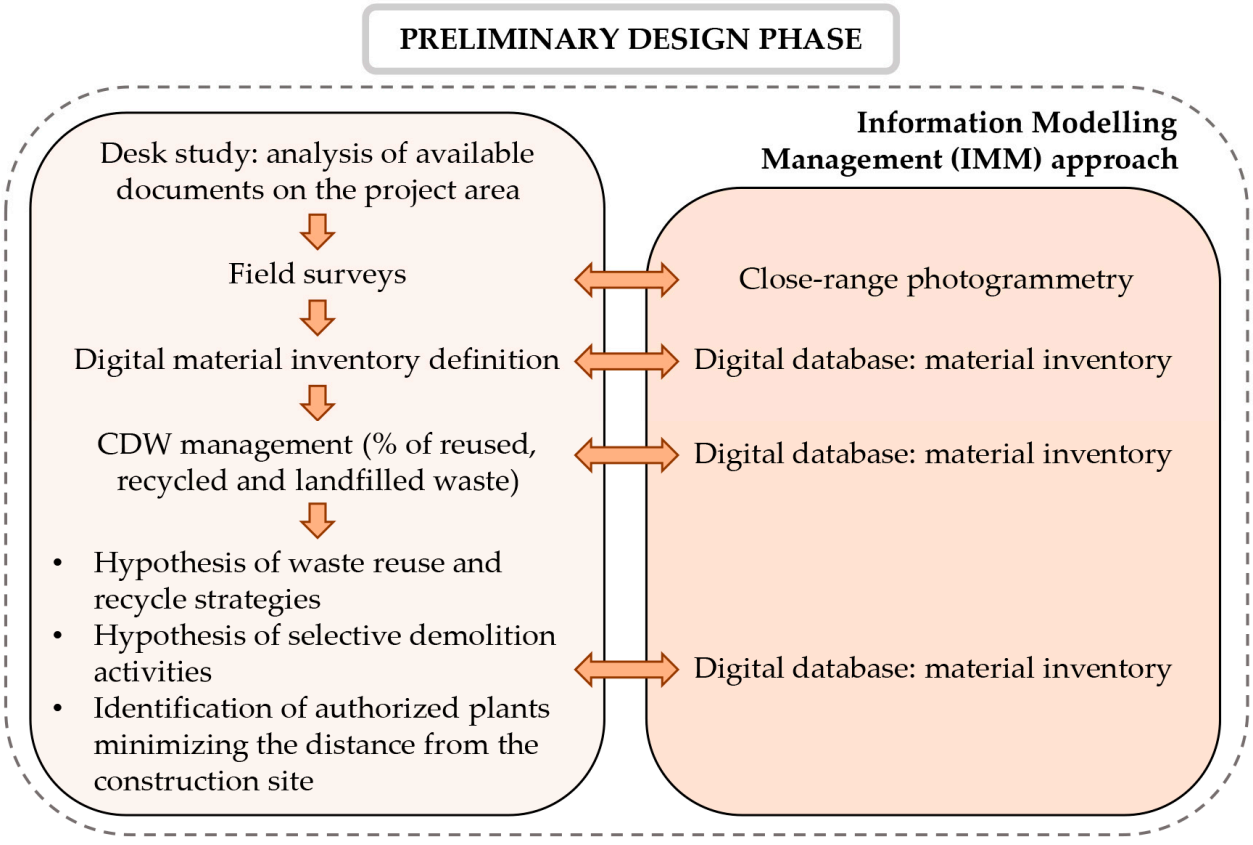


Figure 4. General scheme for waste audits during the preliminary design phase within a IMM approach.

In order to collect the information needed to define the digital material inventory, close-range photogrammetry was considered. The output of close-range photogrammetry are points clouds realized from the images collected on site. This technology enables 3D measurements and the remote analysis of the images to identify materials and elements.

Data collected through field surveys are the basis for the definition of the digital material inventory, i.e. the output of the waste audit. The digital material inventory allows the organization and management of a higher quantity of data by going beyond the basic level of information of a standard inventory of materials [5]. The proposed digital material inventory structure is shown in Table 2, and includes:

- Basic information, including material estimation and description;
- Detailed information, including material types and European Waste Codes (EWC);
- An improvement of the basic levels of reporting hazardous and non-hazardous materials by considering three levels of reporting: (a) hazardous, (b) non-hazardous and recyclable, and (c) non-hazardous and reusable on site. The three levels enable an easier definition of waste management strategies through the prior identification of recyclable and reusable materials;
- The identification of recyclable materials and authorized recycling plants in the proximity of the project site to minimize the carbon emissions for waste transportation, hence promoting a circular economy approach at the local scale [25].

Table 2. Structure of collected data in the digital material inventory.

EWC Code	Material Description	Quantity	% of the Total (in Weight)	Waste Management Strategy Hypothesis	Distance of Proposed Recycling Plant
		[m^3/kg]	[%]	[Reuse; recycle; landfill]	[km]

The digital material inventory is then used to define proper selective demolition activities and their related costs. Consequently, a more reliable estimation of the costs for the demolition phase can be included in the total budget for the subsequent design and call for tenders phases. In addition, selective demolition plans can be defined considering actual waste quantities and components.

The evaluation of the methodology applied to the case study was performed by comparing the selective demolition costs calculated through the digital material inventory with the costs of the parametric non-selective demolition of the same buildings.

5.3. Design Phase: Waste Minimization and Sustainable Resource Use within a BIM Approach

During the design phase, the BIM approach was proposed for waste minimization and management and to foster the sustainable use of resources (Figure 5).

The BIM model for the design phase was generated by linking all construction materials to similar information as the ones collected for the demolition materials in the digital material inventory. Material quantities, types, related quantities of construction waste, and EWC codes are linked to each construction material.

The BIM model is used to:

- Store all graphic and non-graphic information, drawings, and documents of all the disciplines of the design phase;
- Perform design reviews, clash detection, quantity take-off, phase planning, and site utilization, thus supporting and facilitating the proper management and minimization of construction waste;
- Identify materials producing the highest quantities of construction waste.

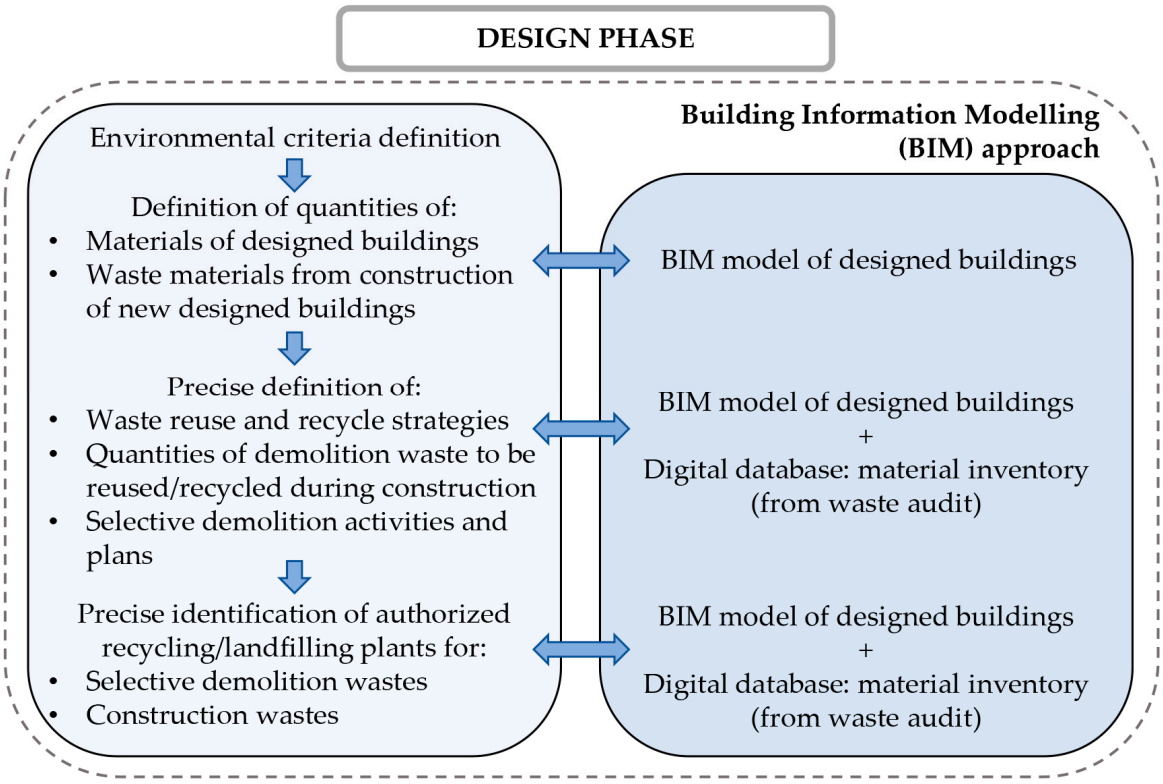


Figure 5. General scheme for waste management during the design phase within a BIM approach.

The quantities of construction materials from the BIM-based quantity take-off and from the digital material inventory can be compared in order to identify possible reuse strategies on site. It is possible to select the construction materials that can be replaced by demolition waste materials as secondary raw materials, allowing for a reduced use of raw materials.

The effectiveness of the methodology applied to the case study is validated by analyzing the advantages enabled by the use of the BIM model, in particular, regarding the sustainable use of resources through the on-site reuse of demolition waste materials.

5.4. Call for Tenders Phase: Environmental Award Criteria within IMM and BIM Approaches

GPP and IMM methodologies are considered as key aspects to introduce and integrate sustainable practices in AECO industry. This sub-section describes the innovative approach to the call for tenders phase, aiming to evaluate and compare the bids according to their environmental impact, and regarding the aspects of CDW minimization and management, and selective demolition procedures.

The adopted tender process type is the Design Build (DB) model, in which a single operator is selected to conduct the final design and construction. The presence of a unique actor for the two stages eases a more efficient information transfer with the Client and a more collaborative process, which also ensures an easier management of the procurement and construction processes for the Client [84]. As a consequence, the DB model represents a valuable framework for the application of IMM approaches [85]. In addition, if the construction company realizes the final design, company characteristics and standard procedures can be taken into account. As a result, the final design can be optimized according to the capabilities and characteristics of the company itself.

The call for tenders process based on the DB model implies the MEAT evaluation system introduced by D.Lgs. 50/2016, as recalled by Section 2.1. The evaluation of the bids is based on objective alpha-numerical criteria. The assessment of the quality of the bids is based on the rankings on the defined criteria (Table 3), thus promoting the automation of

the evaluation process. The environmental criteria considered in this research concerned the following sustainability aspects [86]:

- Selective Demolition Procedures Criteria: procedures that should be defined according to the waste audit and digital material inventory;
- Demolition Waste Management Criteria: considering demolition materials as defined by the waste audit. It was necessary to define recyclable demolition waste by at least 70%, a mandatory requirement introduced by CAM (Section 2.2). The digital material inventory represents a fundamental annex of the tender documents for the identification of demolition materials and waste;
- Recommended Authorized Recycling Plants: minimizing the distance from the construction site and the carbon emissions from waste transport according to the analyses of the waste audit and the digital material inventory;
- Construction Materials and Waste Management Criteria: their quantities, characteristics, level of recyclability or reusability to achieve recyclable construction materials by at least 70%, a mandatory requirement introduced by CAM (Section 2.2);
- Construction Technical Solutions and CDW Management: on-site reuse strategies for demolition waste materials according to the BIM-based analyses;
- Construction Technical Solutions: procedures to increase the levels of durability, maintainability, safety for construction, and to decrease the waste generation.

Table 3. Scheme of criteria and sub-criteria for the bid evaluation process.

Category	Criterion	Evaluation Sub-Criterion	Sub-Criterion Value
A—Passive element requirements	A.1—Material production site distance	A.1.1—Distance of the production site of materials	3
	A.3—Environmental requirements	A.3.1—Contractor certification according to UNI EN ISO 14001	1
		A.3.2—Producer certification according to UNI EN ISO 14001	3
		A.3.3—Recyclability of materials at end-of-life	2
D—Construction and demolition phase	D.1—Safety	D.1.1—Contractor certification according to OHSAS 18,001	1
	D.2—Constructive solutions and site management	D.2.2—Demolition plan and CDW management	10
E—Maintenance	E.1—Building maintenance	E.1.1.—Maintainability and durability of construction materials	7

Throughout the entire process, waste minimization paired with the definition of safe and efficient selective demolition procedures is promoted with the highest rankings. Respecting the environmental criteria when presenting the bids would have provided additional points to the ranking of the companies, thus increasing their possibility of winning the call for tenders, and, at the same time, promoting the application of sustainable practices among the participants. In particular, the call for tenders assigned 80 out of 100 points to the technical offer. Among them, 27 points regarded the environmental criteria (Table 3), covering more than 25% of total points. Moreover, environmental criteria were linked to safety aspects by the sub-criterion D.1.1, requesting the OHSAS 18001 certification of the construction company safety management processes (which has been replaced by International Standard ISO 45001 in 2018) [87,88].

In addition, the criteria and sub-criteria used to evaluate the bids in the tender are aligned with LEED certification criteria (Table 4) [89].

Table 4. Parallelism between LEED credits and evaluation sub-criteria of the proposed tender.

Evaluation Sub-Criterion	LEED Credit
A.1.1—Distance of the production site of materials	MR Credit: Sourcing of Raw Materials: products sourced (extracted, manufactured, and purchased) within 100 miles (160 km) of the project site are valued at twice their base contributing cost, up to a maximum of 200% of the cost.
A.3.1—Contractor certification according to UNI EN ISO 14001	ISO 14001 (evaluating environmental management system of companies) is not directly linked with LEED (evaluating building environmental performance). However, it has been demonstrated that companies implementing ISO 14000 standards are more likely to be able to provide buildings with higher energy and environmental performance, and consequently, higher LEED ratings [90,91].
A.3.2—Producer certification according to UNI EN ISO 14001	
D.2.2—Demolition plan and CDW management	MR Credit: Construction and Demolition Waste Management: develop and implement a construction and demolition waste management plan and achieve points through waste prevention and/or diversion.

The following paragraphs describe the sub-criterion D.2.2 (Table 3) and the related scoring system. Sub-criterion D.2.2 is related to CDW management and is aligned with the LEED "Material and Resource (MR) Credit: Construction and Demolition Waste Management". The intent of the LEED requirement is the reduction of "construction and demolition waste disposed of in landfills and incineration facilities through waste prevention and by reusing, recovering, and recycling materials, and conserving resources for future generations.", and specifically, the considered MR Credit aims "to divert at least 50% of the total construction and demolition materials from landfills and incineration facilities." [89].

Sub-criterion D.2.2 divides waste that the company expects to produce by:

- Re-usable waste on site, identifying the expected methods and, when necessary, the treatments to make waste reusable;
- Recyclable waste, identifying the related methods of separation of different types of waste on site;
- Landfilled waste, divided for hazardous and non-hazardous waste, including the disposal methods and, when necessary, treatments to be landfilled.
- Specifically, the following data shall be defined for each waste material (Table 5):
- EWC codes;
- Description of construction activities producing the waste materials;
- Total amount of m-th non-hazardous waste material $Q^{i}_{Rif,\ m}$ and of p-th hazardous waste material $Q^{i}_{Rif,p}$ (unit of measurement: kg);
- Percentage of non-hazardous waste material to be reused on site $\%^{i}_{Riu,\ m}$;
- Percentage of non-hazardous waste material, excluding excavated soil, to be recycled $\%^{i}_{Ric,\ m}$;
- Percentage of non-hazardous waste material, excluding excavated soil, to be landfilled $\%^{i}_{Sma,\ m}$;
- Percentage of hazardous waste material as defined by Directive 2008/98/CE to be landfilled $\%^{i}_{Sma,\ p}$.

Table 5. Example of table for expected waste quantities, types, and EWC codes.

EWC Code	Construction Activity	Amount of Waste [kg]	Non-Hazardous Materials			Hazardous Materials
			% Reused	% Recycled	% Landfilled	% Landfilled
Non-hazardous material EWC code	Construction activity description	$Q^i_{Rif,\,m}$	$\%^i_{Riu,\,m}$	$\%^i_{Ric,\,m}$	$\%^i_{Sma,\,m}$	-
Hazardous material EWC code	Construction activity description	$Q^i_{Rif,\,p}$	-	-	-	$\%^i_{Sma,\,p}$

Considering each EWC non-hazardous waste code, the sum of the percentages $\%^i_{Riu,\,m}$, $\%^i_{Ric,\,m}$, $\%^i_{Sma,\,m}$ shall be equal to 100% since it corresponds to the total amount of that specific non-hazardous waste material. On the other hand, for each EWC hazardous waste code, the single percentage $\%^i_{Sma,\,p}$ shall be equal to 100% since the entire quantity of a hazardous waste material is represented by this percentage.

The quantities of each m-th non-hazardous waste material to be reused ($Q^i_{Riu,\,m}$), recycled ($Q^i_{Ric,\,m}$), and landfilled ($Q^i_{Sma,\,m}$) shall be calculated as follows:

$$Q^i_{Riu,\,m} = Q^i_{Rif,\,m} \cdot \%^i_{Riu,\,m};\; Q^i_{Ric,\,m} = Q^i_{Rif,\,m} \cdot \%^i_{Ric,\,m};\; Q^i_{Sma,\,m} = Q^i_{Rif,\,m} \cdot \%^i_{Sma,\,m}$$

In addition, the quantities of each p-th hazardous waste material to be landfilled ($Q^i_{Sma,\,p}$) shall be calculated as follows:

$$Q^i_{Sma,\,p} = Q^i_{Rif,\,p} \cdot \%^i_{Sma,\,p}$$

The total amount (in kg) of non-hazardous waste to be reused (Q^i_{Riu}), recycled (Q^i_{Ric}), and landfilled ($Q^i_{Sma-Nper}$; $_{\mathrm{Nper}}$: subscript for non-hazardous waste) shall then be calculated as follows:

$$Q^i_{Riu} = \sum_{m=1}^{N} Q^i_{Riu,\,m}\;;\; Q^i_{Ric} = \sum_{m=1}^{N} Q^i_{Ric,\,m}\;;\; Q^i_{Sma-Nper} = \sum_{m=1}^{N} Q^i_{Sma,\,m}$$

The total amount (in kg) of hazardous waste materials to be landfilled ($Q^i_{Sma-per}$; $_{\mathrm{per}}$: subscript for hazardous waste) shall also be calculated as follows:

$$Q^i_{Sma-per} = \sum_{p=1}^{N} Q^i_{Sma,\,p}$$

where N is the total number of materials from Table 5.

The total amount of waste (Q^i_{TOT}) is the sum of recycled, reused, and landfilled waste, considering both non-hazardous (subscript $_{\mathrm{Nper}}$) and hazardous materials (subscript $_{\mathrm{per}}$).

$$Q^i_{TOT-Nper} = Q^i_{Riu} + Q^i_{Ric} + Q^i_{Sma-Nper}$$

$$Q^i_{TOT-per} = Q^i_{Sma-per}$$

$$Q^i_{TOT} = Q^i_{TOT-Nper} + Q^i_{TOT-per}$$

The total percentages of materials for reusing, recycling, and landfilling of non-hazardous (subscript $_{\mathrm{Nper}}$) and hazardous materials (subscript $_{\mathrm{per}}$) shall be defined as follows:

$$\%^{i}_{Riu} = \frac{Q^{i}_{Riu}}{Q^{i}_{TOT}} \; ; \; \%^{i}_{Ric} = \frac{Q^{i}_{Ric}}{Q^{i}_{TOT}} \; ; \; \%^{i}_{Sma-Nper} = \frac{Q^{i}_{Sma-Nper}}{Q^{i}_{TOT}} \; ; \; \%^{i}_{Sma-per} = \frac{Q^{i}_{Sma-per}}{Q^{i}_{TOT}}$$

Finally, it is possible to calculate the coefficient $D\%^{i}_{D.2.2}$:

$$D\%^{i}_{D.2.2} = \%^{i}_{Riu} \cdot coef_{Riu} + \%^{i}_{Ric} \cdot coef_{Ric} + \%^{i}_{Sma-Nper} \cdot coef_{Sma-Nper} + \%^{i}_{Sma-per} \cdot coef_{Sma-per}$$

where $coef_{Riu}$, $coef_{Ric}$, $coef_{Sma-Nper}$, and $coef_{Sma-per}$ are defined in Table 6.

Table 6. Waste management coefficients for non-hazardous and hazardous waste materials according to waste treatments.

Classification of Waste	Waste Management Coefficient Code	Waste Management Coefficient Value
Reused non-hazardous waste materials	$coef_{Riu}$	100%
Recycled non-hazardous waste materials	$coef_{Ric}$	80%
Landfilled hazardous waste materials	$coef_{Sma-per}$	75%
Landfilled non-hazardous waste materials	$coef_{Sma-Nper}$	50%

The final score for criterion D.2.2 of the i-th offer shall be calculated as follows:

$$P^{i}_{D.2.2} = D\%^{i}_{D.2.2} \cdot P_{D.2.2}$$

where:

- $P^{i}_{D.2.2}$ is the score of the i-th offer for criterion D.2.2;
- $P_{D.2.2}$ is the maximum score that sub-criterion D.2.2 can reach;
- $D\%^{i}_{D.2.2}$ is the scoring percentage that multiplies the maximum score available for the criterion, obtaining the i-th offer's score as defined above.

The evaluation of the methodology applied to the case study was performed by analyzing the results of the call for tenders, and the responses of the participants, particularly the winning one, to the optional award criteria regarding environmentally sustainable aspects.

6. Case Study

The case study involved the decontamination and renovation of a brownfield in the Municipality of Inveruno in the Province of Milan, Italy, including an extensive demolition phase of the existing buildings in the industrial site and the subsequent construction of a new school complex for a total amount of EUR 15 M. The project area was classified as a brownfield in the open data set of the Lombardy Region.

6.1. Case Study Selection: Importance of Soil Protection and Brownfield Rehabilitation

Brownfields are defined as polluted and abandoned sites where urban transformation interventions combine remediation and reuse [27,28]. As recalled in Section 2.3, the brownfield phenomenon and the importance of preserving green fields is widely acknowledged in Europe as well as in the Italian context. Despite that, land consumption in Italy maintained a rate of 2 square meters of land irreversibly lost every second in 2019 [28]. The most affected land type is green fields, i.e., areas with agricultural vocation. Green fields are three times more affected by land consumption than urban areas. In 15 out of 20 Italian regions, the consumed land exceeds 5% of the complete regional area. In particular, the highest percentage of consumed land, which is equal to 12,1%, belongs to the Lombardy Region [28]. Consequently, the remediation, reuse, and redesign of brownfields within a circular economy approach could enable the reduction of land consumption by avoiding taking advantage of green fields and helping achieving zero net land consumption by 2050 [30]. In addition, CDW management strategies can be even more effective when

applied to brownfields [27,28]. Furthermore, disused former industrial areas inside urban contexts generate processes of environmental and social degradation, and their renovation can help in contrasting this combined phenomenon, representing, at the same time, an opportunity to redesign dense urban areas and to rethink the distribution of functions and services [37].

The presence of about 1,260 hectares of brownfields in the Province of Milan, corresponding to over twice the area of the Milan historical center [37], justifies the choice of the case study, since brownfield renovation is critical for the Province of Milan. The main goals of the case study application are: to integrate environmental sustainability by recycling demolition materials, and by reducing the use of raw materials and green fields during the construction phase; to integrate social sustainability through the transformation and rehabilitation of a brownfield into a new school complex area that will be open to the municipality.

A previous stage of the research project was discussed in an article by Pellegrini et al. [12], which also reported a brief preliminary description of the case study presented here, which was not yet fully developed. The tender has now been awarded, and this study describes the advantages, limitations, and effectiveness of the proposed method based on the analysis of the case study results.

6.2. Existing Area and Design of the New School in Inveruno

The project area has a total area of 18,229 square meters. There are several existing underground structures, portions of masonry, and a large surface covered by concrete floor. In addition, the area hosts a vegetable oil refinery building, which is 32 m tall with concrete walls and a composite steel-concrete deck (Figure 6). The project includes the decontamination of the brownfield and the selective demolition of the disused industrial buildings and concrete surfaces.

Figure 6. Project area in Inveruno showing the highest of the to-be-demolished existing buildings (on the left) and the existing underground structures (on the right).

Regarding the design of the school complex, this process involved the construction of secondary and primary school buildings and an auditorium. The school buildings have a courtyard shape, and in the courtyards, squares and gardens are located (Figure 7). All of the buildings and the external area surrounding the school facilities can be used separately from students, teachers and school staff and can be used by the citizens of the municipality. This represents a fundamental aspect concerning social sustainability for the transformation and rehabilitation of the brownfield.

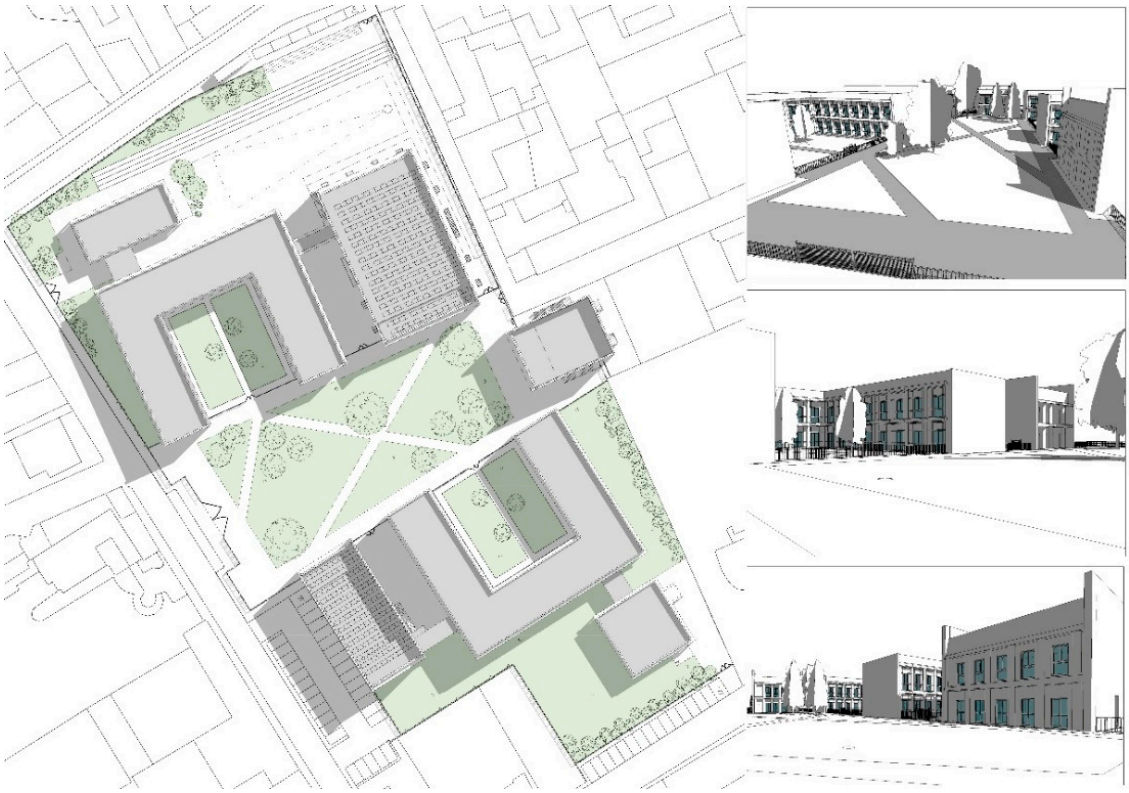


Figure 7. Design configuration of the new school complex in Inveruno, Italy.

7. Results

7.1. Preliminary Design Phase: Waste Management and Selective Demolition Planning within a IMM Approach

During the preliminary design phase, the output of field surveys supported by close-range photogrammetry were image planes of the to-be-demolished facilities (Figure 8). The image planes were used for measuring, material recognition, and for conducting analysis in remote mode.

Figure 8. Image planes of two sides of the abandoned 32-m-high vegetable oil refinery building slated for demolition, obtained via close-range photogrammetry.

All the data and information regarding construction techniques, materials, and related data were gathered and digitized in the digital material inventory, some examples of which are shown in Table 7. The digital material inventory enabled the maximization of the quantity and quality of the recyclable materials by obtaining the fractions of mono-materials that were suitable for reuse or recycling as secondary raw materials.

Table 7. Extract of material inventory data.

EWC Code	Material	Quantity	% of the Total (Weight)	Waste Management Strategy Hypothesis	Distance of the Recycling Plant
17 09 04	Mixed construction and demolition waste, such as concrete and masonry	6716 m^3	45%	Possible reuse on site: Replenishment of underground volumes Formation of embankments Preparation of roadbeds for the path of construction vehicles Draining layer for lamination boxes Possible recycling by crushing on site or in authorized centers	30 km
17 04 05	Iron and steel	746 m^3	51%	Transfer to ferrous materials recycling plant	4 km
17 03 02	Bituminous mixtures	345 m^3	4%	Transfer to authorized disposal facility for non-hazardous waste	20 km

In addition, it supported the definition and adoption of selective demolition strategies (Table 7), by including the following data:

- Types of structures to be demolished;
- Safety measures to be adopted during the demolition activities;
- Material types and their EWC code classification;
- Quantity of materials and related management strategies, i.e., on-site reusing, recycling, or landfilling.

A central aspect that emerged from the field surveys and from the digital material inventory definition was the serious state of abandon of the entire vegetable oil refinery facility. None of the building elements could be dismantled and reused. In addition, the disassembly of the metallic components before the demolition would have been dangerous for the workers. Therefore, the sorting of the metal components was planned for after the demolition of the concrete and brick parts.

In addition to detailed demolition planning, it was possible to quantify the costs associated with the selective demolition activities by linking each activity to the related expected cost of execution. Consequently, it was possible to obtain a reliable prediction of the total costs of the selective demolition phase, which were compared to the costs associated with non-selective demolition procedures. Non-selective demolition procedures consider the demolition of an entire building without any interest in the materials involved and, consequently, does not allow the proper separation of the elements or the fractioning of mono-materials that are suitable for reuse or recycling as secondary raw materials.

For the present case study, selective demolition costs identified with the support of the digital material inventory accounted for EUR 514,381. On the other hand, non-selective demolition costs could be estimated at an amount of about EUR 405,020 by considering a unique parametric cost for the demolition of the total volumes. Consequently, the selective demolition costs represented 127% of the estimated non-selective demolition ones.

7.2. Design Phase: Waste Minimization and Sustainable Resource Use within a BIM Approach

During the design phase, the BIM model allowed the estimation of the quantities of the needed construction materials by means of the quantity take-off. Construction materials quantities were then compared with waste quantities stored in the digital material inventory, and finally, some applicable on-site reuse strategies were selected.

Among the selective demolition strategies proposed in the digital material inventory, the demolition of the concrete external floor surface and of the concrete parts of the vegetable oil refinery provided a considerable amount of concrete as a homogenous portion of waste. For both the great quantity of waste available and the various possible reuse strategies, the concrete waste was selected to be entirely reused on site (Table 8).

Table 8. Reuse activities of total quantity of concrete wastes as secondary raw materials.

Reuse Activity	Amount of Surface or Volume Covered with Reused Materials	Quantity of Reused Material	% of the Total Concrete Wastes
Aggregate for the preparation of roadbeds for the paths of construction vehicles	2300 m^2 of construction site paths	470 m^3	7%
Replenishment of underground volumes in the project area	5843 m^3 of underground volumes	5843 m^3	87%
Aggregate for sidewalks realization and as draining layer for lamination boxes	2727 m^2 of sidewalks and remaining 144 m^3 as draining layer for lamination boxes	403 m^3	6%

7.3. Call for Tenders Phase: Environmental Award Criteria within IMM and BIM Approaches

This sub-section provides the results of the application of the presented DB call for tenders method to the case study analyzing the specific tender documents, followed by the responses and results of the bids, in particular, those of the winning company bid.

In regard to the tender documents, the digital material inventory supported the verification of the feasibility of the selective demolition strategies to be included in the tender documents. In addition, the digital material inventory supported the identification of selective demolition costs that could also be included in the tender documentation as a part of the overall budget for the proposed project.

Furthermore, starting from the digital material inventory and the BIM-based analyses during the design phase, the tender documents included the hypothesis of the on-site reusing of concrete wastes as secondary-raw-material aggregates. Consequently, a pulverizer was proposed as equipment to be used on site to reduce the dimensions of the inert materials and to make them uniform for further use.

Regarding the scoring of the bids in the environmental criteria described in Table 3, the average score of 10 out of 11 bids, excluding the lowest score, was equal to 23.4, corresponding to 87% of the total available score (27/100) in the environmental criteria (Figure 9). In particular, 10 out of 11 construction companies obtained good scores in sub-criterion D.2.2 (Table 3) by providing data and strategies for CDW management. Only one offer obtained a negative result, i.e., zero points in the sub-criterion, due to a lack of specifications and documentation on CDW management strategies.

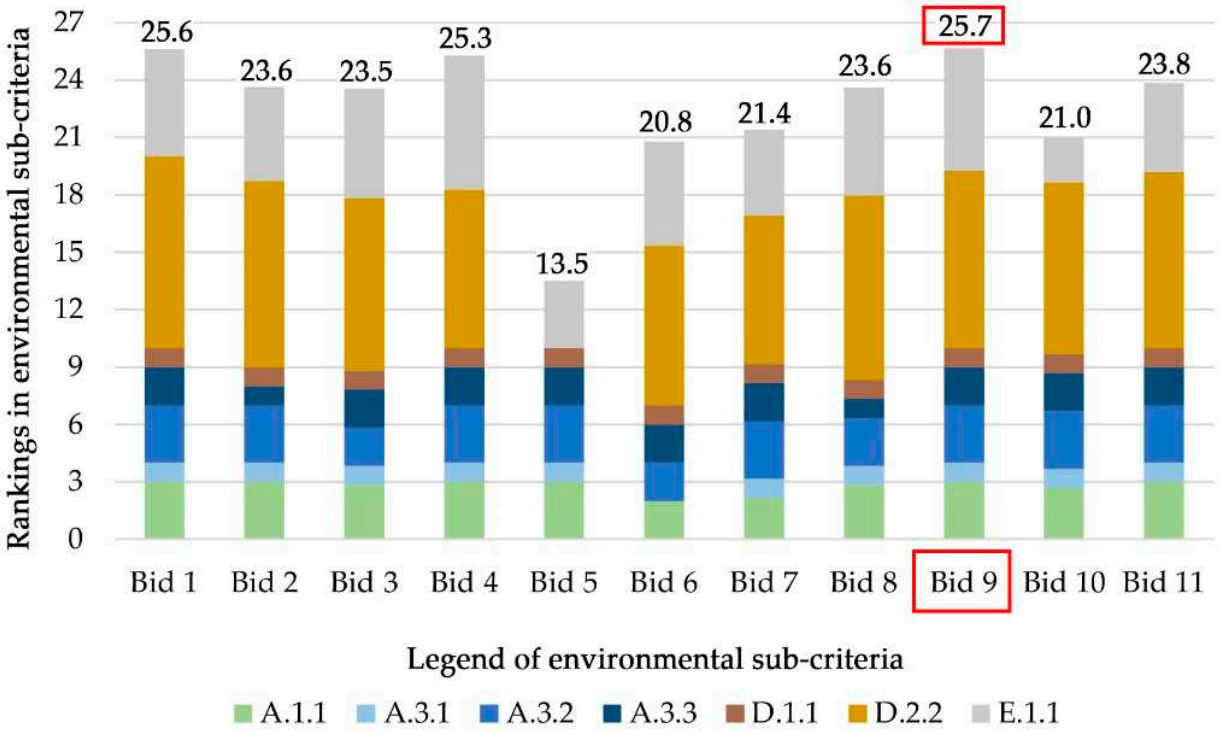


Figure 9. Scores and rankings in environmental award criteria of the eleven bids, including the winning one (Bid 9).

Regarding the winning company (Bid 9, Figure 9), the bid scored a total of 25.7 out of 27 points on the environmental award criteria, which represented 26% of the total 100 points and 32% of the 80 points of the technical offer. Based on the waste audit and digital material inventory and on the suggestions from the tender documents regarding selective demolition as described above, the company proposed an entire plan and site layout for the demolition phase. The plan included:

- Selective demolition activities;
- Specific work areas inside the demolition site layout;
- Construction vehicles and equipment specific for different areas and activities.

In addition, the plan included safety requirements and indications for the demolition phase, e.g. areas of the site precluded to worker access near the areas where the total demolition of concrete structures would be performed with excavators equipped with demolition grabs. Furthermore, the company linked the analysis of the demolition phase and activities with information regarding the materials provided in the digital material inventory. Consequently, they could identify all waste quantities (Figure 10) and could select the specific authorized plants needed for recycling and landfilling, starting from the authorized plants suggested in the tender documentation. Figure 10 shows the types of materials and the related percentage of reused, recycled, and landfilled waste, aiming to minimize the landfilled waste.

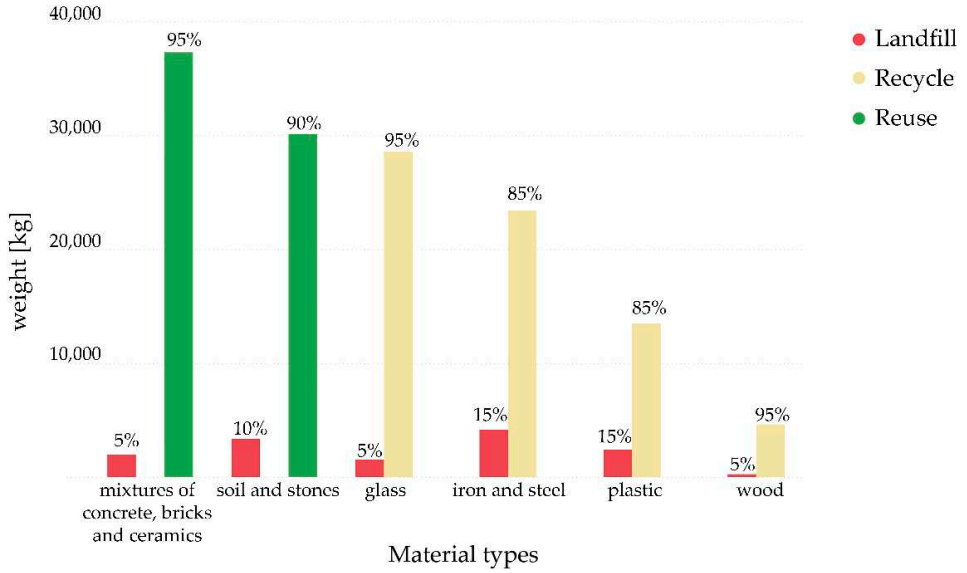
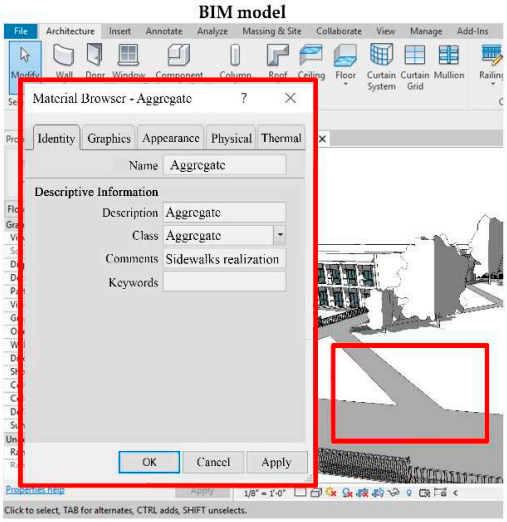


Figure 10. Reused, recycled, and landfilled waste proposed by winning company and divided by material type.

Starting from the BIM-based suggestions for the on-site reuse strategies included in the tender documents, the winning company proposed to reuse most of the concrete, bricks, and ceramic demolition waste materials (EWC code equal to 170904) as secondary raw materials for the realization of the construction site roadbeds, as aggregate to realize sidewalks, and for the replenishment of underground volumes (Figure 11). The quantities of materials extracted from the BIM model of the designed buildings were compared to the quantities of waste materials recorded in the digital material inventory. Consequently, it was possible to define which quantities of the construction materials could be replaced with reused or recycled materials from the demolition of the existing facilities. In addition, in regard to soil and stones, the company planned for the majority of these materials to be reused on site for external works.



BIM model

Material description	Volume
Aggregate	259
Replenishment of underground volumes	5,843
Total	6,102 m³

Digital material inventory

EWC code	Material	Quantity	% of the total (weight)	Waste management strategy hypothesis	Distance of recycling plants
17 09 04	Mixed wastes (concrete and masonry)	6,716 m³	45%	Possible reuse on site: - Replenishment of underground volumes - Formation of embankments - Preparation of roadbeds for the path of construction vehicles - Possible recycling by crushing on site or in authorized centers - Draining layer for lamination boxes	30 km

Figure 11. Comparison of design material quantities from the BIM model of the designed buildings, the selective demolition waste quantities from the digital material inventory, and the selection of reuse strategies.

Regarding the new school complex construction phase, the winning company used the BIM model in order to define and manage all quantities of waste and recyclable materials from the project. Figure 12 shows the total percentages of reused, recycled, and landfilled waste materials, accounting for around 45%, 46%, and 9% respectively. Consequently, over 90% of the waste was planned to be recycled and reused, minimizing the total quantity of landfilled waste accordingly.

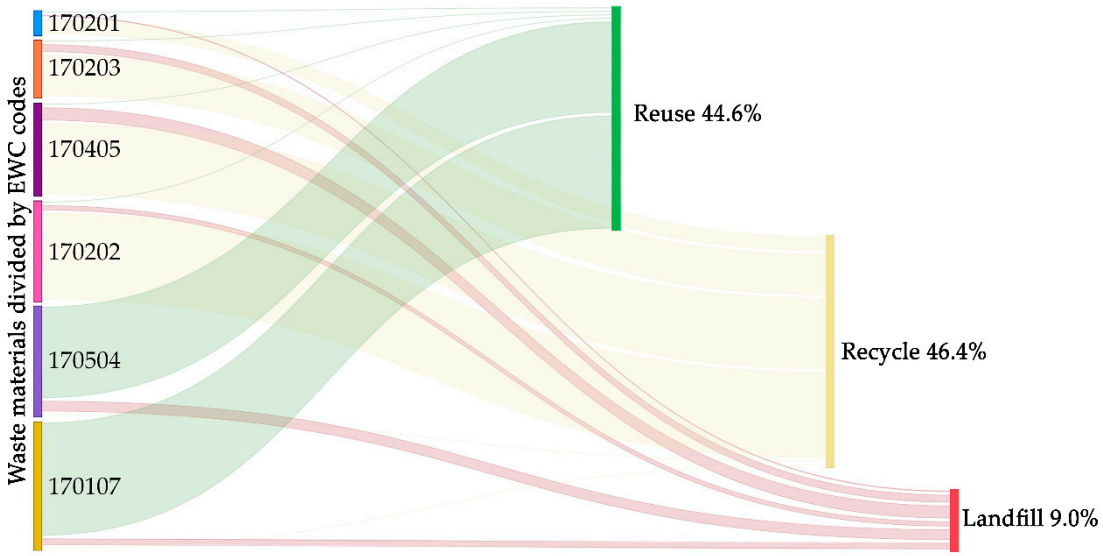


Figure 12. Total percentages of reused, recycled, and landfilled waste.

8. Discussion

This section discusses the results of the application to the case study using IMM approaches during the design and call for tenders phases, which was presented in the previous section.

Regarding the preliminary design phase, the application of the proposed methodology allowed the definition of a precise and complete waste audit and digital material inventory, which supported the planning and optimization of the selective demolition phase. Close-range photogrammetry for field surveys was the easiest and safest survey technique considering the abandoned status and the height of existing facilities [52], allowing for a limited number of on-site surveys and adding the possibility of in-depth analysis in remote mode.

Figure 13 compares CDW management and demolition phase planning in a traditional process and considering the proposed methodology. The use of a digital database as a material inventory promoted always available and up-to-date data that were organized and structured in a machine-readable form, thus ensuring data readiness and processability and agile data management [80,81]. The case study confirmed that the definition of a waste audit allowed to [5]:

- Support the definition of reuse and recycling practices and the higher quality and easier traceability of waste through the proper identification and separation of materials;
- Plan selective demolition activities with their associated costs of execution;
- Ensure an unbiased competition amongst the participants in the call for tenders that could depend on reliable information regarding existing site and building conditions and demolition costs, allowing them to propose appropriate construction site plans.

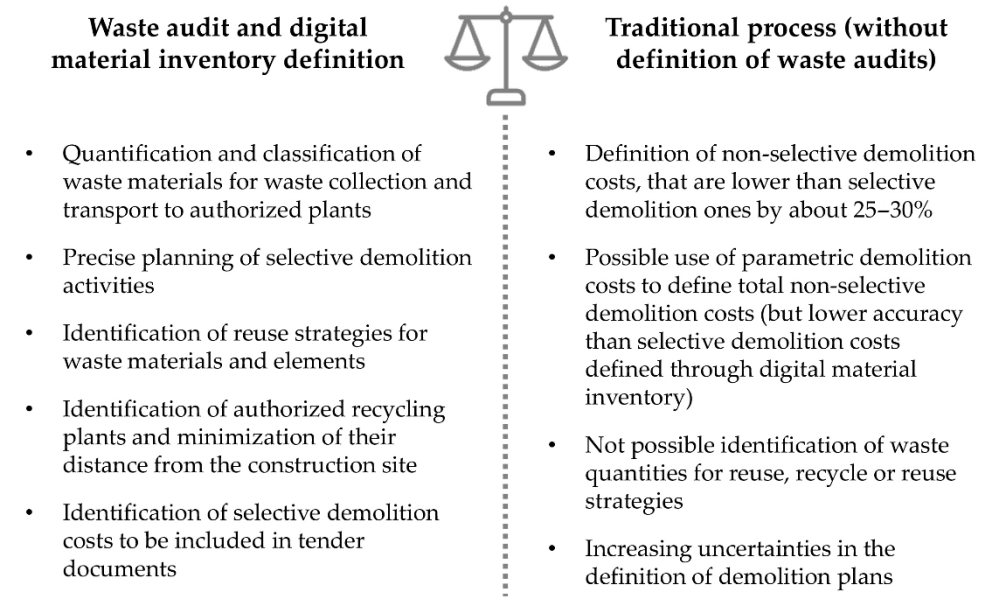


Figure 13. Comparison between the proposed methodology with waste audit and digital material inventory definition, and a traditional process.

The selective demolition costs represented 127% of the estimated non-selective demolition ones, clearly highlighting the importance of applying proper waste audits and selective demolition planning. As a matter of fact, if lower non-selective demolition costs had been considered during the call for tenders phase, the actual increased selective demolition costs would have only been identified during the actual demolition phase. This would have caused the necessity of increasing the project budget or could have resulted in disputes between the Public Client and the company, causing time delays or increased costs. Therefore, the correct identification of selective demolition costs is paramount to ensure the proper development of the tender and construction phases.

Considering the design phase, the creation and use of a BIM model of the designed buildings allowed the reduction of construction waste and the promotion of waste minimization during design reviews and clash detections between design disciplines, designers, and specialists [39,42]. In addition, the possibility of defining on-site reuse strategies, in particular by using concrete wastes as secondary raw materials, resulted in savings for the purchase of a considerable amount of new raw materials, with positive results both regarding the project budget and the environmental aspects, fostering local circular economy practices, and demonstrating the concept of waste as a resource [23,24].

Concerning the call for tenders, the proposed methodology enabled to:

- Support of the Public Client in including sustainability criteria for the evaluation and scoring of the bids and in analyzing the environmental impact of the bids, while acquiring the necessary competences for proper GPP implementation [11];
- Promotion of the integration of CDW management and minimization, sustainable resource use, and selective demolition procedures among the participants.

The high scores of 10 out of 11 bids in the environmentally sustainable award criteria included in the call for tenders demonstrated that:

- All of the bids and the participants recognized the importance of the optional award criteria and decided to gain competences and know-how on the topic;
- The well-defined award criteria supported by the digital material inventory and by the BIM-based design data led the participants to more easily apply and integrate sustainable practices in their procedures.

Regarding the actual winning bid (Figure 14), the environmental factors represented a fundamental part of the offer since numerous points had been assigned to the company on

the environmentally sustainable award criteria, i.e., 25.7/100 total points and the 95% of the total available points regarding the above-mentioned award criteria. In particular, the detailed tender documents supported the selective demolition planning as a critical part of the project by assigning numerous points to correct demolition planning and proper CAM application. In addition, the precise identification of waste materials quantity and information in the waste audit supported the maximization of the quantities of recycled and reused waste materials and the proper selection of reuse strategies by the company. Furthermore, the company was able to select authorized recycling and landfilling plants, minimizing the distance from the construction site to reduce emissions.

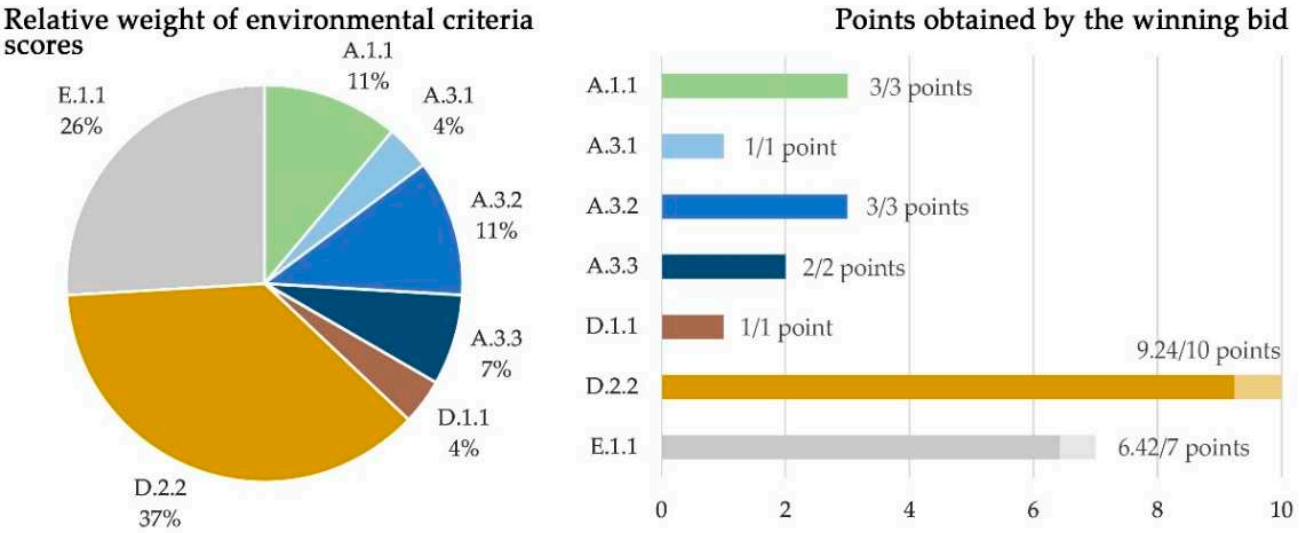


Figure 14. Graph of relative weight of environmental sub-criteria and graph of the scores obtained by the winning bid.

The Design Build (DB) procurement model allowed the contractor to manage the process flow and information right from the final design stage [84], enabling the optimization of CDW management and selective demolition plans, and the decrease of CDW production, which in a traditional tender process would have been linked to design incompleteness or reworking [42–44]. In addition, the contractor's involvement in the final design phase avoided the increased risk of waste generation that typically occurs in the construction phase of a traditional construction process [45].

9. Conclusions

The construction sector produces over 30% of the total amount of waste by volume in the European Union, being one of the most polluting industrial sectors. In addition, since 2004, the amount of construction waste has increased of about 20%, while other industrialized sectors have reduced the waste generation of over 20% [4]. Consequently, the adoption of Construction and Demolition Waste (CDW) management and minimization strategies is paramount. The correct definition of selective demolition plans and strategies is also a fundamental step for proper CDW management when considering projects that involve extensive demolitions.

A review of the regulatory framework at the international, European, and national levels highlighted that environmentally sustainable processes, waste minimization and management, and the implementation of Green Public Procurement (GPP) are needed and are promoted by the United Nations, the European Union, and national governments.

The main drivers for the integration of environmentally sustainable strategies in the construction industry and to overcome the barriers are the following:

- Promoting sustainable strategies by regulations and by Public Clients through design requirements and call for tenders criteria;

- Integrating sustainable strategies into company business models and procedures as a way to maintain and increase their competitiveness;
- Introducing Information Modelling and Management (IMM) methodologies to support the implementation of sustainable strategies.

The literature review on the integration of IMM and BIM methodologies and waste management highlighted that existing studies have mostly investigated these aspects from the designer and constructor's points of view. Few studies have analyzed the integration of BIM and GPP in construction procurement to evaluate the environmental impact of the bids. However, a comprehensive application of IMM methods and GPP from the Public Client's point of view aiming to evaluate and reduce the building environmental impact during the design and call for tenders phases, represents a gap in the literature.

The research proposes a methodology for the preliminary design phase through the definition of a digital material inventory as a fundamental part of waste audits for selective demolition planning and CDW management by adopting close-range photogrammetry to safely perform field surveys of to-be-demolished abandoned buildings. During the design phase, a BIM model is created for the designed buildings to support CDW management and on-site reuse strategies selection. Regarding the call for tenders phase, the methodology involved the definition of environmental award criteria in a MEAT framework, enabling the introduction of GPP and CDW management in the tender process.

The methodology was tested on the case study of a brownfield renovation that included extensive demolitions and the construction of a new school complex in the Province of Milan.

The IMM approach, i.e. the digital material inventory for the preliminary design phase, and the BIM model for the design and tender activities, permitted to maintain consistency during the entire process. The selective demolition costs calculated through the digital material inventory and the demolition plans represented 127% of the estimated non-selective demolition ones. The correct identification of the demolition costs represents a fundamental aspect that ensures that the whole procedure, involving the tendering, project assignment, and the subsequent demolition and new construction phases, can be conducted without resulting in disputes, delays, and budget increases.

The demand of the call for tenders was highly focused and accurate, hence ensuring that the offers met the requirements and complied with environmental strategies, including improvements and considerations about on-site reuse strategies, CDW management, and selective demolition plans. In general, the combined use of IMM approaches for the selective demolition phase and demolition waste management, and of the BIM methods for the designed buildings, ensured effective CDW management and the precise identification of reuse and recycling strategies. The demand guided and pushed the application of sustainable practices by the construction companies that recognized the importance and value of introducing sustainable strategies in their own business models. In addition, the method allowed the Public Client to assess the environmental impact of the bids. Furthermore, the Design Build (DB) procurement model enabled an increased collaboration between the Client and the constructor and a less fragmented and more efficient information flow. Consequently, it allowed for the better implementation of CDW management and minimization strategies by almost all of the participants. Furthermore, the precise CDW management during the design, tender, and construction phases will support CDW management during the operational phase of the building, promoting proper reusing and recycling strategy application during the whole building lifecycle.

The research highlighted the critical role of the Public Client as the actor that can trigger a change in the construction sector by implementing GPP and applying best practices during all the phases, supporting a sustainable construction process. In addition, the study demonstrated the positive effects and results of the model application for brownfield recovery.

The proposed methodology was previously tested with positive results in another case study of the new primary school in Melzo, also using the DB procurement model,

but with a simpler design and without almost any demolition [12]. The positive results of the presented case study demonstrate the replicability of the methodology since this case study was a brownfield renovation, with a more complex design, an increased size of the new buildings, and included extensive demolitions, resulting in more complex CDW management, selective demolition planning and sustainable resource use.

10. Further Developments

Further developments of this research will include the use of distributed ledger technology; in particular, the implementation of Smart Contracts based on blockchain technology can be proposed. Thanks to its main features, the use of a distributed ledger can improve information management, and the execution of a Smart Contract can guarantee the immutable and reliable recording of all of the information. The potential integration of a blockchain and IMM methodology can boost the information production, validation, monitoring, and management, offering a transparent, permanent, and shared archiving of the information on a distributed ledger.

For this research case, the proposal of this innovative system permits the proper traceability of all the information related to the materials and the waste cycles pursued in the process. Consequently, this application enables better communication and collaboration among the participants acting in each phase of the construction process, from the planning to the disassembly of the building. The use of a distributed ledger and Smart Contracts in the management of the information related to waste production and management enables the recording and tracking of all the of the relevant data, assuring their access at any time in a reliable way. This means that an IMM based on a blockchain can be considered as a trusty base for the decision-making process, allowing the proper planning and management of construction waste and the environmental impact of the entire process. Based on real and reliable information, more sustainable decision and planning can be conducted in the entire construction industry.

As stated before, despite the fact that some environmental sustainability protocols are mandatory (i.e. CAM in Italy) and that others often provide additional scores in MEAT approaches (e.g. LEED—Leadership in Energy and Environmental Design, ITACA, etc.), an objective and reliable assessment of their compliance is still struggling to be obtained. This is mainly due to the intrinsic complexity and the lack of adequate assessing digital tools. Thus, another development of the outlined IMM approach will concern the introduction of automated sustainability criteria evaluation methods through the integrated simulation of Information Models and automated score attribution systems. This could provide the dual objective of increasing GPP adoption and enhancing digitalization in the tender evaluation processes as required by European Directives. The achievable goals consist of the shortening of the tendering phase, cost reduction as well as avoidance of controversies and corruption. In addition, this will ensure the objective and trustworthy evaluation of sustainability criteria compliance based on the actual use of the building rather than on rough saving assessments. On the contrary, bids will be evaluated through well-defined, clear, and machine-readable criteria in order to digitalize and automate the evaluation process.

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Glossary

AECO: Architecture, Engineering, Construction, and Operations industry. BIM: Building Information Modelling. A BIM method refers to digital techniques used for the modelling and management of information for a built asset and specifically refers to the creation of a digital model of a building. CDW: Construction and Demolition Waste. DB: Design Build. The DB procurement model merges the actors responsible for final design and the construction into a single operator. The Client dialogues with a unique actor, increasing the efficiency of information transfer [84]. EWC: European Waste Code. GPP: Green Public Procurement. GPP aims to purchase goods with good value for money during the whole product lifecycle while supporting environmental protection and reducing negative environmental impacts [14]. IMM: Information Modelling and Management. The IMM approach refers to digital techniques to create and manage information throughout an entire process, allowing for optimized management, organization, querying, computing, and analyzing capabilities. LEED: Leadership in Energy and Environmental Design. LEED is a green building rating system that is used worldwide. It provides a framework for healthy, highly efficient, and cost-saving green and sustainable buildings [89]. MEAT: Most Economically Advantageous Tender. The MEAT is assessed by organizations on the basis of the best price quality ratio, aiming to achieve value for money on a building lifecycle basis. Contracts are awarded based on both quality and price by defining award criteria linked to the subject matter of the contract [18].

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sustainability

MDPI

Article

Limits of the Environmental Impact Assessment (EIA) in Malaysia: Dam Politics, Rent-Seeking, and Conflict

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Abstract: Environmental Impact Assessment (EIA) is often portrayed as a policy measure that can mitigate the environmental influence of corporate and government projects through objective, systematic, and value-free assessment. Simultaneously, however, research has also shown that the larger political context in which the EIA is embedded is crucial in determining its influence on decision-making. Moreover, particularly in the case of mega-projects, vested economic interests, rent-seeking, and politics may provide them with a momentum in which the EIA risks becoming a mere formality. To substantiate this point, the article examines the EIA of what is reportedly Asia's largest dam outside China: the Bakun Hydro-electric Project (BHP) in Malaysia. The study is based on mixed methods, particularly, qualitative research (semi-structured interviews, participatory observation, and archival study) coupled to a survey conducted in 10 resource-poor, indigenous communities in the resettlement area. It is found that close to 90% of the respondents are dissatisfied with their participation in the EIA, while another 80% stated that the authorities had conducted the EIA without complying to the procedures. The findings do not only shed light on the manner in which the EIA was used to legitimize a project that should ultimately have been halted, but are also testimony to the way that the BHP has disenfranchised the rights of indigenous people to meaningfully participate in the EIA.

Keywords: environmental and social impact assessment; dam and mega-projects; forced displacement and resettlement; land eviction and expropriation; Borneo and Orang Ulu; first nations and ethnic minorities

1. Introduction

Incorporating the Environmental Impact Assessment (EIA) into existing planning and decision-making processes is generally put forward as a means to identify potentially adverse effects of proposed (mega-) projects. The EIA can provide the information for more grounded decisions on how to proceed, and ensure the project's environmental sustainability, economic viability, and social acceptability [1–4]. At the same time, however, research has ascertained a divergence between what is aimed for by the EIA and what is practiced and enforced [5].

Various studies have shown that the EIA can become a political tool whereby the decision to approve projects is outweighed by other reasons than technical or environmental considerations [6]. In this context, the EIA may merely serve to legitimatize decisions which, in fact, have already been taken [7,8]. In effect, the EIA exists as a symbolic token decoupled from realities on the ground, and with limited influence on the decision-making to approve, alter, or even reject projects [9–12].

This article acknowledges that improvement on certain shortcomings of the EIA could be achieved through procedural, methodological, and technical ways [13–16]. At the same time, however, it also

moots that a decisive factor in the success or failure of EIA is constituted by the larger socio-political context in which it takes place. In fact, the politics and rent-seeking over EIA, by which public policies and/or economic conditions are manipulated as strategies to raise profits or personal gains, are prime factors that need reflection prior to considering its execution. Put differently, when the environment in which the EIA is embedded cannot safeguard its independence, it will be extremely difficult to conduct in an impartial manner. It needs emphasis that this presupposes that the EIA practitioner is not part and parcel of the politics and rent-seeking itself, which may not be necessarily the case [17]. To substantiate the argument, this article presents the case of the EIA of a dam, which at 205 m high, is reportedly Asia's second largest dam: the Bakun Hydro-electric Project (BHP) in Malaysia.

The bulk of the research on the BHP has focused on its impact on energy supply [18,19], its policies on compensation [20], and its social sustainability [21]. With regard to the latter, Andre's in-depth study [22] duly noted that social sustainability for mega-projects, such as the BHP, need to move beyond formal lists of social indicators. Instead, these should be assessed through evolutionary, qualitative, and hermeneutic approaches that enable the identification of social issues of concern. To date, however, few studies have specifically examined the EIA of the BHP, which is a lost opportunity, as the EIA was the main tool through which the Malaysian government tried to legitimize it.

The study by Memon [23] is one of the few exceptions that squarely looks into the EIA of the BHP. Although done with great care and depth, his study was carried out well over a decade before the dam went into operation. In this context, there is a need to follow-up and update Memon's seminal study, which we aim to do in various ways: (1) by complementing an ex ante analysis of the EIA, with an ex post analysis conducted after the dam went into operation; (2) by not only shedding light on the way that the EIA was conducted, but also how it was experienced by the affected population—the indigenous Orang Ulu; (3) by not only achieving this in a qualitative way (through interviews, participatory observation, and archival study) as done by Memon, but also in a quantitative way (through a survey conducted in 10 rural communities in the resettlement area).

In this respect and to our best knowledge, the article is one of the first studies of this nature on the Bakun Dam. In addition, through the comprehensive, mixed methodology adopted here, this case might also enhance our general understanding of the dynamics and politics of the EIA around dams and other large infrastructural projects. The article is structured around a dual research question: (1) How and to which extent did politics and rent-seeking around the EIA influence project implementation? (2) How did these politics and rent-seeking, in turn, influence the views and experiences of the affected population with regard to the EIA?

Apart from the introduction, this article is divided into four main sections. In the second section, we will provide an in-depth description of: (1) the BHP's basic features; (2) the history of the EIA in Malaysia; (3) the vested economic interests that propelled the initiation of the BHP, and; (4) the politics and rent-seeking that surrounded this mega-project's EIA. In the third section, we will introduce the methodology, features of the survey sample and interviews, and describe the research sites in terms of their socio-economic, geographical, and demographic conditions. This is followed by the results section, where we analyze the survey data and qualitative fieldwork in terms of respondents' views on the EIA, with particular reference to public participation, satisfaction, conflict management, and trust. In the fourth and concluding section, we discuss the empirical and theoretical implications of the case for the practice of EIA.

2. EIA of the Bakun Dam: Controversy, Conflict, and Colluding Interests

2.1. Project Features

The BHP is situated in Sarawak State, also known as "Land of the Hornbills," the biggest state within the Malaysian federation of a total of 13 states (see Figure 1). The Malaysian government initially approved the construction of the BHP in 1986, which was Asia's first dam project of this size and level of electricity-generation capacity. At full capacity, the BHP can generate 2400 mW,

while its artificially formed reservoir is the largest lake in Malaysia with a surface area of approximately 70,000 ha (roughly equal to the size of Singapore) and a storage volume of 43.8 billion m^3.

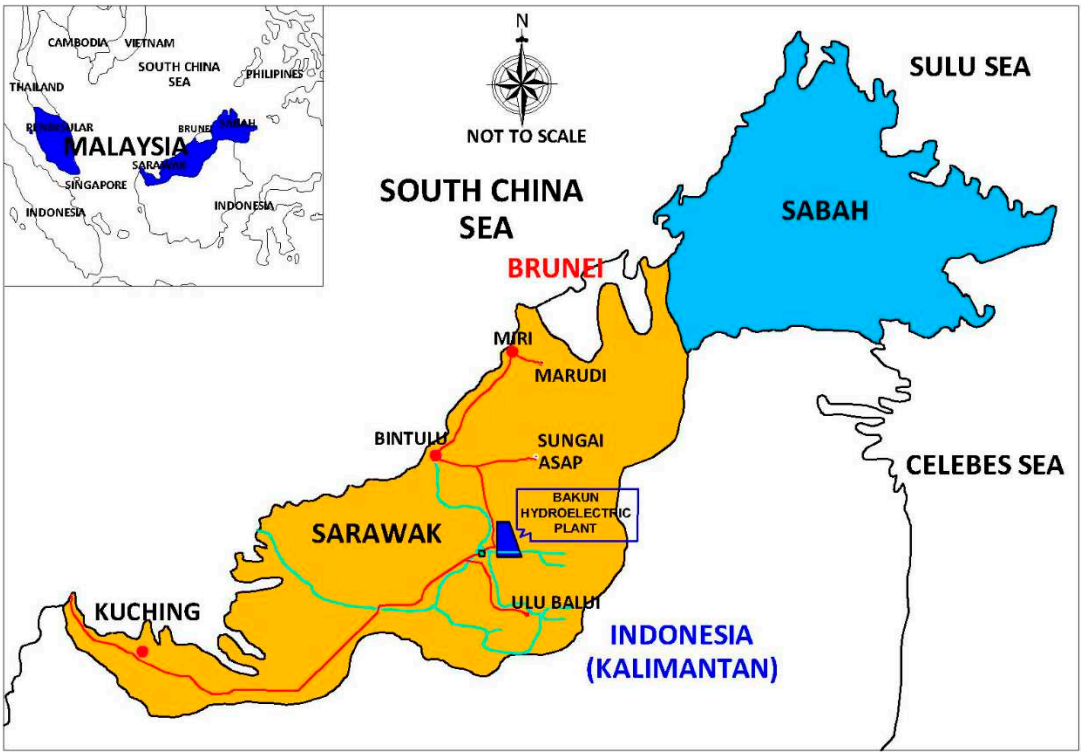

Figure 1. Location of the Bakun Hydro-electric Project. Source: Drawn by Nor-Hisham.

The dam has had a major environmental and social impact. First, it necessitated clear-cutting of around 700 km^2 of virgin tropical rainforest with the consequent loss of rare and endangered plant and animal species [24–26]. Moreover, it has caused the forced displacement and marginalization of an estimated 10,000 people, mostly indigenous Orang Ulu. This has raised serious concerns over social sustainability [17,21]. The Orang Ulu originally inhabited the lands along the Balui River in the Belaga District, but have now been resettled at the Resettlement Scheme of Sungai Asap (hereafter: RSSA). The Orang Ulu are considered a socially vulnerable and economically disadvantaged group in Malaysia. They are mainly engaged in agriculture and the exploitation of forest-based resources including hunting and gathering, small-scale trade and retail, and traditional fishery.

From an economic perspective, the BHP has also proven problematic, more specifically with regard to the economics of energy supply [17,18]. Initially, the government of Sarawak state planned that 90% of the generated electricity would be sent via undersea cables to peninsular Malaysia, as well as neighbouring Brunei, Indonesia, and the Philippines. However, this initiative was aborted due to concerns over costs and feasibility. Today, Sarawak state is still looking for ways to sell its surplus electricity and is operating the dam below its capacity [27].

In March 2012, shortly after the federal government began a corruption investigation into the BHP, the transnational mining corporation Rio Tinto cancelled a plan for the construction of a US$2 billion aluminium smelter that would have used electricity from the BHP. Since the dam went into operation in 2011, a quarter of a century after it was approved, the total costs of the project had ballooned to RM 7.3. billion (as compared to the originally estimated costs of RM 2 billion).

2.2. History of EIA in Malaysia

Prior to 1970, the Malaysian economy was predominantly agricultural-based. There were virtually no environmental concerns due to a strong focus on economic development. Moreover,

environmentalism was minimal, if not absent [28,29]. The agenda for development in Malaysia could be argued to have started through the introduction of the New Economic Policy (NEP) in 1970. During the implementation of the NEP, many large-scale development activities were carried out. Inevitably, while this effort brought about positive economic effects, it imposed pressure on environmental quality and human well-being. As asserted by Aiken [28] the rapid exploitation of natural resources and the expansion of resource-based industries resulted in environmental problems.

Parallel and contradictory to this development, Malaysia attempted to align itself closer to global environmental policies, and more particularly, the principles of the Stockholm Conference on the Human Environment held in 1972 [30]. This was also due to the successful lobbying of Malaysian Non-Governmental Organizations (NGOs), such as the Consumers' Association of Penang (CAP) and the Malaysian Nature Society (MNS). These cumulative factors led to the adoption of the 1974 Environmental Quality Act [31,32].

The need for an EIA in Malaysia was not felt until several natural disasters occurred, more specifically, the flood in Kuala Lumpur in 1970 and in Bota Perak in 1976, respectively. The Department of Environment (DOE) of Malaysia was asked by the World Bank to assess environmental impacts, as flooding had become a major concern [33]. The World Bank visited Malaysia in 1975 and consequently drafted a report recommending the design and formulation of EIA as policy for any major development project [33,34].

EIA has only legally been implemented in Malaysia since 1988. Prior to this, it was in operation since 1979, but without statutory provision. In the Fourth Malaysia Plan (1981–1985), the emphasis on EIA was reinforced through three-pronged strategies: pollution control, comprehensive land use planning and integrated project planning [35]. This further strengthened the role of EIA in Malaysia. During the administration of Prime Minister Mahathir, the industrialisation and urbanisation intensified. This era was marked by economic liberalisation and privatisation causing rapid expansion of the business sector.

Taking cognizance of the fact that prevention measures had failed to address the environmental problems, the Malaysian government introduced EIA through an amendment of the Environmental Quality Act in 1985 (the inclusion of "Section 34A"). The introduction of EIA has—at least in principle—brought about a new approach in environmental planning, where anyone intending to carry out a certain "prescribed activity" has to undertake a study of the environmental impacts before approval can be granted. A major litmus test of the robustness of the EIA was presented the following year when the Malaysian government formally approved the construction of the BHP.

2.3. Collusion of Interests: A Line of Events

Mohamad Mahathir, former Prime Minister of Malaysia, was a staunch proponent of the BHP. He opined that the BHP was crucial for a reliable electricity supply for the nation's industrialisation and urbanisation. Furthermore, he argued that the socio-economic position of indigenous peoples, such as the Orang Ulu, could be improved through the resettlement scheme. In his view, the project was a catalyst for development. Within Sarawak state, the BHP was fervently championed by its Chief Minister, Taib Mahmud, who maintained:

> *Bakun is a huge gift from the federal government—proof of the lie of the outdated idea that the Federal Government wants to rob us of our resources and colonise us. With Bakun, Sarawak will be the powerhouse of Malaysia* [24].

Under the banners of "public interest" and development, both Mahathir and Taib criticized those who opposed the project as foreign agents, unpatriotic, or anti-modernist [36]. However, politicians' interest in the BHP was not entirely out of public or national concerns. There was a tight collusion between political leaders and the corporate sector. A poignant example is the manner in which the project was granted to the main contractor. In 1994 the concession was awarded—without open tender—to Ekran Berhad, a company engaged in timber and property development, yet,

inexperienced in dam construction. The company's owner, Ting Pek Khiing, was widely known to have close personal connections to Mahathir, the federal Minister of Finance, and the Chief Minister of Sarawak State [24,37,38].

Ekran Berhad enjoyed substantial benefits from the BHP construction, including an estimated 4 billion tonnes of timber valued at RM one billion. In addition, the company was awarded 11,578 acres of plantation in the resettlement area. Lastly, it won a contract with a value of RM 300 million to construct the 165 km Bakun-Bintulu road connecting the BHP and the resettlement area (Figure 2).

Figure 2. Bakun-Bintulu road (connecting the Bakun Hydro-electric Project (BHP) and Resettlement Scheme of Sungai Asap (RSSA)). The road is often busy with logging trucks. Source: Photograph by Nor-Hisham.

Yet, in 1997 a dispute erupted between Ekran Berhad and the Swiss-Swedish engineering contractor, Asia Brown Boveri Limited (ABB). The latter objected to a RM 9 billion contract being awarded without open tender to four companies under Ting Pek Khiing's control [37,38]. In the wake of the 1997 Asian Economic Crisis, the federal government deferred further construction and Ekran Berhad withdrew from the project two years later. For this, it was compensated at RM one billion [24,37,39] (In 2010, Ting Pek Khiing was declared bankrupt by the Kuala Lumpur High Court because he defaulted on a loan amounting to RM 60.79 million that he had borrowed from the Bank of Commence 6 years earlier [40]).

The BHP was also strongly supported by other corporations. For one, there is the sole and largest cement producer in Sarawak: the Cahaya Mata Sarawak Berhad (CMSB). Onn Mahmud, the brother of Sarawak's Chief Minister, Taib Mahmud, is generally assumed to direct the operations of CMSB [37,41]. Moreover, Taib Mahmud's two sons, Sulaiman and Mahmud, had considerable interests in Pacific Chemicals, the company that was granted logging operations in the BHP project area [24]. In 2002, the entire operation over the BHP was taken over by a joint venture between Sime JV and Sinohydro of China: the Malaysia–China Hydro Joint Venture (MCHJV). Sime JV is a subsidiary of Sime Darby (a Malaysian flag conglomerate, with business roots in plantations), a so-called 'Government Linked Company' of which chairman and board of directors are traditionally appointed from former political leaders of Malaysia's major political party, the United Malays National Organization (UMNO) or other parties from the National Front, the coalition of which UMNO is a part. The chairman of Sime Darby is without exception appointed from previous UMNO leaders who have retired or failed to win general elections. For example, the previous Sime Darby Chairman was Musa Hitam (2007–2012), a former Deputy Prime Minister and ex-UMNO Deputy President. He was followed by Abdul-Ghani Othman (2013–2008), the former Chief Minister of Johore.

Sinohydro, Sime JV's counterpart, is a Chinese state-owned hydroelectric and construction corporation founded in 1950. In the wake of China's Belt and Road Initiative, the corporation has entered the global market, and is now active across Asia, Africa, the Americas, and Europe. Its current portfolio includes the construction of the Rio Blanco Dam in Honduras, the Hambantota Port in Sri Lanka, the Hamad Port in Qatar, and the Kochav-Hayarden Hydro-Electric Station in Israel. Under the new joint venture, Sime JV obtained 70% and Sinohydro 30% of the shares. Having described the network of interests that is tied to the BHP, we will proceed to examine the procedures, rhetoric, and actual practice of the BHP's EIA below.

2.4. The EIA between Rhetoric and Reality

The BHP was legally subject to federal EIA requirements as it involved at least one or more of the following, so-called "prescribed activities": (i) the conversion of hill forest land to other land use covering an area of 50 ha or more; (ii) logging activities which cover an area of 500 ha or more; (iii) dam and hydroelectric power scheme projects with dams over 15 m high; and, (iv) ancillary structure installations covering a total area in excess of 40 ha and/or reservoirs with a surface area in excess of 400 ha. As such, Malaysia's Environmental Quality act (Order 1987) ordains that:

> *Any person intending to carry out any of these prescribed activities shall appoint a qualified person to conduct an environmental impact assessment and to submit a report thereof to the Director-General (DG)* (Section 34A (2), [42]).

In April 1994, Ekran Berhad designated the Centre for Technology Transfer and Consultancy at UNIMAS, a local Sarawakian university, as the main consultant for the BHP's EIA. Its CEO, Ting Pek Khiing, claimed that the EIA would be completed by June 1994. This tight timeframe raised questions of whether it would be rushed to completion [43]. One month later, the socio-economic impact study was carried out separately by the Sarawak State Planning Unit, a unit under the Sarawak Chief Minister's Department, causing concerns over the study's independency.

While the EIA was still being conducted, Ekran Berhad had already carried out preliminary construction work, and by September 1994, an earth-breaking ceremony for the BHP was officiated by its greatest proponent, Prime Minister Mahathir [24]. Markedly, the ceremony took place before the project had received Cabinet approval, and even before the EIA itself had been approved. Other groundwork followed, including land clearance, construction of the access road, and river diversion. Only by March 1995, the first EIA report (for the reservoir) obtained approval, a mere six months after submission [24]. The decision on this part of the EIA had been reached without public review and without the full EIA report being completed, despite clear legal requirements [44,45]. The three remaining parts of the EIA were then still pending.

On 20 April 1995, three indigenous representatives from the longhouses (large rural communal dwellings) of Long Bulan, Uma Daro, and Bato Kalo (now all inundated by the reservoir) filed an originating summons at the High Court in Kuala Lumpur. They claimed that the 1974 federal Environmental Quality Act had been violated, and asked to be given the right to make representation as provided for under the law [46]. However, the case did not materialize, as the project was by then delayed due to the Asian Economic Crisis and the fact that Ekran Berhad had pulled out.

According to federal regulations, the EIA process requires public participation at two distinct time points:

- The stage of conducting the EIA and the preparation of its report, when the project proponent ought to consult affected people via: (a) citizens' committees; (b) public meetings and workshops; and, (c) soliciting public opinion [47];
- The review of the report and its approval. At this point, the EIA report compiled by the project proponent must be displayed for public inspection including by the affected people [47].

In reality, however, the affected population and civic groups who demanded access to information received no response from authorities. For example, in February 1994, a coalition of NGOs and the

Democratic Action Party (DAP) urged the government to be more transparent in releasing information on the BHP. Yet, when a public forum was planned in Kuching, which was to be attended by the Finance Minister of Sarawak State, the Chair of the Bakun Development Committee, representatives of the Orang Ulu Communities and civic organizations, the event was cancelled two days before [48].

As controversy over the BHP was mounting, Prime Minister Mahathir criticised interest groups and NGOs, and maintained:

> *Some parties, like NGOs, oppose the EIA report merely because they want to reject it without listening to clarifications* [49].

In addition, he asserted that it was

> *Normal practice for the government to approve an EIA before displaying it to the public* [49].

To this, two NGOs, Sahabat Alam Malaysian and the Consumers' Association of Penang, retorted that there was no public copy for review, even four months after the EIA had been approved [49]. After strong protests, the reports were made available another month later, and only at the DOE Headquarters in Kuala Lumpur over 1300 km away from where the affected population lived. Moreover, despite the fact that two months is the standard term for public review, the EIA reports were extremely shortly displayed: in Belaga and Kapit the report was up for inspection during a single day [24].

Under the background above, we conducted our fieldwork—including a survey, participatory observation, and semi-structured interviews—in the project area and the resettlement area of the BHP.

3. Materials and Methods: Survey and Interviews

Our analysis of the Bakun Dam's EIA was accomplished through "mixed methods" [50,51], i.e., the use of multiple sources that include quantitative information gathered through a survey and the analysis of government and corporate statistics, as well as qualitative data gathered through interviews, participatory observation, and literature research. The survey and fieldwork have been conducted at the Resettlement Scheme of Sungai Asap (or RSSA), a new settlement area built for the displaced Orang Ulu. Preliminary data collection was done shortly after the dam started operation, in May 2011, and coupled with 21 semi-structured interviews and participatory observation. A second round of fieldwork was carried out from September until November 2012. This time, a pilot survey of fifteen households was carried out, followed by a full survey among 220 respondents from 10 "longhouses," large communal dwellings built on stilts and generally hold up to 100 families in separate living quarters. More specifically, these were: Uma Kulit, Uma Belor, Uma Daro, Uma Nyaving, Uma Kelep, Uma Lahanan, Uma Bawang, Uma Batu Liko, Uma Balui Ukap, Uma Bakah, Uma Badeng, Uma Penan, Uma Lasong, and Uma Juman. These 10 longhouses comprised five different ethnic sub-groups, namely the Kenyah, Kayan, Lahanan, Ukit, and Penan. The total population in the RSSA was 11,616 in 2012 (accounting for 2219 households) [52].

Of the total sample (Table A1, Appendix A), the majority (74.5%) was working as farmer, while logging workers accounted for 8.2%, transport workers for 5.5%, professional and clerical workers, respectively, for 2.7% and 1.4%, and other employment for 7.7%. In terms of monthly income, the majority (44.1%) earned a monthly income below RM 450.00 During the fieldwork period, the currency exchange between Malaysian Ringgit to US Dollar was around RM 0.32 to 1 US Dollar. whereas the second monthly income bracket (25.5%) earned RM 451.00–RM 700.00. Respondents who earned RM 700.00–RM1000.00 were recorded at 18.6%. Other high-income bracket categories contained few respondents. For example, those who earned a monthly income bracket of RM 1601.00–RM 1900.00 constituted 3.7% of respondents. As a comparison to the poverty line at the national level, this monthly income finding gives us an alarming trend whereby, according to Malaysia's poverty standard for the state of Sarawak, households with a total monthly income less than RM 830.00 and RM 520.00 are considered poor and extreme (hardcore) poor respectively [53]. The monthly income also exposed that the objective of the resettlement programme for the BHP which focuses on job-oriented activities

to generate higher income for the resettlers on a sustainable basis through the restructuring of the existing socio-economic activities as aimed by the Economic Planning Unit [54] is a long way from being achieved.

To achieve a higher degree of representativeness, the study employed a multi-stage cluster sampling [55,56] Clustering was made according to the ethnic sub-groups whereby about 10% of the total number of family heads of the Orang Ulu at the RSSA. In this way, the survey aimed to ensure that all the heads of the Orang Ulu households received equal opportunity to be selected as respondents. In addition, theoretical saturation was used to determine the sample size, up to the point where additional data provided no new insights into the research questions [57,58]. All surveys were executed by the main researcher without assistance from students, interpreters, or else. To prevent bias in answering the questionnaires, a household-by-household approach (one-on-one household visits) was utilized while group meetings or group discussions were intentionally avoided.

To complement and strengthen the quantitative part, a qualitative approach through semi-structured interviews was carried out with local community leaders at the RSSA. There are four categories of local leaders among the Orang Ulu: the highest is "Temenggung" followed by "Pemancar," then "Penghulu" and lastly "Tuai Umah" (or headman). Sixteen interviews were conducted with the local village leaders of the Orang Ulu of the Village Development and Security Committee. Semi-structured interviews were also conducted with a variety of stakeholders involved in the BHP (see: List of Interviewees, Appendix A). Each of the interview sessions lasted between sixty minutes to ninety minutes.

Lastly, the research also included literature and archival research on the larger Malaysian context of dam-building, EIA, and customary land rights. For this part of the research, we relied on federal and local state reports, as well as studies by NGOs and (semi)corporate organizations, such as the dam contractors and funding agencies.

Having discussed the materials and methods of this study, the following section continues to examine how the affected indigenous people, local leaders and NGOs' viewed the EIA. The section is structured around the following main themes: (1) the level of respondents' participation in the EIA; (2) the extent to which procedures of the EIA were followed in a fair and open manner, and (3) the management of conflict and consent to the project.

4. Results: The Fieldwork

4.1. Lacking Participation in EIA

Of the respondents, the greater majority (87.9%) were dissatisfied with the participation in the EIA. In contrast, only 5.4% were satisfied. Probing into this, respondents provided the following reasons (Figure 3):

1. 41.7% felt that the authorities did not consider their requests (such as concerning compensation or relocation);
2. 21.1% felt unable to effectively review the EIA reports due to the limited period granted to them;
3. 20.7% stated that the use of the English language in the reports posed a major barrier;
4. 15.1% maintained that the locations where the EIA reports were displayed were too far away from where they lived.

When we examined whether and to what extent respondents felt if the EIA had empowered their public participation, three quarters disagreed, of which 54.5% disagreed strongly. The survey findings were corroborated through the interviews with key informants. As, for instance, one of the plaintiffs in the court case against the government said:

> *The government does not want to consult us. In this case, the government did not follow the [EIA] regulations (Interview, Kajing Tubek, villager, RSSA 24-9-2012).*

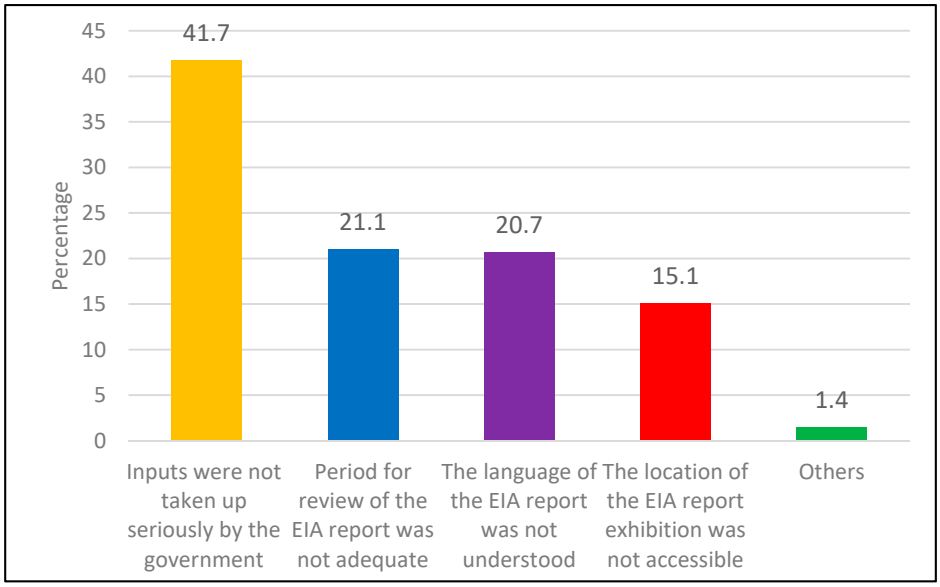

Figure 3. Reasons for respondents' dissatisfaction with the Environmental Impact Assessment (EIA). Source: This survey.

Similarly, a representative from the NGO Sahabat Alam Malaysia, asserted:

Public participation in Malaysia is conducted more as a procedural requirement. Project developers do not encourage it. They tend to be silent rather than to facilitate it (Interview, Jau-Evong Jok, coordinator, Marudi, Sarawak, 19-9-2012).

4.2. Procedures: Manipulation, Bias, and Distrust

Due to the limited possibilities to participate, the majority (80.0%) of the respondents felt that the authorities had conducted the EIA without complying to procedures. In fact, 36.7% was of the opinion that there were elements of manipulation, while 21.1% felt that the EIA was biased towards project proponents, and 19.5% stated that it focused on local leaders rather than the general populace (Figure 4).

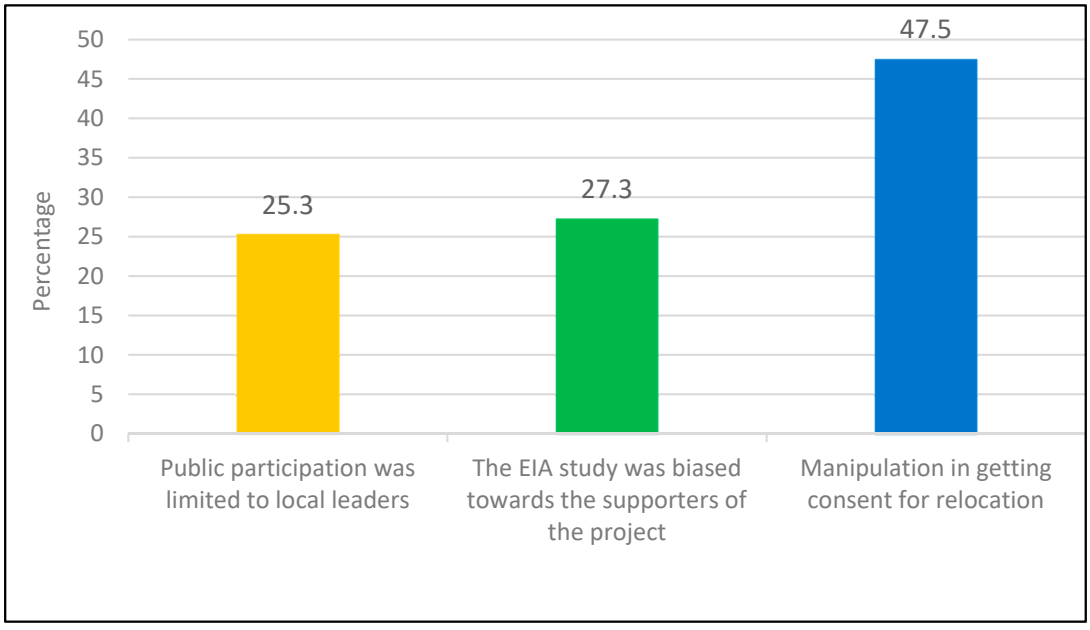

Figure 4. What are the non-compliance aspects of the EIA? Source: This survey.

The respondents' negative views on the role of the EIA were reflected by the NGOs. The Executive Director of the Borneo Resources Institute, an indigenous civil organization in Sarawak stated:

> *In many cases, the EIA process is used to legitimize the project proponent's action without genuine intention to empower the public. Many do it (sic) just for the sake of procedure or formality, particularly when the project is strongly backed by the government. This is clearly the case in the BHP (Interview, Mark Bujang, Miri Sarawak, 21 September 2011).*

In the next part of the survey, we probed respondents' view of the government's role in the EIA. It was found that the majority (80.5%) disagreed that the BHP had increased their trust towards the government. Three-quarters or 75.5% of the respondents disagreed (of which 40% strongly disagreed) that the way in which the EIA had been conducted by the government was acceptable. Lastly, 85.9% agreed (of which 36.8% strongly) that politicians were the ones who reaped the economic benefits from the dam project.

4.3. Conflict Management and Consent

One of the stated objectives of the Malaysian EIA is its role as a platform where social discontent can be managed, facilitated, and channelled through public participation. Consequently, participation is assumed to mitigate social conflict towards the proposed projects. Unfortunately, the survey revealed that 75% of the respondents felt that the public participation had failed to reduce conflict, while 13.6% even felt that it had increased conflict.

In order to have a better understanding of the nature and frequency of conflicts, we asked the respondents about how they protested and how often they were engaged in them. Over half (53.9%) expressed to have resisted against the project through non-violent approaches, such as writing of petitions and letters, amongst them, 37.0% had written between 2–4 times (since the moment they were informed about the project and the time of resettlement) (see Table 1). The second type of protest was through road blocks, to which 18.7% resorted, mostly only one time (by 10.2%). This was closely followed by demonstrations undertaken by 17.4%, with over 12% equally divided over having engaged in it either once or between 2–4 times. Open fights with workers was the form of protestation that was opted for only by 9.4% of the respondents, varying between once (4.1%) to 2–4 times (also 4.1%) before they were resettled.

Table 1. Type and frequency of protest prior to resettlement.

Type of Resistance	Frequency (%)				% Age of Total
	1×	**2–4×**	**5–7×**	**>8×**	
Petitioning	12.8	37.0	3.5	0.6	53.9
Road blocks	10.2	5.3	2.0	1.2	18.7
Demonstration	6.4	5.8	3.7	1.5	17.4
Fights with project workers	4.1	4.1	1.2	0	9.4
Others	0.6	0	0	0	0.6
Total	34.1	52.2	10.4	3.3	100.0

Source: This survey.

A final indication of the failure of the EIA to rally greater social support was with regard to the issue of consent (albeit not legally required for projects to go ahead). An overwhelming majority (84.5%) stated that they had not consented to the project, while a similar percentage (86.0%) indicated they had also not agreed with the decision to be relocated.

Other reports have corroborated that local people were forced into relocation through intimidation, tricks, and threats [59]. For instance, the government withheld monetary compensation to force people to accept resettlement at the RSSA [60–62]. In this regard, a female leader of one of the communal longhouses stated:

> *If we have an opportunity, of course we don't want to move out from Ulu Balui to here. However, the government withheld our compensation money. (. . .) So, we have to agree to resettle. No option (Interview, Devong Anjie, headwoman of Uma Nyaving, RSSA, 1 October 2012).*

5. Discussion: Limits and Opportunities of the EIA

This article has presented and analysed the EIA of the Bakun Hydro-electric Project. It aimed to demonstrate how the politics and rent-seeking that surround the EIA have been decisive in its failure to safeguard the overall sustainability of the project. By analysing the EIA's execution itself, coupled to fieldwork in the resettlement area of the indigenous population displaced by the dam, several conclusions can be drawn.

One, both at the federal and the regional state level, there were significant vested interests in an expedient, hasty approval of the EIA. Scholarly discussion has also focused on the question whether rent-seeking in resource-rich economies fosters development, although the evidence on this is inconclusive [63,64]. Through a collusion between large companies that stand to benefit from the dam and the leadership of political parties, such as UMNO, the EIA was diluted into a mere formality. The disregard of a legally required EIA was most glaring in the fact that commencement of the dam construction took place before having been accorded by the Cabinet, and even prior to the EIA's approval. Whereas the EIA was not submitted for review until September 1994, construction had already started 22 days later. The EIA was approved just 6 months later, in March 1995.

Two, the government's rush with the EIA has caused widespread resentment among the affected indigenous population. Most respondents (close to 90%) were not satisfied with their level of participation in the EIA. Reasons for this were enumerated as (in order of importance): (1) lacking government attention to information requests; (2) limited time allowed for reviewing the EIA reports; (3) linguistic barriers making it impossible to understand the reports, and; (4) the remote location where the reports were displayed, i.e., in the nation's capital over 1300 km away from the indigenous settlements. Thus, it is not surprising that four-fifths of the respondents maintained that the government paid scant regard to the EIA procedures. Of these, well over one-third felt that the EIA had been manipulated, whereas one fifth stated that it was biased towards supporters of the dam, and another one fifth maintained it was focused on local leaders and not the general populace.

Three, the EIA's objective to rally social support for the project through public participation has utterly failed, with almost 9 out of 10 respondents stating that they had not consented to the dam project, nor with the decision to be resettled. Alternatively, one might also ascertain that the objective to push through the BHP with a minimum effort at mitigating environmental impact and social grievances has succeeded. Demonstrating this bitter success is the fact that despite evident, widespread resentment over the dam amongst the affected population, it did go into operation nevertheless.

It is in the light of these three reasons that one may read others' condemnatory typification of the BHP:

> *If for no other reason, then, Bakun is an excellent case study for policymakers because it intimately sketches the anatomy of failure, a failure of government planning, implementation, and oversight, no matter how technically sound the dam's concrete face, spillway, or powerhouse become* [18].

When zooming out from our case-study, it can be seen that the BHP is no exception. Regardless of whether we look at large dam projects in the Philippines [5,65], Cambodia [66], or Laos [67], the EIA has been seriously impaired by the larger political context of which it is a part.

In this regard, other studies have called attention to the dynamics of rent-seeking surrounding mega-projects. It has, for instance, been observed that in Thailand, Indonesia, and Malaysia, the support for the EIA by political and corporate decision-makers was low [68]. Others duly noted:

> *Policy failures on environmental grounds need to be grasped for what it is—not as an overnight, nor as a faulty judgement. The decision of public policies in these countries is too often shaped both*

directly and indirectly, by those with a vested interest in the continued mismanagement of natural resources [69].

Is this study testimony to the inefficacy and futility of the EIA? Not quite. There might be a dual lesson to be learnt from mega-dam projects. First, there is a tiny, yet limited window of opportunity through which the EIA practitioner (or opponents of the project) could hope to influence decision-making. Projects with the magnitude of the BHP tend to acquire an own momentum, due to the substantive economic interests and political prestige vested in them, leaving two ways out: to divert it, or if all fails, to divide it. Diverting a mega-project implies the search for alternatives that may achieve similar objectives, but in ecologically and socially less disruptive ways. For instance, in the case of hydro-electricity, one may consider managing demand through energy saving technologies or behavioural change towards "greener" life-styles [20]. However, when such proposals run counter to political realities, one could also try lobbying for the division of a mega-project into smaller, more manageable components (which could be politically more palatable than scrapping the project altogether). In both cases, diversion or division, the EIA might have an important role to play.

There is a second lesson from this case-study: if none of the options above are accepted, and the project is still given the green light, the EIA practitioner is to tread with extreme care not to legitimize something that should have been halted. With the legacy of the BHP by and large unresolved, there are well-founded concerns that such a scenario might unfold once more, not in the least given Sarawak State's plans to build another ten to twelve dams.

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Appendix A

Table A1. The respondents' profile.

Gender	**Number**	**% of Total**
Male	215	97.7
Female	5	2.3
Total	**220**	**100**
Age Cohort	Number	% of total
18–30 years	7	3.18
31–40 years	11	5.00
41–50 years	53	24.09
51–60	87	39.55
61 and above	62	28.18
Total	**220**	**100**
Education	Number	% of total
University	3	1.4
College	8	3.6
High school	58	26.4
Junior high school	54	24.5
No formal education	97	44.1
Total	**220**	**100**

Table A1. *Cont.*

Current Occupation	Number	% of total
Professional and administrator	6	2.7
Clerical	3	1.4
Farmer	164	74.5
Logging worker	18	8.2
Transport worker	12	5.5
Others	17	7.7
Total	**220**	**100**
Household Size	Number	% of total
<3	30	13.64
4–5	113	51.36
> 6	77	35.00
Total	**220**	**100**
Monthly Income	Number	% of total
RM 451.00–RM 700.00	153	69.6
RM 701.00–RM 1450.00	50	22.7
RM 1451.00–RM 2450.00	14	6.4
RM 2451.00 and above	3	1.4
Total	**220**	**100**

List of interviewees

Anjie, D, a Headwoman of Uma Nyaving, at the RSSA on 1 October 2012
Bit, S., a Penghulu, at the RSSA on 30 September 2012
Bujang, M. an Executive Director of BRIMAS, in Miri Sarawak on 21 September 2011
Igang, D., a villager at the RSSA, by telephone on 22 July 2013
Igang, N., a Teacher at the RSSA on 11 October 2012
Imu, S., a villager and NGO Activist, at the RSSA on 12 October 2012
Jok, J-E, a Coordinator from SAM Sarawak, in Marudi, Sarawak on 19 September 2012
Kulleh, T., a Pemancar, at RSSA on 2 October 2012
Ligue, M., an Assistant of Tuai Umah from Uma Balui Liko, on 16 October 2012
Lihan, M.M., Chairman of the Village Development and Security Committee of the RSSA, at RSSA Bakun Sarawak on 25 May 2011
Lusat, K., Assistance District Office (ADO) of Sub-district Office of Sungai Asap, at the RSSA on 25 September 2015
Magui, M., a Tuai Umah of Uma Penan, at the RSSA on 11 October 2012
Nyipa, L., a Tuai Umah of Uma Lahanan, at the RSSA on 7 October 2012
Sanggul, A., a resettler, at the RSLB on 25 September 2012
Tubek, K., a villager cum a plaintiff, at the RSSA on 24 September 2012
Tungau, L., a villager, at the RSSA on 23 May 2011
Umek, J., a Pemancar, at the RSSA on 29 September 2012
Urun, A, a villager at RSSA on 1 October 2012)

List of interviewed organizations

Association of the Orang Asal Network Peninsular Malaysia (JOAS)
Borneo Research Institute (BRIMAS)
Consumers' Association of Penang (CAP), Malaysia
Department of Environment (DOE) of Kuala Lumpur
Department of Environment (DOE) of Putrajaya (HQ)

Economic Planning Unit (EPU), Prime Minister's Department
Ministry of Energy, Green Technology and Water (MEGTW)
Natural Resources and Environmental Board (NREB)
Sahabat Alam Malaysia (SAM), Penang
Sahabat Alam Malaysia (SAM), Sarawak
Sarawak Hydro Berhad
Sarawak Economic Planning Unit, Kuching Sarawak
Sub-district Office of Sungai Asap, Sarawak
Traditional administrators at the Resettlement Scheme of Sungai Asap, Sarawak
Village Development and Security Committee of the RSSA, Sarawak

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Article

Understanding Social Impact and Value Creation in Hybrid Organizations: The Case of Italian Civil Service

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Abstract: The aim of this paper is twofold: first, it aims to analyze what kind of value is generated by hybrid organizations and how; second, it aims to understand the role of social impact assessment (SIA) in the measurement of added value, especially in terms of social and economic change generated by hybrids. Hybrid organizations are a debated topic in literature and have different strengths in responding to needs, mainly in the public interest. Nevertheless, there are not many studies that identify the impact and change generated by these organizations. After highlighting the gap in the literature, the study proposes an innovative approach that combines SIA, interview, interventionist approach and documental analysis. The breakdown of SIA through the five elements of the value chain (inputs, activities, outputs, outcomes, and impact) guarantees a linear definition of the value generated through change with procedural objectivity capable of grasping hybrid organizations' complexity. The value generated or absorbed is the change generated by the impact measured based on the incidence of public resources allocated. Through the SIA and counterfactual approach, the civil service case study analysis highlights how the value generated by public resources can be measured or more clearly displayed in the measurement process itself.

Keywords: hybrid organization; social impact; value creation; civil service; social impact assessment

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1. Introduction

Academics have been debating the definition and outcome of hybrid organizations [1]. In the literature, there are three classic forms of hybrid organizations: hybrid public companies formed by subsidiaries and investee companies, social cooperatives to which the public provides a mandate for achieving specific objectives and social enterprises [2,3]. However, the classical forms of hybrid organization are added to other more complex forms and have not yet been studied in the literature. An example is given by those third sector organizations that receive public funds, where in fact, the public sector is a partner in specific activities and in some cases also involves the private sector to achieve shared social objectives. In these cases, the interest in the project's impact and the value created become recurring themes of interest for the new organizational forms created. The subjects involved in the hybrid organization pursue the common interest and support the achievement of social, environmental, or economic needs by overcoming potential obstacles thanks to the characteristics of each one who in such organizations unite to form a new organizational form [4]. The reform linked to New Public Management has led to different types of outsourcing of public interest services, some typically oriented towards new corporate forms under public control, others towards the public–private partnership, others towards new hybrid solutions in which different organizational forms are united to answer the need [5–8]. Furthermore, since 2017 in Italy, the country has

witnessed the reorganization of legislation on the third sector, including associations (social promotion association, voluntary associations), social cooperatives, social enterprises, ecclesiastical bodies, and foundations [9]. The new legislation increasingly directs existing organizations towards general interests of public interest, with objectives of social and environmental sustainability as already highlighted for non-profits and the possibility of carrying out commercial activities with a type of taxation different from those profit companies community-oriented shared public purposes [10,11]. In several cases, the reform has changed the third and non-profit, making it part of the public fabric through new forms of hybrid organization to respond to a lack of available resources and economic difficulties [10,12,13]. The recent global financial crisis and the pandemic triggered by COVID-19 have had various effects on evaluating public performances that have led to budget cuts and the search for new organizational forms to meet the need with fewer resources available [14,15]. To decrease the available public budget associated with better systems of efficiency and use of public resources, the parallel stream of research on sustainable business models capable of responding to the economic, social, and environmental system's developmental complexity has been added [16–18]. The approach provided by hybrid organizations could support the correct use of resources, the limited use of the same response to a paradigm already studied by O'Flynn [19], who questioned himself with the adoption of new public management in the twentieth century of managerial approaches borrowed from the private sector and applied to the public sector to increase public value. The public value generated by the adoption of new managerial approaches, as clarified by Stoker [20], includes the involvement of stakeholders in the collaborative and production process as a way of overcoming the previous model. From this perspective, the analysis conducted sees the subjects traditionally involved as stakeholders on equal components of hybrid organizations.

O'Flynn [19] identifies in the concept of public value a new approach that adheres to that defined by hybrid organizations which, as theorized by the scholar, have a greater capacity for collecting preferences, a multi-accountability approach that involves all subjects, the ability to pursue multiple objectives including service results, satisfaction, results, trust, and legitimacy. The public value generated by hybrid organizations can be determined through the social and economic impact of the projects and services of public interest carried out [16,21]. Public value offers a broader way of measuring government performance and guiding policy decisions, according to Kelly, Mulgan, and Muers [22], where public value could measure the impact of public interest projects. The concept of performance recalled in the paper therefore refers to the holistic conception of public value. The literature on hybrid organizations has not yet defined the public value it can generate either through a meaningful approach or case studies. The analysis conducted focuses on an example of a hybrid organization generated by a large project shared between the different types of organizations to merge them into a single organization with the same expectations and interests. This is the Italian national civil service. The theoretical approach proposed to define public value in hybrid organizations can be generalized as it responds to the verifications and requirements identified by Ruddin [23], who also highlights how an approach that can be generalized to other case studies has practical relevance in social studies. In the analysis conducted, the same hybrid organization approach applied to civil service projects can be adopted in different European contexts. The analysis conducted after a brief description of the existing literature seeks to identify a possible approach to determine the hybrid organization's social impact and value [24]. The approach to facilitate understanding of the logical passage divides the project into the five phases of the social impact assessment approach [25,26]. Interviews, collection of results, interventionist approach, and application proposal for evaluating the added value allow the inductive passage [27] from practice to theory and vice versa, highlighting and understanding the main aspects. The study initiates a process of reflection on complex hybrid organizations and the possibility of measuring the impact generated through an innovative approach from a logical point of view. Following the research gap and the observation of empirical

phenomena not explained by existing studies, our analysis will provide answers to the following research question (RQ):

RQ1: How do hybrid organizations generate value and what kind of value is it?
RQ2: How does the social impact assessment measure the phenomenon of value creation linked to change?
RQ3: Is social impact assessment a useful tool to understand the use of public resources generated by hybrid organizations?

The study consists first of an analysis of the literature and the second section presents the methodology and the inductive approach on the specific case divided into phases and recalls through the social impact analysis. The findings guide the reader in the subsequent discussion and conclusions, providing practical elements to demonstrate the approach's capacity and generated value. The discussion guides the reader to understanding social impact. The conclusion highlights the international debate theme and the possible application of the results in an international context.

2. Theoretical Framework

This section is dedicated to the theoretical framework of the paper and it is composed of two main pillars. First of all, the purpose is to analyze several definitions of hybrid organizations. Then, the aim is to analyze the academic debate on impact measurement in hybrid organizations, individuating a literature gap on value creation evaluating to fill. The debate on the issue of social impact is generated by the consideration of multiple criteria of different nature (economic, environmental, and social), as well as the transparency and engagement of the different stakeholders, such as organizations, government, and communities oriented towards mapping resource sustainability in a complex environment.

2.1. Framework

The term "hybrid organization" is used to combine elements from both for-profit and non-profit sectors, to maintain a mixture of market and mission oriented practices, and to address economic, social, and ecological issues [28,29]. Nevertheless, there are different definitions of hybrid organizations, due to their nature and complexity [30].

By definition, hybrids are the offspring of different species [31] and, for what concerns the organization and management literature, the term has been employed to describe organizations that draw on at least two different paradigms, logics, and value systems, allowing the rise of a new conception of economic organizing [32]. In this sense, hybrid organizations can be seen as a new form of organization, able to compete not only on the quality of goods, but also on the capacity to effect positive social and environmental change [33]. Boyd et al. [34] defined hybrid organizations as entities that are market-oriented and mission-centered, which can be studied on the basis of two specific criteria [35]:

- they have a business model aimed to create social value;
- they are able to generate income to sustain their operations.

Hybridity represents a mixture of several heterogeneous components and does not refer to something new, but to a new combination of existing elements. Besharov and Smith [36] used this term to indicate the coexistence of two or more distinct forms of organization. Jay [37] provided a similar definition, according to which hybrid organizations are seen as entities able to combine multiple institutional logics to solve complex problems. Indeed, a hybrid organization is driven by two forces, represented by social change and the sustainability of organization [38], offering a blended value proposition, composed of economic, social, and environmental components. It is in this sense that, according to Santos [39], this type of organization is mainly focused on creating value rather than capturing it, while Haigh and Hoffman [40] underline its ability to provide high quality differentiated goods and to pursue both a social and environmental mission. Furthermore, Boyd et al. [34] state that hybrid organizations are generally characterized

by a long-term perspective on profit and a very close and personal relationship with their crucial stakeholders (suppliers, producers, and customers).

According to Grossi et al. [41], in the field of public administration and management, hybridity refers to organizations composed of structural elements deriving from other types of organizations belonging to different sectors (private, for profit, and third sector). It is within such triangulation that they identify specific hybrids:

- public/private for profit hybrids, like state-owned enterprises;
- private for profit/third sector hybrids, like social enterprises or co-operatives;
- public/third sector hybrids, like welfare associations or other organizations sponsored by government.

The concept of hybrid organizations has been adopted to describe various configurations of cross-sectoral collaboration, such as network and hierarchy [42], government and business [43], academic and market [44], healthcare and science [45]. According to Doherty et al. [46], by spanning the boundaries of private, public, and non-profit sectors, hybrid organizations are able to bridge institutional fields, facing conflicting institutional logics. In this sense, they are able to earn trust and the authority to establish connection and dialogue between several categories of actors, also by including former opponents [47].

Given these considerations, for the purpose of this paper, we adopt the definition provided by Jolik and Niesten [48], according to which hybrids represent collaborations between independent organizations that exchange and develop goods and services to create value, reduce agency and transaction costs and allocate residual claims, by combining resources, organizing information, and safeguarding contractual hazards and property rights. Despite the recent increased interest in hybrid organizations, the literature appears fragmented across many academic disciplines over several decades.

According to one of the most popular approach, hybrid organizations are seen as a continuum between sectors [49,50], while other authors preferred to follow a "single sector emphasis" [51–54], studying hybrid organizations from the perspectives of one specific sector, the public or the private one.

Other writers have gone further in a separate sector approach, looking at hybridization and hybrid organizations as the permanent features in the welfare system [55,56].

Furthermore, numerous studies were carried out with the aim to individuate the factors on which depends the likelihood to develop a hybrid organization [57]. They focused on the motivation of traditional entrepreneurs. Some showed the desirability for self-employment, tolerance for risk and self-efficacy at the center of their interests [48]. The literature on hybrid organizations presents hybridity as an enabling condition to achieve legitimacy from different institutional logics, in order to survive [28,58]. On the other hand, organizational stakeholders and policy-makers can become "institutionally confused" if an hybrid's behavior does not match the description of the ideal-typical form of organization in contemporary society [59]. In this sense, even if hybrid organizations have to solve tensions regarding their identity, according to Battilana and Lee [60] and Santos et al. [39], the conflicting logics they respond to and the practices they implement can be seen as the essence of their constitution, the condition to handle specific and complex situations [61].

The specific concept of hybridity in public administrations still appears undeveloped [62]. Several studies have analyzed hybridization within public organizations [63], considering structural and cultural complexity as its main feature [64,65]. Structural complexity in public organizations can be measured in terms of vertical specialization and horizontal specialization, both characterized by intra and inter-organizational elements [58–60]. Vertical intra-organizational specialization indicates how formal authority is distributed among different levels of hierarchy. Vertical inter-organizational specialization instead focuses on specialization among public organizations (ministries with many subordinate agencies). On the other hand, horizontal intra-organizational specialization indicates the internal specialization of public organizations, while horizontal inter-organizational focuses on the level of specialization among public organizations at the same levels. Cultural complexity, instead, shows the variety of informal, cultural norms and value within

and among public organizations. A weak level of cultural complexity means cultural homogeneity and integration, with members who are all committed to the same norms and values. On the basis of these considerations, Christensen and Laegreid [63] affirmed that hybridization in public organizations can assume different meanings, which can be explained through complexity (in all its configurations). More deeply it reflects potential inconsistency between diverse structural and cultural elements in a public entity. In this conception, hybrid structures that follow different organizational principles can link new means of coordination and traditional sectoral agreements and be an effective way to manage the "coordination paradox" (i.e., vertical coordination measures can counteract horizontal coordination). However, the performance and effects of these practices are often conflicting and uncertain, and there is a trade-off between potential gains through flexibility and disadvantages through ambiguities, tensions and conflicts that fall within the sphere of cultural elements. Coordination is a crucial structural element for governance and quality capability because it shapes program design and influences efficiency gains, which in turn affect government legitimacy.

2.2. Hybrid Organizations and the Determination of the Generated Value

Academics and scholars are now debating the fallout that different organizational forms have in terms of impact measurement [66] based on environment, workers, community, and governance and managerial approaches and frameworks adopted for measuring the previous elements. The economic aspect actually has an impact on the reference community and internal elements of the organization in the hybrid organization model [66]. If different approaches have been identified to map and measure the impact of organizations whose boundaries are well defined, the literature cannot define numerous application cases and possible approaches of objective measurement within hybrid organizations [1,67]. The definitions provided also identify social cooperatives and hybrid organizations in the literature as typical examples of hybrid organizations in which, at the same time, interests oriented to generate profit from the private sector, respond to community needs as required by the public sector, and achieve social objectives or environmental as required mainly by non-profit organizations [46,68]. The two forms were the first to be fully configured as hybrid organizations. The third sector is increasingly configured as a hybrid organization withouthaving identified appropriate tools for measuring and evaluating the value generated by the impact of the activities often organized in collaboration with the public and private sectors. Several articles analyze how collaboration or partnership with the private sector can generate value [69,70] or destroy value [71]. Several articles suggest that the partnership between public and third sectors can generate value in the community context [72]. To the studies, there are also methodological proposals for mapping the social impact in the third sector [73,74]. However, there are no studies on how to determine the impact of hybrid organizations objectively [28,46]. The two studies highlighted the absence in the existing literature reviews of a common approach that considers mission drift and challenges to legitimacy in hybrid organizations. They recalled particular social enterprises as a classic example of hybrid organization [41] and the difficulty in defining the value generated by hybrid organizations—public and third sector in the definition of value for the territory and the reference community [23]. Hybrid organizations can generate excellent value, especially when welfare is transforming into a welfare mix in which the public needs the private sector and the third sector to achieve efficient and effective results in the social field under the principles of New Public Governance and New Public Management [75]. Moreover, if the public defines the objectives of general interest, approves the activities, finances them, or co-finances them and requires the collaboration or prevalent implementation by the third sector and the private sector, how can this generated value be measured? Esposito and Dicorato [76] highlight how the public sector needs to determine the impact of the resources used through the partners' ability to generate value, legitimize social activities, and guarantee operational and financial sustainability. The literature gap linked to both hybrid organizations and the evaluation of the value

generated is repeated and coincides with a mutual interest in enhancing the impact on the social and economic system.

For what concerns the partners' ability to generate value, according to Rhodes [77] and Osborne [78], this depends on the ability to build partnerships and inter-actions between different sectors (generally the public and the private ones), promoting cooperation as well as equity and democracy. Nevertheless, different approaches for what concerns the measurement of public value can be retraced overtime [79]. The public value generated by hybrid organizations can be determined through the social and economic impact [11,16,74]. Indeed, if in line with the Bureaucratic Public Administration (BPA) public value was evaluated in terms of legitimacy and formal correctness [80], the New Public Management focused on its economic dimension [81]. On the other hand, the theories of network governance stressed the role of interdependencies for multi-actor collaboration and how meta-governance can manage and provide direction to such networks [82–84].

In this sense, co-production assumes a significant relevance for public value production and engages citizens not only in voting [85], but also implies a redistribution of power between professionals and citizens, pointing out important issues related to accountability [86]. In order to co-produce public value, different actors have to share the same perception of public value and then they have to develop specific capacities such as being able to overcome significant gaps, divergent resourcing, and differing time frames. Emerging literature has identified different mechanisms to manage potential conflicts between actors at different levels [87–89] and, among these, hybridization appears as the crucial one by sustaining distinct policies and practices that pursue competing values.

Kelly et al. [22] studied public value on the basis of its three "building blocks," represented by services, outcomes and trust. According to such an approach, the aim is to generate outcomes in society by providing public value through services. Furthermore, other authors have started to focus on new and intangible aspects, such as citizen participation and the need to satisfy their demand and overcoming the previous public sector paradigms [90–92]. This new attention can be seen as the main contribution provided by the Public Value theory to evaluate the value generated by hybrid organizations.

Lastly, even with the aim to measure performance, Faulkner and Kaufman [93] carried out a model based on four different dimensions which can be adapted to several contexts, including hybrid organizations. The first dimension is related to social, economic, cultural, and environmental outcomes [4], while the second one is about trust and legitimacy, since public activity must be legitimized by all stakeholders involved, stimulating trust [91,92,94]. The third dimension takes into consideration the quality of public service, which is a crucial aspect in the provision of public services and involves satisfying users' needs [95–99]. The latter is dedicated to efficiency, with the aim to minimize costs [100], bureaucracy [101], and value for money [102].

As anticipated, a second current of theories tends to evaluate the impact of social activity through social legitimacy [76], highlighting the importance of specific factors such as autonomy, trust, steering, and ability to influence performance [103].

Performance represents a complex concept to define, especially for what concerns hybrid organizations. While for-profit organizations measure it in terms of outputs—taking into account their effectiveness, efficiency, and productiveness—for non-profits it is harder to quantify goals, since they operate in less competitive environments which makes benchmarking more difficult [104,105].

From a literary point of view, there are different opinions for what concerns the effect of an organizations' autonomy on performance. I On the one hand, autonomy can create transaction costs which negatively affect performance [106,107]. On the other hand, autonomy can be beneficial, valuing citizens' satisfaction rather than efficiency. According to Cambini et al. [108] and Swarts and Warner [109], autonomization ensures cost savings, but it depends on the sector where it takes place [110].

Generally, strategic steering is associated with positive effects on performance, since it can help communicate what level of performance is expected, to assess whether objectives

are achieved and to align management's interest with that of governance establishing sanctions and rewards [111,112]. But, according to Benabou and Tirole [113], extrinsic motivation through incentives can replace intrinsic motivation, generating distrust.

The last approach that can help in assessing hybrid organizations' performance suggests looking at the concept of sustainability, considering not only the social and environmental impact related to activities but also wider issues such as climate change, social stability, job creation, and the protection of human life [114,115]. According to Mahadi and Sino [116], understanding the notion of public value represents the first step to achieve sustainable development and deliver services satisfactorily. Sustainability represents a fundamental driver for public–private partnership activities, allowing the pursuit of public and private partners' goals without compromising the capacity to meet the needs of their reference communities. The same could be said for hybrid organizations, which overcome the risk of conflicting logics and ensure a positive social impact.

3. Method Approach

In Italy, the civil service represents a typical example of the transfer of public funds to cover general interest activities that involve users present throughout the national territory. The civil service has similar characteristics in other European countries. In Italy, civil service is voluntary and can be carried out as an alternative to military service as in France, Germany, Spain, Holland, Poland, Portugal, United Kingdom, the Czech Republic. In other countries such as Austria, Cyprus, Denmark, Finland, Greece, Latvia, Lithuania, Slovakia, Sweden, Switzerland, Norway, it is mandatory [117]. On 3 April 2017, the Civil Service in Italy was established with the characteristics currently in force according to the Italian Legislative decree 6 March 2017, n. 40. The Universal Civil Service, "is aimed at the non-violent and unarmed defense of the homeland and peace between peoples" and, "constitutes an institution of integration, inclusion and social cohesion, aimed at strengthening the relationship between the citizen and the institutions of Italian Republic, contributing to the stability of democratic institutions as well as to the construction of a participatory democracy and new forms of citizenship." This experience exclusively dedicated to young people between 18 and 28 years can be carried out in Italy or abroad, both in member countries of the European Union and others. Participation is bound to adhesion to a project, presented by a third sector, which can last from 8 to 12 months. The organization which organized the universal civil service is an excellent example of a hybrid organization as the selected projects have been taken advantage of and are co-financed by the Department for Youth Policies of the Italian State. The Department is partner and investor of the organization. The accredited body evaluates the impact obtained by the various projects in response to the Department's general objectives, and the offices that welcome the subjects involved are part of the third sector and non-profit. Therefore, there is an extension, control, and public interest that involves different organizational forms with non-uniform types of financing. The case study is subject to public contributions and public control. Having to respond to reporting purposes of a public nature and public accountability, it is itself a hybrid organization due to the principle of the prevalence of economic substance over legal form [118]. The case study considered is significant for the analysis that we intend to conduct because the Vol.To volunteer service center is one of the third sector bodies that welcomes and coordinates the largest number of people involved in the civil service. Vol.To was accredited as a National Civil Service Body in 2005 by enrolling in the Register of the Piedmont Region (Italy). Over time, the number of its reception centers increased to becomethe only private social body registered in the first class in the Regional Register (with several offices greater than 100) in 2017. With the reform of the third sector that establishes the Universal Civil Service, Vol.To obtained accreditation for 140 reception centers in collaboration with 72 organizations (non-profit and ecclesiastical centers) defined by the "Reception Bodies" standard.

The civil service project represents in its configuration a significant example of a hybrid organization where public interests, objectives, and projects are shared, approved, and

financed or co-financed by the public sector to generate social value. The bodies accredited to host the civil service subjects are either public bodies or third sector. The projects involve third sector partners, public or private, for the performance of specific activities falling within the objectives of general public interest. The empirical investigation and analysis of the generated value of the hybrid organization of the civic service analyzed, as well as the project realized by Vol.To, was supported by the Bank Foundation and established by law as a point of regional reference [119].

Analysis of the empirical data followed a systematic combining approach based on an abductive process [27] which is characterized by the interplay between rich longitudinal empirical data and literature. The longitudinal analysis of a case study allows, through different methodologies and approaches, identification and explanation of the same phenomenon with different sources and visions and responding to the gaps that a single approach provides in literature. Examples of longitudinal analysis of a case study are defined equally in the literature [120,121]. The project is defined in four phases:

(1) Analysis of the case study through Social Impact Assessment (SIA). SIA is the approach identified as a possible solution to mapping the process of hybrid organizations [25,26]. To analyze the approach, we refer to the phases of the value chain shown in the results section. The study recalls in the results the five phases for the impact assessment and the elements associated with each. These are input (human, financial and material resources), activities (transformation of inputs), outputs (products and services), outcomes (results and effects on beneficiaries) and phase impact (change in the reference community), which define the generated value [122,123].
(2) Creation of a chronological overview of the interview and interventions in the examined public value based on empirical data from documentation and interventionist workshops to structure a new approach to measure the impact and social change. The interventionist approach was conducted through five meetings which took place from three months before the start of the project up to one month after the end of the project. The interviews were carried out on subjects who participated in the civil service at the end of 2020 and onmanagers and employees of Vol.To between 2019 and 2020 to identify the best approach to be adopted for measurement. The interventionist approach involved the participation of one of the authors defining the tools, elements, and methodology to be adopted to measure social impact and value generated through an agreement between the University of Turin (Italy), Vol.To and the Presidency of the Italian Council of Ministers. The activity was developed in 2020. Interviews with volunteers, were developed by semi-structured questions aimed at defining the actual change provided by the project through the counterfactual method [124].
(3) Use of key concepts of the theoretical framework (SIA method) to link the empirical findings with measurement of impact in the hybrid organization. The data collected are available online. References were provided in open access in order to guarantee the replication of the result by the other researchers [125–127]. The determination of the social impact of the project described is part of an impact certification process by a European certifying third party. The approach is the derivation of a practical and theoretical training project which providedcertification of the skills on the social impact of the author who dealt with the interventionist analysis by the University of Turin (Italy) and a European skills certification body called CEPAS [128,129]. The approach on social impact assessment is one of those teachers and certified to one of the authors present in the SCH120 register held by CEPAS.
(4) Analysis of the overall results to answer the research question.

The impact is the actual assessment of the change and the value generated. Therefore, it will be described and commented on in the Discussion as a logical element of the approach's final determination.

The case study analyzes the fallout of the 2019 project of Vol.To completed in the year 2020.

Ninety-four people had access to the project, 36 of whom were males and 58 females, with 44 young people employed in Turin (Italy) and 48 in the Province of Turin. The selections rewarded graduates who have risen to 59, 6% (56 young people) and young people with low schooling were penalized, which fell to 13.8% (13 people). Graduates which slightly decreased, are 26.6% of the total number of operators who participated in Vol.To. Vol.To's civil service projects support the activities carried out by the third sector, which can strengthen their support for the reference communities with the help of volunteer operators involved. The needs and the projects activated identify 25.7% cultural animation activities for minors and young people, followed by initiatives aimed at users with disabilities (20%) and support for the elderly (17.1%). The other activities aim to support adults in distress, including women in difficult or poor health conditions, school tutoring, peace education, civil rights, and environmental protection activities. In Table 1 and Figure 1, all partners and direct stakeholders of the project interested in increasing their workforce or covering voluntary activities were already active with a transfer of values and skills.

Table 1. Hosting third sector organizations according to the classification defined by the Legislative Decree Italian 117/2017.

Type of Organization	Percentage Distribution
APS (associations for social promotion)	8.6%
ASD (amateur sports associations)	2.9%
Association	8.6%
Social cooperatives	11.4%
Foundations	8.6%
Odv (volunteer organizations)	57.1%
Ecclesial bodies	2.9%

Figure 1. The host organizations of civil service Vol.To.

The representation of the impact of activities and stakeholders is made even more complicated as each third sector entity has one or more public, private or third sector entities as a partner (Appendix A).

4. Empirical Evidence

This section presents the interviews, the proposed approach for evaluation and enhancement of personnel, and the impact as conclusive elements of the SIA analysis in support of the study's empirical and theoretical tips.

4.1. Input

The project involved an overall investment of €42,911 against a ministerial loan of €7740. Three trainers were employed for general training: Rosanna Lopez: responsible for managing volunteers, Vol.To. Maida Caria: accredited trainer, Vol.To. Sandro Prandi: accredited trainer, Vol.To. Experts in general training were also employed concerning specific necessary skills not possessed among Vol.To employees: Nice Law Firm Stefano Lergo: civil protection expert Enrico Bussolino: third sector expert. They were involved after general training of trainers for specific projects and on average each project required six trainers, for a total of 185 trainers, of which 87 were male and 98 were female, with an average age of 51 years.

4.2. Activities

The activity carried out included acquiring generic skills on preordained topics and specific training provided within the host organizations with work activities in the project context defined for each. The generic training considered four macro-areas with a total duration of 42 h for each class (consisting of a maximum of 25 people each) delivered in the first 180 days to provide useful elements for understanding and elaborating the experience of the Civil Service. The macro-areas treated customized based on the project of interest concern the values and identity of the national civil service, active citizenship, and the young people within the civil service context. The frontal lesson (40%) is the classic technique for teaching, where the trainer deals with a specific topic using his/her studies and experiences in the field of civil service and related issues. Support of diversified instruments includes documentary screening, PowerPoint presentations, reading of texts, and testimonials from external experts. Non-formal dynamics (60%) includesthe most interactive techniques between the trainer and the group and between the members of the group itself such as role-play, simulations, plenary discussions, group work, expressiveness workshops, and sharing of personal experiences. Generic training supports the experience, although specific training and experience in the civil service are more characterizing and have a bigger impact. Each project required a period of specific training on project activities for a minimum of 50 h with teachers who are experts in the subject with many years of experience and/or a degree relevant to the activities envisaged. All the organizations involved chose to administer more hours than the minimum required. On average, the specific training lasted 75 h with a minimum of 72 h and a maximum of 108 h, delivered within the first 90 days of the project. On average, each project required six trainers, for a total of 185 trainers, of which 87 were male and 98 were female, with an average age of 51 years. It is sufficient to refer to the project activities indicated in the table below. In addition, each volunteer was accompanied by a tutor, who monitored and supported people (a minimum of 10 h per week). The need to which Vol.To responds through the project activities includes an activity equal to 30 h a week for 12 months. The areas of action concern minors and young people's cultural animation, organization and management of workshops for children, and participation in events for children and families (Figure 2).

The individual specific activities for each project falling within the defined activities of general interest can be found in Appendix B.

To be able to map the change in skills and knowledge of each subject, the civil service project envisaged participation in a skills certification path in collaboration with the University of Turin. The path started in parallel with training and field activities involving the subjects in five steps. Certification of skills is part of a project funded by the European Union and adopted for Erasmus+ courses' certification. The reference model used was born from a European LEVER UP project that was created in line with the Non-formal/Informal Learning Validation (NFILV), and Validation of Prior Learning (VPL) approaches. Creation of the reference model was created by partners between 2014 and 2016 in Italy, the Netherlands, Denmark, Spain, and Poland [130]. LEVER UP was created to help individuals enhance and make visible transversal skills and competencies acquired through non-formal and informal learning experiences, for example, by volunteering. This allows them to

increase their awareness, social responsibility, employability, and mobility. The first step is to create awareness of the value of the experience carried out in the volunteer/civil lawyer from a human and educational point of view. The key factor in this step recognizes that skills can be learned in informal settings, and volunteering is one of them. Each experience allows a person to learn specific knowledge and skills, which allows for skill development. The first step was conducted through an interview.

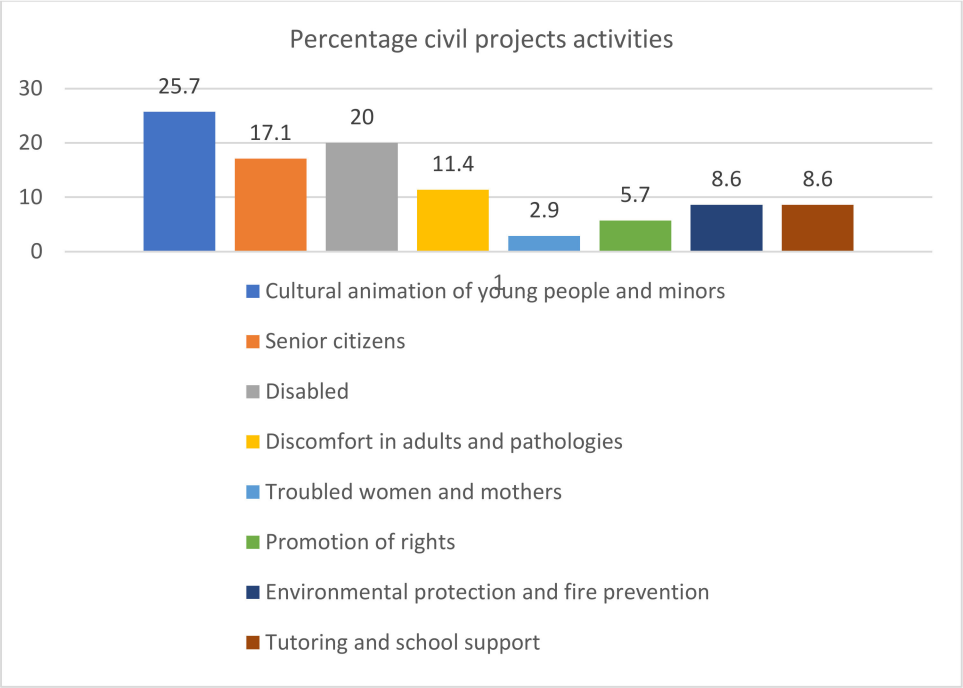

Figure 2. Percentage of Civial Project Activities.

In the second step, the subjects were helped by their tutors and had to reflect on what they have learned and the skills they developed during the year of Universal Civil Service. To understand which skills were acquired, the Lever Up tools were used, which allowed for a comparison between their level of competence and that which is described in the European standards. In the second step, the subjects were helped by their tutors. They had to reflect on what they learned and the skills they developed during their year of Universal Civil Service. The Lever Up tools were used to define the skills that were acquired, which allowed for comparison of their competence level with that described in the European standards. The third step involved documentation and collection of evidence on the skills acquired through various types of materials (photos, audio, video, reports, presentations, letters, storytelling). There was also an optional part in which it was possible to declare how the chosen skills related to school, work, volunteer work, or other experiences. The documentation and evidence collected were evaluated by an external commission, composed of Vol.To and the Faculty of Psychology, which analyzed the documents and evidence presented based on pre-established criteria and based on the level of complexity experience. In the last step, the subject acquired a greater awareness of his/her skills. The growth of awareness about these abilities will be useful to the volunteer to strengthen their self-esteem and for personal development. Finally, a certificate of validation of Lever Up skills will be issued, which can be used in various areas, such as work.

4.3. Output

The output included the 94 trained volunteers, the 42 h of generic training and the 75 h of specific training, the number of subjects who participated in the certification of skills and the project paths carried out.

4.4. Outcomes

The outcome achieved refers to participation in continuing training. The outcome is defined by the percentage of people who followed continuing vocational training after graduation. The outcome is related to the change in the skills and behavior of the subjects. Moreover, among the outcomes is also the impact of the number of hours of activities carried out thanks to the civil service in addition to those that the host subjects already carried out. Of the subjects in this study, 32.4% managed to validate at least three competences with appropriate evidence as required, while 44.1% preferred to focus exclusively on one of the 15 competences provided by the standards. The remainder did not complete the validation process.

4.5. Social Impact Assessment

The self-assessment associated with the certifications acquired highlights a first approach linked to personal change. At the end of the course, participants were provided with a questionnaire to map this aspect. The participants found a behavior change in almost all cases thanks to the skills and the path taken.

Furthermore, for 93.8% of participants, the change was good (21.5% good, 27.7% excellent, 44.6% excellent) while only 4.6% were considered sufficient and 1.5% insufficient. Of all the participants, 96.9% believe they increased their skills, are oriented to work on the project, and were able to identifythe soft skills that the project intended to instill in participants. The indicator is above the average as the 96.9% achieved by the Vol.To project exceeds the national average for the same parameter in the previous year by 15.8 percentage points. The certification of skills certifies the subject's ability. The second impact is linked to the activities carried out and generated 1440 h for each subject within the host institution, impacting the general population through activities of general interest.

The real novelty is being able to map the impact of the activities on the territory, which, through specific actions, respond to the public interest (or general interest) de facto in integrating state public activities.

4.6. Interventionist Journey, Interview Results and Evaluating Volunteer Activity Approach

The development and definition of the approach adopted for measuring the added value and the consequent social impact generated saw the collaboration of one of the authors with four key employees of the voluntary service center Vol.To who deal with deciding and developing the project and an official of the Italian council of Italian Council Presidency responsible for the project.

Based on previous experiences, the president of Vol.To had the need to identify and map the impact of civil service project. In particular, he declared, "I am sure the civil service has potential repercussions that must require an objective evaluation of the value generated given that the center co-finances the project." The need to map the impact and determine the added value is also stated by the official of the Italian Council Presidency who said, "We need to know if the objective of the project approved and shared by our offices has been achieved and what the results are based on to the public resources transferred." Duringvarious meetings, the two employees who deal with the definition of objectives, activities, and results highlighted two main aspects: "We need to identify the impact of training towards objectives of general interest and real change" and, "We understood that the activities in collaboration with the host third sector organizations have an impact on the whole system that allows to carry out activities that otherwise would not have been provided." No one has highlighted the difference between partner organizations participating in the project, different interests, or internal conflicts. With respect to the

specific question concerning the legitimacy of the hybrid organization configured in the project during the design phase of the approach to be adopted to evaluate the impact and relative value generated, the president of Vol.To states, "There are no problems with the legitimacy of collaboration between organizations with different objectives because they all converge towards a common goal that leads to greater welfare without creating real differences between all those involved." Indeed, all the subjects have taken for granted the sharing of the project's formal and informal objectives within a hybrid organization that sees the project presence of different subjects with opposite legal forms. All highlighted the importance of mapping the added value generated and determining the impact of the funding from a perspective of efficiency and analysis of the change generated, in this case by the subjects selected by the civil service.

The cost effectiveness and reliability of the measure are two fundamental requirements for measuring volunteering activities and confirm the national need for an international framework to measure volunteering activities [131]. The need to effectively identify and add value can be achieved through interviews with civil service volunteers. In agreement with all the subjects, the activities and changes, skills and abilities detected by each subject were evaluated. Some examples of interviews can be viewed at [125] but will be summarized in the outcome section. However, the method is subjective and not objective and cannot determine the enhancement of the volunteer activity's impact during the civil service on the system. The Italian Ministry of Labor and Social Policies already proposed a methodology to determine the value of volunteering in the third sector. The proposed scheme defines an indirect replacement method that allows identifying the hourly value of volunteering carried out to allow an objective quantification. During the periodic annual meetings, the interventionist approach made it possible to identify that the indirect method was the best one for determining the impact on context. According to the SIA analysis, all elements led to the quantification of the impact. The replacement cost can be determined through the following method:

UWIFR = $\sum$t HiVi Wi
UWIFR = replacement cost for single function
Hi = average hours worked by volunteers in function i
Vi = number of volunteers who performed the function i
Wj = average salary applicable to function i

The approach identifies the real value of the volunteers' hourly activities based on the type of service carried out at the host organizations or at private or public companies that are partners of the initiatives. The determined value is shared within Vol.To and accepted by the Ministry which approved it as an objective value for determining the hours of volunteering. The determined value is shared within Vol.To and accepted by the Ministry which approved it as an objective value for determining the hours of volunteering.

4.7. Understanding Social Impact and Measuring New Value Creation

This section proposes the desired approach determining the added value linked to the specific activities carried out and the related social impact. The project's economic value starts from the evaluation of income and expenses related to the project. The revenues include public transfers linked to the recognition of expenses and revenues for consultancy to third sector entities that received the subjects in charge.

For the development of its social activity, Vol.To has generated economic value created which is distributed to human resources through the payment of wages and all related charges. Suppliers were remunerated due to the purchase of products and services necessary for the production of the services and management costs related to the structure. The value relating to personnel costs includes 68.40% of the activities carried out by the head of the Civil Service project in the figure of Dr. Maida Caria, for 17.63% of the activity carried out for the selection of participants in the course, for 12.02% linked to the activities of the internal trainer and a residual part for contracted external training. The head of the Civil Service's activities concerns the entertainment activity of institutional relations

with the region, the Department of Youth Policies, the university, the high schools and the Foreign Office of the City of Turin. The manager also managed the project sites' accreditation activities, planning, monitoring, research, selecting volunteers, maintaining relations with 35 tutors, and providing general training for 111 subjects (42 h for four classes). The activities of the head of the Civil Service lasted eight months.

The person in charge of the selection activities is configured with the management of institutional communications relating to the projects and participated in the selection interviews for a duration of two months. Simultaneously, the training phase that saw the specific design for the training course and delivery can be qualified with one month of activity.

Training activities related to 1.95% of the performance carried out by a safety expert (4 h module), activities of a communication expert (5 h module), and assistance for the legal part carried out by two lawyers (5 h).

The remuneration of suppliers, on the other hand, is divided by 96.94% into printing services for material used for the training course (roll-up printing, postcards, A3 posters, gift vouchers, plasticized signs for each organization, riders for each organization, A5 flyers, and printing personalized T-shirts for each volunteer) and the residual part for the hospitality offered to the Civil Service party. The management costs are completely related to expenses for the general training room used (42 h for four courses) and expenses for using the workstation equipped with PC (Office) for eight months.

The activities represented in the reclassification of financial items can also be assessed through a questionnaire administered to civil service volunteers at the end of the course. From the data obtained, another degree of satisfaction is highlighted concerning all the aspects evaluated. In analyzing the financial statement, there is no real distributed added value as the costs are higher than the project's revenue. Vol.To has covered the difference of €25,711 with its own operating income. In proportion, the project absorbed 1.32% of the total fund. Table 2 represents the financial statement of income and expenses.

Table 2. Prospect of income and expenses.

Element	Values in € Year 2019
Revenues from consultancy institutions	9400.00
Transfer for reimbursement of training expenses from the Department of Youth Policy–Italy Government	7740.00
Economic value	17,140.00
Remuneration of suppliers	655.00
Remuneration of personnel and utilities	40,936.00
Management fees	1390.00
Economic value distributed	41,911.00
Economic value absorbed	25,711.00

From a first analysis, the civil service project absorbs rather than generates value, but this is wrong if one evaluates the impact and not the single reality. However, the volunteer activity carried out on the territory can be defined as the real distributed impact that did not represent financial terms. A total of 94 volunteers were employed, of which 36 were males and 58 females. In general, the qualification possessed by the majority of participants is in the Higher Middle School License (56 volunteers), followed in order by the University Diploma (14 volunteers), the Lower Middle School License (13 volunteers), and Degree (11 volunteers). Of 94 volunteers, 44 were employed in the city of Turin, and 48 in the Province of Turin.

Therefore, the impact of the civil service in economic terms includes the activity of 94 volunteers located throughout the region with a hypothetical remuneration of €17.11 per hour recognized in terms of enhancement of voluntary activities in the project. Volunteering

hours are recognized through the tabular criteria previous described (Section 4.2) associated with the fifth level of contributions (educator, hours without title, head worker, head cook, home assistant and tutelary services operator, hours of social assistance involved in basic assistance or otherwise defined, coordinator hours, teacher or manual and expressive activities, guidance with programming tasks, masseuse, entertainer, general nurse or childcare assistant with educational functions).

The same criteria were adopted by Vol.To on the occasion of the 2011 Single Deadline Call included in the financing activities of the projects of volunteer associations. The recognition and enhancement of voluntary work is a practice aimed at enhancing the third sector's contribution, methods, and push towards European recognition which took place by CSVnet in the national association of service centers for volunteering (CSV), which includes 62 of the 63 Service Centers for Volunteering.

Each volunteer worked 1440 h in one year. Therefore, the volunteers added value in the unrecognized territory for €24,638.40. Net economic contribution due monthly to each volunteer was equal to €439.50 per month and €5274 per year, which is equal to €19,364.40 for each volunteer. If the enhancement considers the number of active volunteers involved in the project, the value generated should be equal to €1,820,253.60. If we consider the value absorbed by Vol.To for public transfers and recognition by third sector entities, the net value is equal to €1,803,113.60. This value is further decreased by the economic value (net of transfers and contributions) absorbed for realizing the project (equal to €25,711), which brings the quantification of the activities carried out to €1,777,402.60. This is a value that does not find correspondence in financial result, but which is distributed throughout the territory. Therefore, out of 2500 Third Sector Entities accredited by Vol.To, the national civil service contributes €710.96 to the workforce for each. With 35 organizations involve in the project, the value for each organization of the hours worked would be equal to €50,782.93. According to the data, this activity has an impact on the provinces of Turin, Vercelli, Cuneo, and Asti. In 24 cases, there is expectation of a collaboration with public bodies such as civic libraries, hospitals, municipalities, schools, universities which would increase the overall value.

5. Discussion

The realization of the civil service through new organizational forms responds to the highlighted need to reduce available resources and obtaining a better impact in terms of performance [22]. The evidence provided by this case study analysis highlights how the social impact assessment and the breakdown into five phases of the analysis guarantees a real ability to determine and map the change up to the evaluation of the value generated through the quantification and qualification of social impact [25,26]. The process is innovative because SIA is applied together with interviews, interventionist analysis, and methodological determination of a hybrid organization's value. Vol.To is configured as hybrid organizations that directly carry out a coordination activity based on public funding and collaboration and by the host subjects (third sector, private and public partners) that involve the adhering subjects. The observation interventionist and the interviews confirm how hybrid organizations on specific welfare and social activities are able to overcome institutional limits with a capacity for dialogue between the different forms that strengthen the achievement of objectives [22,117,118]. Public funding that necessarily requires the involvement of other subjects in order to effectively respond to the need of the context for the allocation of voluntary resources of civil service on the territory on specific activities accompanies a vision of prolongation of interests and needs towards subjects with different forms, where business models and organizations share purposes and methods. The interviews highlight the shared need of the two financing organizations (Presidency of the Italian Council of Ministers and Vol.To) to define the territorial impact and value generated by highlighting an approach capable of mapping changes. In the literature, analyses of sustainability approaches and models focus on a single organization, proposing valid models exported to other types of participating organizations. In the case analyzed, the

approach analyzes cross-cutting elements such as social change, welfare, and educational activities carried out, and the economic context's impact, providing a broader and more generalizable vision. The analysis also highlights the elimination of the potential conflict between different interests usually identifiable in the network. The minimization of costs is evident for the public sector given the co-financing of Vol.To although this approach highlights from the accounting documents a greater control of inputs and outputs planned upstream and shared by all subjects with less bureaucratization of access to resources and the effective generation of value [11,14,16]. It is not possible from the analysis to state that the hybrid organization is better than direct management by the public sector. However, it is indisputable to affirm that the third sector's reform and the need to map the resources provided are due to an awareness of the limits already highlighted by the new public governance on the management and evaluation of performance between public and private entities. At the same time, the public sector alone would not be able to trace the market need, would not be able to identify the right placement of the subjects adhering to the civil service, and would not be able to provide proper training and assistance in the path of individual growth without stealing resources from a sector where austerity has already led to a reduction in staff in search of efficiency [30].

The orientation towards a common interest of public service leads to the determination of objective indicators capable of supporting and supporting the financing decisions and determining shared projects within hybrid organizations.

6. Conclusions

Through theory and case study, the study highlights that hybrid organizations generate social and economic value thanks to the change generated by the activities carried out. This value is determined in social–educational and economic well-being that would not have been successful without hybrid organizations. Therefore, the study confirms the first definition and configuration of generated value that is attributable to organizations oriented to the public interest [16,21]. The value generated is often an intangible value such as the change in skills or the economic fallout that does not present reporting by the organizations themselves. The case study represents for practitioners and academics an excellent starting case study to highlight all the cases in which public funding between subjects generates hybrid organizations for the principle of the prevalence of economic substance over legal form [118]. The social impact assessment adopted within the study provides a useful tool to map and determine the change given by the impact and the real value, which can be objectively quantified. The approach adopted can be generalized to any business and contributes at the literature on hybrid organization and social impact. Social impact assessment is a necessary tool to determine the value creation by hybrid organizations. In the case examined without the analysis, the hybrid organization had the determination of the outcome without being able to assess the real value creation that was determined on the change in individual skills subjects (social change) and the economic value distributed on the territory. Therefore, social impact assessment is one of the tools that public administrations and hybrid organizations must use to allocate resources and objectively enhance public interest activities inside the new complex organizations. The breakdown of impact assessment through the five elements of the value chain (inputs, activities, outputs, outcomes, and impact) guarantees a linear definition of the value generated through change with procedural objectivity capable of grasping hybrid organizations' complexity. The value generated or absorbed is the change generated by the impact measured based on the incidence of public resources allocated. The case study analyzed does not allow to generalize the metrics adopted for inputs, activities, outputs, results and impact. The impact that personalization requires is based on the context and objectives of interest and quantifying each country's added value [122,123]. The impossibility of generalizing the precise metrics but only the approach generates several research questions aimed at identifying indicators and measures that can be shared for each sector or social, environmental, and educational project. The study is part of the debate on evaluating

efficiency, effectiveness, and external context need of hybrid organization, providing new stimuli and reflections through the literature and case studies on value creation. Evaluating the performance, impact, and generated value of hybrid organizations initiates a debate within the area that is interested in post-modern public management. The analysis could begin a debate on the relationship between generated value and sustainability in the light of reducing expenditure and the response to epidemic crises.

Civil service impact assessment is common to many nations and requires a reproducible methodology for assessing change and generated value. The two approaches defined the impact in terms of skill change and individual approach with a certified change verification, and the real impact and economic value of the project concerning what was transferred and absorbed, which highlight real sustainability of the activity realized by the particular form of hybrid organization in the welfare system. The hybrid organization has an impact in social terms (for the change in the behavior of volunteers) and economic terms (for the value generated and the workforce made available to the third sector and private entities). It also increases the ability to respond to the questions of the market of social, welfare, and educational services envisaged by the project with the sharing of expectations, objectives, and cost-effectiveness required by the public sector, which is the project partner itself.

Limitations and Future Research

The study carried out presents only one case that should be analyzed in similar international contexts, although civil service projects highlighted characteristics and organizational change between adhering subjects are common. The approach adopted is suitable for analyzing the civil service's impact and value but could change metrics according to each hybrid organization's specificity. Future studies should highlight the impact of hybrid organizations and their generated value. When the literature is rich enough, it will be possible to determine common approaches to organizational clusters. The empirical evidence suggests that the approach could be guided by the common purpose of all the subjects that come together to achieve a common goal. This hypothesis should be refuted by new evidence.

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Appendix A

Organization	Partner
A.I.B. Volontari Antincendi Boschivi-Sez. Bussoleno	A.S.D. ANIMA LIBERA: teaching of laboratories and courses A.C.F. MUSIC-ALL:singing lessons, show assembly.
A.S.D. L'isola che c'è	City of Druento: consortium of social assistance services of Pianezza-Day Center Management
Amici di Lazzaro	/
Amici di M.A.I.S.	M.A.I.S. Ong-CIFA Ong-RE.TE. Ong-Collaboration during workshops and in communication and promotion activities. Cascina Roccafranca e Associazione Variante Bunker: collaboration in the promotion and dissemination of materials, making available spaces for activities.
Area G Volontari	/
Associazione Don Bernanrdino Reinero	Associazione di Volontariato "Libro Aperto": collaboration for the creation and organization of events and workshops.
Auser Volontariato	Municipality of Turin and the police: transport network at affiliated hospitals and healthcare facilities. Cooperativa "La Valdocco": delivery of water to users reported by the cooperative and also organization of recreational activities in air-conditioned environments. City of Carmagnola-Transport and accompaniment of children with disabilities CISA 31-Transport to health facilities Municipal Pharmacy: free delivery of medicines for people over 75 or with walking problems. School complexes transport and accompaniment of pupils with handicap for playful support activities and psychomotor activities.
Banco Alimentare	/
Cascina Macondo	Associazione C.P: conducting the folk dance workshop-pedagogy and history of folk dance. Gruppo musicale Lumayna: use of the voice-popular song-rhythms-musical games. Municipality of Torino:search engine project-accreditation at the Ingenio Shop for the sale of artifacts and books; logistical support for the organization of events and dissemination of the project;contribution. VI circumscription di Torino: loan for the use of a small gym for the dance; theater workshop in Turin; contribution to the ceramics and storytelling workshops at the Via delle Querce facility where disabled people are accompanied by educators and OS of the Municipality
Contact	/
Cooperativa Quadrifoglio	Associazione Culturale Balancé: specific consultancy with its experts for the creation and monitoring of laboratories.
Cooperativa Quadrifoglio	Associazione Culturale Balancé: specific consultancy with its experts for the creation and monitoring of laboratories.
Cooperativa Quadrifoglio DUE	Associazione Culturale Balancé: specific consultancy with its experts for the creation and monitoring of laboratories.
Croce Rossa Susa	Cities: Piedmont Region: hospitals andreports; conventions and agreements as needed.
DI.A.PSI.- Difesa Ammalati Psichici-PIEMONTE	/
Don Bosco 2000	/
Fondazione Circolo dei Lettori	Civic library of Torino: loan of books and reading aloud in hospitals, making instrumental and human resources available. Associazione La Brezza Onlus: involvement in the preparatory phase, through the provision of human resources. Host organizations: Humanitas Gradenigo hospital, Mauri-ziano Umberto I hospital, Molinette hospital, Univoc Institute, "Lorusso e Cutugno" prison.
Fondazione Piazza dei Mestieri Marco Andreoni	Associazione Piazza dei Mestieri: organization and management of project activities. Immaginazione e Lavoro soc.coop: promotion of activities proposed by the civil service. Cooperative La Piazza: graphic design and printing Vanni Editore-promotion and distribution, training of civil service volunteers.

Organization	Partner
Jeshua	Image Capture: supply of materials. La Piccola Casa della Divina Provvidenza, Cottolengo Torino: support at the project ü F.I.S.M. Torino, Centro di Formazione Francesco Faa di Bruno-Formazione Scuola dell'Infanzia: provision of material and human resources and spaces.
L'Altra Idea	Associazione Sportiva Dilettantistica HIDALGO Onlus: implementation of equestrian rehabilitation projects, collaboration with qualified therapists.
L'Isola che non c'è	/
La vita al centro	Associazione Biodanza Italia-Biodanza Teacher Training Baby Fox Association:provided professional entertainers. La Casa di Riposo San Vincenzo-The Cooperative Terra Terra, Azienda Agri-cola Apenocciola: provided an animator available for the creation and management of the G.A.S.
Legambiente Metropolitano	Istituto per l'Ambiente, Educazione Scholé Futuro Onlus: organization of workshops on air pollution and traffic control, environmental education activities in schools.
Merope	A.Ge. Piemonte: support for relationships with families. Ammp Sede Val Sangone: support in case of disabled transport. Echos Communication: support in the communication action.
Parrocchia Cottolengo	Ente Piccola Casa della Divina Provvidenza: to transmit these values to the minors and young people of the SGB Cottolengo oratory, through training meetings with operators and moments of sharing.
Presidio Sanitario San Camillo di Torino	University Hospital City of Health and Science Turin, School of Medicine of the University of Turin-Implementation of medical rehabilitation projects and research activities University of Turin, Department of Psychology: shared research activity.
S.E.A.–Servizio Emergenza Anziani	PRO NATURA Torino-Promotion of events, guided tours of the area. Ass. TELEHELP Turin-Te-rescue and telephone assistance. UNI.VO.C.A. Unione Volontari Culturali Associati: cultural events aimed at the elderly. ASSOCIAZIONE AMICI DELLA SACRA DI SAN MICHELE ONLUS: organization and provision of volunteer guides and witnesses for real and virtual visits.
S.E.A. delle Alpi	/
S.O.G.IT–Opera di Soccorso dell'Ordine di San Giovanni–I Giovanniti	S.O.G.I.T.-COMITATO REGIONALE PIEMONTE: activity coordination function.
Società Cooperativa Sociale La Mimosa	/
Sollievo	A.S.D. ANIMA LIBERA: teaching of dance workshops and courses. A.C.F. MUSIC-ALL: singing lessons, show production and assembly.
Specialmente Tu	/
VIVERE–Associazione volontari e famiglie con figli Portatori di Handicap	FONDAZIONE FRIMARIDE ONLUS: communication, awareness of the project. FORUM DEL VOLONTARIATO: search for volunteers and awareness of the project.
Vivi gli animali	Department of the Sustainable City, Municipality of Collegno: educational and awareness-raising programs, organization and promotion of information meetings and recycling laboratories, use of natural resources and recycling. San Donato Social Cooperative, Abele Lavoro Social Consortium: integration of people in socio-economic difficulties, educational and awareness-raising courses Djanet Association: educational and awareness programs. Tricycle Association: educational and awareness paths, use of natural resources and recycling.
Vol.To	Permanent Interregional Forum of Piedmont and Valle d'Aosta Volunteering:contacts with schools, project promotion, teacher meetings, scheduling of meetings, participation in the final event. S.A.A.-School of Business Administration of the University of Turin: provision of a communication expert for training.

Appendix B

Scope of Action	Type of Activity
Cultural animation of minors and young people	- Organization and management of workshops for children
	- Participation in the organization of events for minors and families
	- Sports activities management
	- Participation in the preparation of games, activities, sets
	- Planning of individual activities to be carried out with children and families
	- Organization of events and playful-recreational activities
	- Organization and management of proposals for local schools
	- Management of relations with external bodies
	- Secretarial activities: management of parental registrations and authorizations, reporting of events
	- Support for managing and maintaining contacts
	- Event communication through social media
	- Educational, linguistic, and relational support activities and participation in business workshops
	- Organization and participation in educational and recreational outings
	- Organization and participation in school camps
	- Supporting school educators/teachers in carrying out educational activities
	- Search through the web for initiatives aimed at children
	- After school support for school staff
	- Management and coordination of groups during the educational workshops
	- Support the Association's volunteers in information meetings in schools
	- Map the public places of aggregation of young people and organize meetings
	- Process data to improve the service
Senior citizens	- Social telephony
	- Accompanying the elderly
	- Animation and organization of playful activities
	- Support for socialization
	- Handling of paperwork with online forms
Disabled	- Listening to family members
	- Design of ad hoc activities for individual users
	- Organization and participation in individual and group outings with clients
	- Participation in apartment group activities
	- Management of creative workshops for the disabled (dance, poetry, reading, etc.)

Scope of Action	Type of Activity
Adult discomfort and pathologies	- Search for new food donors and personal contact
	- Monitoring of partnership requests from catering companies
	- Drafting of agreements with the charitable structures
	- Counter activities for collecting information, requests, needs
	- Reception and listening to people in conditions of hardship
	- Accompanying users in handling bureaucratic procedures
	- Assisted medical transport
	- Emergency services as stretcher bearers
	- Promotion of the culture of emergency through active participation in training opportunities for schools and citizens
	- Supporting hospital staff during targeted interviews with patients and their families in order to understand their needs.
	- Quarterly update of a report indicating the list of critical issues and patient needs
	- Research and analysis of the offer on the territory in terms of structures, facilities, associations and services in general that may be of help to the patient who returns to their home
	- Setting up moments of meeting between patients to encourage socialization and sharing their difficulties
	- Organization through the support of other professionals, of recreational activities
	- Contact discharged patients by telephone having feedback on the perceived well-being linked to the results of the rehabilitation process concluded in the structure.
	- Report through a specific report of the path developed during the project with the details for each patient taken in care
Troubled women and mothers	- Anti-trafficking prevention and support for former victims and single women
	- Support for entire families and very young people
Promotion of rights	- Research farms at Km. 0
	- Management of the G.A.S.
	- Planning and realization of laboratories
	- Accompaniment in external activities
	- Realization of courses in schools (relationship with teachers and students)
	- Design of survey questionnaires
	- Planning of interventions against discrimination
	- Management of a class
	- Realization and management of multi-ethnic events with students
	- Mapping of intercultural events in Turin and its province

Scope of Action	Type of Activity
Environmental protection and fire prevention	- Monitoring of the territory and mapping of areas at risk of forest fire
	- Monitoring of the territory and sighting of outbreaks in periods of high risk of forest fires
	- Forest fire prevention activities with the cleaning of woods and forest areas
	- Information and awareness-raising activities for citizens and the public administration on the issues of preventing and fighting forest fires
	- Creation and updating of specific web pages
	- Implementation of training programs with the schools in the Municipality of Bussoleno
	- Organization of periodic network exercises between the public administration and the various associations
	- Promote workshops on new mobility to create opportunities for exchange between the various bodies
	- Stimulate the participation of citizens to dare new lifestyles and take care of air quality
	- Promote and disseminate good practices with information material, dossiers and statistical reports
	- Strengthen information and communication through the site, Facebook and YouTube
	- Meeting, knowledge and care of farm animals
	- Management of school visits and any hospitality
	- Use of natural resources and recycling
	- Care of the green and common areas
	- Organization of work groups for people in socio-economic difficulties
Tutoring and school support	- Scheduling of meetings in schools
	- Preparation of materials needed for the lesson, computer programs, exercises, textbooks.
	- Interviews with the teachers of the students followed alongside an educator
	- Cognitive meetings with families
	- Realization and administration of tests for the student
	- Data analysis
	- Study support activities
	- Monitoring of the activities carried out, the conduct and performance of students
	- Presence to guarantee children with SEN access to work in small groups
	- Presence in the after school and summer center to guarantee children with difficulties a positive experience in attending various activities
	- Presence in the canteen to allow all children to experience a situation of well-being during convivial moments with a child/adult ratio below the legal limits
	- Collaboration with the management and administration to organize cultural events

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The Human Capital for Value Creation and Social Impact: The Interpretation of the IR's HC Definition

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Abstract: The paper aimed at assessing and identifying in a comparative way the potentiality and suitability of the Integrated Reporting (IR)'s definition of human capital (HC) within a selection of companies and social cooperatives. Employing in-depth interviews, the qualitative study analyzed the points of view of a selection of human resources managers to firstly check and test the connection between human capital, value creation, and social impact. The contribution of human capital to value creation is not easily recognized, especially by smaller-sized companies. The results suggested that the HC definition of the IR in the for-profit sector seems to be more applicable to the top management than to the whole workforce, while it appears as "fitting" for the managers of social cooperatives because of its explicit focus on ethical values, loyalty, and motivation. This allowed opening possible channels of dialogue between the profit and not-for-profit sectors. The paper proposed practical recommendations to operationalize the IR's HC definition.

Keywords: human capital; integrated reporting; value creation; social impact

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1. Introduction

The paper focused on human capital (HC) and value creation dynamics in a selection of Italian conventional firms and social cooperatives. The paper intended to clarify whether the Integrated Reporting (IR) definition of the HC defines a model that could be applicable in order to better manage the value creation process and indirectly influence the potential social impact. To achieve such a goal, researchers interviewed a purposive selection of HR managers from conventional firms and social cooperatives active in the Northwest of Italy.

The IR framework foresees six capitals: financial, manufactured, intellectual, human, social and relationship, and natural. Such capitals are defined as 'stock of value that are increased, decreased, or transformed through the activities and outputs of the organization. This represents one of the main key concepts of the IR and also one of the most criticized' [1,2], mainly because of the difficulties in comprehension and adoption by firms.

One of the main theoretical references followed in the research is the critical accounting approach [3,4]. The critical accounting approach [5] insists on the role of accounting as a catalyst between organizations and companies to make accountability a wider, inclusive, and democratic process focused on their social impact. The paper contributed to the debate on the limits of the conventional accounting/non-financial reporting and accountability models [6,7], especially if applied to the social entrepreneurship sector [8]. This difficulty of adaptation and application of traditional models increases exponentially in measuring, evaluating, and reporting the most intangible elements of organizations, such as HC [9]. The same standard-setters highlight how the HC is one of the most difficult capitals to be measured and disclosed.

The literature [10,11] has shown that, up to date, the implementation of the IR model is still limited; however, the IR is recognized as a tool for transparency and accountability. Research based on a sample of IR prepared by a sample of 18 European State-owned enterprises between 2013 and 2017 shows an increasing level of disclosure during the observed period [12].

Some emerging studies [13,14] are highlighting the potentials and limits [15] of the IR model. This paper can be included in this recent branch of research. In this sense, the purposive sample of Italian companies and social cooperatives can constitute an interesting and challenging field of analysis not sufficiently explored. Additionally, the study intends to practically contribute to the call launched by several authors [10,16,17] to critically stress and explore benefits and constraints related to the IR application and directly contributing to the active debate promoted by the IIRC.

The definition provided by the IIRC states that the HC is related to 'people's competencies, capabilities and experience, and their motivations to innovate, including their:

- alignment with and support for an organization's governance framework, risk management approach, and ethical values →
- ability to understand, develop and implement an organization's strategy →
- loyalties and motivations for improving processes, goods and services, including their ability to lead, manage and collaborate'. This definition is closely linked to value creation [18], goes beyond economic performance, and is an extensive and wide concept involving different scales also external to the organizations.

The dynamics between HC and value creation represent a quite challenging topic to be in-depth studied both from the academics and the practitioners' point of view. The IIRC itself highlighted the difficulties to adequately explore the connections between HC and value the creation process, in which reporting can play a crucial role for communication and measurement issues. Despite the fact that human capital is increasingly recognized as a relevant driver of corporate competitiveness and sustainability, the limits of financial measurement systems, which cannot fully evaluate intangible resources and are inadequate to deal with the difficulties inherent to managing the development of new emerging assets, are clear [19]. As stated by Beretta et al. [20], intellectual capital disclosure, in fact, is mainly with a backward-looking orientation and with a limited focus on human capital. In order to try to overcome this issue, few studies proposed frameworks for integrating tangible and intangible aspects of HC to comprehensively measure the overall level of human capital, as that by Mubarik et al. [21].

The peculiarity of the present paper is related to its effort to include the HR manager's point of view in the whole analysis, jointly with a more financial-oriented perspective. The same IIRC highlighted that the HR managers were one of the least involved categories in the IR redaction phases. Starting from such challenging aspects, the paper focused on the analysis of the human capital and value creation process within two different types of organizations: conventional firms and social cooperatives. Conventional firms represent a quite well explored scope of analysis for research around IR issues, on the other side, the social cooperatives have been less analyzed. It has been noted that the debate in the social sector around the measurement of social innovation outcomes and impacts mainly reflects the perspective of private social finance that increases the demand for consistent measures to account for the intended social impacts of capital allocation. In response to these demands, a number of organizations have developed methodologies for measuring the success and impact of innovation, attempting to incorporate social and environmental 'bottom lines' [22]. This area of research constitutes an interesting and challenging perspective for a series of reasons. First, the IR appears to be an appropriate framework for combining both qualitative and quantitative elements and is adaptable to structures with entrepreneurial characteristics used to manage multiple capitals and seems to be compatible with multiple objectives and stakeholders' claims as social cooperatives [23,24]. Second, the IR approach appears consistent with nature strongly oriented on mission and commitment typical of some types of social cooperatives focused on disadvantaged people, quite low trained/educated and normally kept outside from the "traditional" job market. Third, the social cooperatives, despite being "quite" formally ignorant of the IR model, are already applying such an approach in practice more than conventional firms with a less holistic vision.

Starting from the assessment of the HC definition provided by the IIRC, the paper analyzed the links between HC and Intellectual Capital (IC), compared HC and value creation dynamics between conventional and social entrepreneurship, and built some possible bridges and exchange of best practices between them. In particular, the paper addressed the following research questions:

- RQ1: Is the IR's HC definition effective and applicable to both conventional companies (including SMEs) and social cooperatives?
- RQ2: Are the components of the IR's HC definition useful to articulate a clear picture of the value generated by the HC management of conventional companies (including SMEs) and social cooperatives?
- RQ3: Could the IR be a possible and useful driving force to improve the HC valorization within both conventional companies (including SMEs) and social cooperatives towards the goal of improving social impact?

The paper is organized as follows: first, we introduce the theoretical framework; then we detail the methodology applied in the research; afterward, we explore and discuss the main findings; finally, we expose the final conclusions of the study.

2. Materials and Methods

The search for greater accountability, the need for valuable and context-oriented HC information (not merely quantitative), and the establishment of proper and specific non-financial reporting models constitute some key issues for the whole social economy sector [25,26]. Previous research as that by Tejedo-Romero and Araujo (2021) showed that companies are adapting to new regulations and voluntarily disclosing information on human capital, a trend that signals their commitment to responsible attitudes towards employees and stakeholders [27]. For such reasons, the paper can be inserted within the stakeholder theory framework, which analyses the value creation at the firm level and considers the implications of stakeholders' expectations on the information disclosure process 6/16/21 7:46:00 PMp.m. At the same time, the behavioral decision-making theory, more focused on the individual level and on the firm attributes and stakeholder perceptions, also represents a valuable theoretical framework for the analysis [28] mainly because of its greater attention to the increased IR quality and not only on its implementation process.

While the greater part of the academic literature on IR is mostly focused on the studies of the Intellectual Capital (IC) [16,29–34], looking at the HC as a subcomponent of the IC together with the relational and organizational capitals, only a few works directly addressed HC in a stand-alone perspective [35,36].

In the last decades, many definitions and interpretations of HC have been proposed related to the human resources field and around the IC perspective [37–39]. Despite HC and HR (human resources) could be often interchangeably used, HC includes a whole range of factors such as people's knowledge, competencies, experiences, and the full contribution of these to the firm's performance [40]. According to a managerial point of view, HC is composed by staff know-how, staff formal qualifications or aptitude, union relationships with management, and staff relations [41]. Human capital is captured of 'know-how, education, vocational qualification, work-related knowledge, work-related competencies, entrepreneurial spirit' [20].

At a general level, findings from a cross-country analysis emphasized the role of human capital in enhancing the awareness of and compliance with environmental regulations, thus leading to an improvement in environmental performance [42].

However, the measurement and the impact of the specific human capital is a challenging activity. An example is that of Ortega-Lapiedra et al. [19] that defines a human capital specific index (HCSI) to analyze the influence of firms' human capital in their activities devoted to environmental improvements through innovations to produce new ecological products or to introduce eco-innovative processes based on more sustainable resources and the reduction of waste. The study evidenced empirically that human capital is responsible

for creating a sustainable competitive advantage in the eco-innovative activities of the business.

Another study has evidenced that both the human capital development and employees' commitment were found to have a partial mediation in the strategic HR management practices and sustainable competitive advantage [43].

These intangible resources are embedded in the context in which they work and can be presented "in action", showing their contribution to value creation [44]. In order to cover the lack of information in regard to the long-term value creation process [45], the IR framework-based disclosures are characterized by a greater variety of items and more emphasis on human capital [46]. Moreover, as stated by Passetti and Cinquini [47], developing an integrated approach to reporting could provide a more complete overview of the companies' characteristics and performance, with the aim to reduce information asymmetry.

Despite its several criticisms and challenges [15,18,48,49], some emerging research has shown that the IR could be a suitable model to be applied also to hybrid and not-for-profit organizations [12].

The general definition given is that hybrid organizations are organizations created in order to address public needs and to produce services that are public in character, at the same time resembling private corporations in the way they are organized and managed [50].

It has been shown that the combination of public and private characteristics in one organization generates ambiguity that manifests itself in the strategic objectives as well as in the structure of the organization. As stated by Cornforth [51], organizational governance is important in helping to manage competing pressures in order not to degenerate into being no different from capitalist forms of businesses. In fact, one of the challenges facing hybrid organizations, such as social enterprises, is how to combine different logics: commercial logic necessary for operating in the market with a 'charitable' logic of pursuing a social mission [52,53].

The ambiguity imposes specific abilities of the management especially, in driving the human capital [50]: research suggested that organizational membership decisions and socialization policies contribute to imbuing members with organizational values and associated working practices so that they may act based on moral reasoning and commitment to organizational goals [52]. It was found that human capital affects social capital [54] and that experience and cognitive ability influence personal relations and complicity. In other terms, the organizational performance also in terms of social impact is strongly influenced by human capital.

One of the starting points of the research lay in the assumption of Gamerschlag and Moeller around the positive cause-effect link between HC reporting and disclosure and the skills [55], motivations, and commitment of the workforce. Producing human "capital" disclosure on the one side allows companies to determine and appreciate the contribution that human resources provide to the overall economy of the company and on the other, to understand how to improve it, through both a qualitative and quantitative assessment done ex ante or ex post as well [56].

The model was based on a relationship between a company's human capital and its financial performance, taking three factors into consideration (see Figure 1):

(1) workforce-related factors (human capital), such as the workforce's capabilities, its motivation, and commitment;
(2) company-internal factors (structural capital) include a company's operational performance, its innovation ability, as well as its corporate culture;
(3) company-external factors (relational capital), parameters outside the company that are relevant to a company's success.

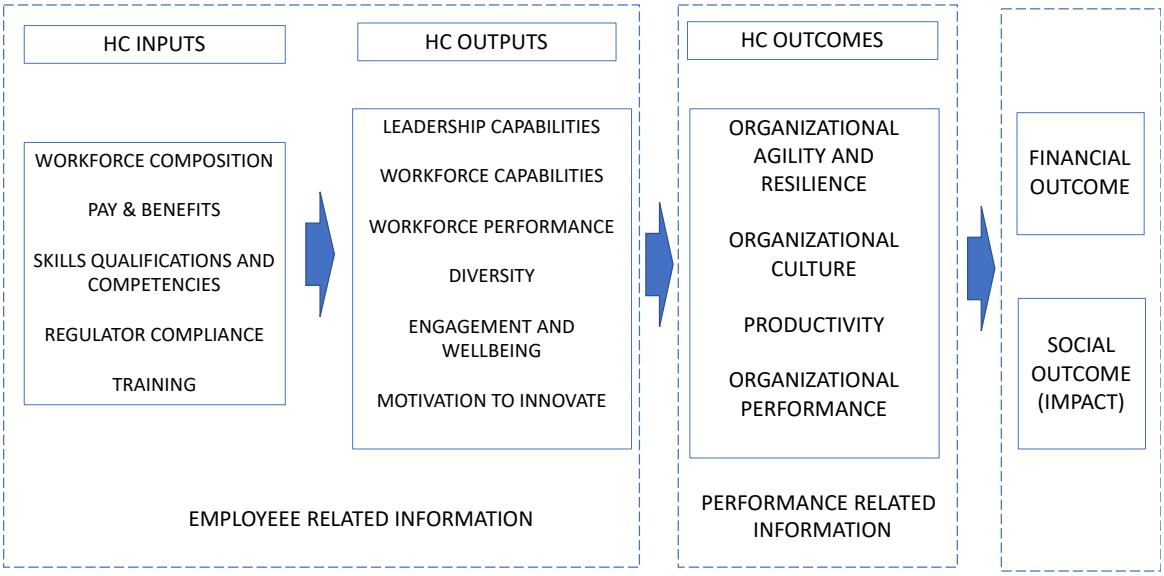

Figure 1. The cause–effect link model.

Our analysis responded to the call launched by Gamerschlag and Moeller to empirically test the veracity of their assumption, focusing in particular on the first factor (the workforce-related or human capital) [55], since it appeared to be the most coherent both with the HC definition of the IR and the core of the paper as well, through semi-structured qualitative interviews addressed to the human resources managers (HR), of ten selected Italian companies and social cooperatives.

The logical process applied in the research was as follows. Starting from the HC definition of the IR, the focus was on three joint levels/points of views of value creation processes: (1) the value creation for/within the HC concept; (2) the value creation for/within the company/cooperative; (3) the value creation towards the external environment (i.e., the social impact).

In order to explore such value creation processes, the following key issues/drivers were checked: (1) how the HC definition of the IR was adapted to the "work scheme" of the selected organizations; (2) how the single HC definition components effectively contributed to the value creation; (3) whether the social cooperatives expressed a greater level of acceptance/sharing of the HC definition; (4) how such potential greater level of acceptance might imply a better HC management and, thus, a greater internal and external value creation.

The main research statement lay around the hypothesis that whether an organization (mainly a hybrid form as the social cooperative) effectively interpreted and applied all components of the HC definition of the IR, might consequently improve its performance and management of HC and, thus, enhance its social impact also outside.

The research approach was qualitative and interventionist [57]. The data collection was based on multiple sources, both primary and secondary data. The primary data were collected from semi-structured interviews addressed to a purposive sample of HR managers coming from companies and social cooperatives active in the Northwest of Italy, while the secondary data (when available) were collected through the content analysis of the NFR (included the companies-integrated reports when available), of their website's sections related to sustainability and CRS issues, and through the reading of other documents (as the social reporting of the cooperatives when available). The combined use of primary data and secondary data made the research design more convincing and consistent [58] allowing to validate the information collected and to identify further insights [59].

The semi-structured interview method (see Appendix A) allowed a certain level of reciprocity between interviewer and participant, enabling to improvise follow-up questions based on the participants' responses [60]. The choice of in-depth and semi-structured

interviews was in line with the localist perspective in accounting [61] to make it more inclusive and increase its role and social effects. Furthermore, semi-structured interviews allowed understanding 'the way interviewees perceive the social world under study' [57].

The interviews were carried out between February and November 2020. The interviews were addressed to 5 HR managers from 5 conventional firms (5 senior) and 4 HRs (3 senior and 1 junior) from 3 social cooperatives. The characteristics of the respondents are disclosed in Table 1. Regarding the saturation issues, 9 interviewees have been considered enough by Francis et al. [62] if considered as an initial analysis sample. Additionally, samples in qualitative research tend to be small in order to support the depth of the case-oriented analysis specific to this methodology [63]. Additionally, purposive qualitative samples provide richly-textured information on the investigated phenomenon [64].

All interviews were recorded, transcribed, and analyzed using qualitative content and discourse analysis techniques [65].

The "twin approach" towards sustainability reporting identified by Stubbs et al. [66] shaped the necessity to include the HR perspectives. According to this author, involving both internal and external stakeholders allows achieving an actual Integrated Reporting, with many organizational units active in collecting information, communicating, and reporting as stakeholders contributing to the value creation process [66], improving the whole quality, scope, and usability of the reporting. Accordingly, purposive sampling was used to select key informants (HR managers) with acknowledged expertise by their experiences in leading HC [67].

The 5 HR managers of the conventional firms were selected through the geographical proximity criteria, the very different average number of employees, and different sectors, while the 4 HR of the social cooperatives work for some of the biggest social cooperatives from the Northwest of Italy active in the field-of-work integration of disadvantaged workers.

The comparative lens between conventional firms and social cooperative, despite already applied by other branches of the economy (see, for instance, the works on performance and productivity of Thompson [68] or that on wage differentials of Bailly et al. [69]), represents in our knowledge a quite emerging and challenging approach in the literature on sustainability and integrated reporting and human capital issues [70,71].

The choice of very different types of respondents (see Table 1) has been influenced by the will to achieve a pluralist and broad point of view (in line with the dialogic polylogic accounting approach—see Dillard and Roslender [72]) and to study the perspectives of organizations with different levels of added value in terms of human capital intensity. Additionally, a peculiar aspect regarding the social cooperatives respondents was that both the organizations expressly asked to involve two different persons (1 senior and 1 junior from the same department) in the research interviews. This request allowed a different and double point of view on the research topics and also to partially deal with the limited number of involved social cooperatives.

An additional important asset of the selected companies regarded the involvement in the study of 2 companies whose core business was respectively HC management (R3) and IC management (R4). This specialization allowed one to achieve a privileged point of view, mainly in the section of the analysis focused on the connection between HC and IC.

Strictly connected with the willingness to provide a multiple and pluralistic point of view was also the fact that the selected companies provided different types of non-financial reporting. The small and medium conventional firms did not provide any report, 2 social cooperatives provided a social report (which is mandatory for them according to the Italian law), the biggest company of the study was the only which prepared an Integrated Reporting.

Table 1. Overview of the main respondents' characteristics.

ID RESPON-DENT	GENDER (M/F)	SENIORITY (Years in the Company)	INDUSTRY/SECTOR	CONVENTIONAI FIRM OR SOCIAL COOPERATIVE	N. OF EMPLOYEES	TYPE OF NFR REPORTING PROVIDED (If Any)
R1	M	8	Pharmaceutical	Conventional firm	560	n.a.
R2	F		Taps and fitting	Conventional firm	87	n.a.
R3	F		Human resources	Conventional firm	2293	IR
R4	M		Intellectual property consultancy	Conventional firm	100	n.a.
R5	M		Textile	Conventional firm	13	n.a.
R6	F	30	Welfare, socio-health and educational services	Social cooperative	743	SOCIAL REPORT
R7	F	34	Cleaning and Environmental Services	Social cooperative	459	SOCIAL REPORT
R8	F	5	Cleaning and Environmental Services	Social cooperative	459	SOCIAL REPORT
R9	M	22	Circular economy/waste collection and disposal	Social cooperative	250	n.a.

3. Results

The findings from the interviews were divided into the following sections:

1. Knowledge and use of the human capital concept,
2. HC and social value creation,
3. Value creation through HC between conventional firms and social cooperatives.

3.1. Knowledge and Use of the Human Capital Concept

Concerning the level of sharing and operability with respect to the IR's definition of HC, respondents were asked to respond by using a 5-point Likert scale (1 = completely disagree, 5 = completely agree). Almost all respondents answered 3 or 4. Thus, the level of sharing to the contents of the HC definition of the IIRC appears quite high, even if at the same time such definition has still been criticized for its excessive technicality and the too theoretical and less operational approach. At the same time, the representatives of the social cooperatives showed a double attitude about the efficacy of applying such HC definition to the basis of the cooperative, to the less-skilled workers/working members. On the one hand, the HC definition can be more easily applied to the top management level ('firstly, the motivations to innovate and the ability to understand, develop and implement an organization's strategy', R9), whereas some of the HC definition components ('as the alignment with and support for the organization's governance and the loyalties and motivations towards the final results', R8) could be more efficiently expressed by "simple" working members. Indeed, for them, the support and the loyalty towards the social cooperative itself was very important, representing an actual 'way to take back their destiny' (R9).

Another point highlighted by some respondents was the possible lack of the HC definition provided by the IR model. Among such identified lacks, one of the most significant ones was the '*self-awareness of people, of workers to be such, to be part of something very specific*' (R7).

The empirical study was aimed at verifying whether and how widespread the use of the term HC was within the selected companies since previous research had also high-

lighted a general preference towards other terms such as people, employees, staff [73]. It could be observed that a slight majority of companies did not use this term in their corporate communication, while most of them usually employ it within their own organization. The company size does not seem to be a determining factor regarding the use of the term HC within companies. One of the most senior respondents, HR of social cooperatives, clearly stated: 'I do not like the use of the word human capital, because (it is) too much connected to the financial capital concept' (R8), while the younger professionals appeared quite open towards the importance of considering the human and financial capital at the same level within the organization.

It was much more interesting to analyze the personal definitions of HC provided by the HR of the companies. Such definitions could be divided into two main categories:

(1) on the one hand, those who see the HC as a physical resource of the company, a "fuel that makes it go", from a perspective mainly oriented to the interest and the point of view of the company;
(2) then, some look primarily at the more "intangible" components of the HC, those related to the skills inherent or developed by employees primarily on a personal and individual level, and not only and solely in the workplace or the formative framework.

This interpretation tends to conceive a closer connection between the company and its staff that can allow the opening of a quite unusual perspective on the delicate dynamics of human capital and the creation of value. On the one hand, the person who leaves the company represents a loss for both parties, from the point of view of the resource, the commitment, and the skills acquired or provided but also about the social and relational capital developed in the company. On the other hand, people (with wrong or right skills and characteristics) placed in the wrong positions can constitute an inefficient investment both in terms of performance and commitment to the company mission as well.

An aspect emerging from the interviews was a sort of division made by some respondents—mainly from the conventional firms—between the '*more skilled and R&D employees for which the academic titles count more, and the human capital represented by the less skilled and more operational job positions for which motivation is a greater asset to be considered*' (R1). If the technical competencies of people composing the IC are normally clearly recognized by HR, a controversial issue regards the difficulty of the IC "elite" to relate with the HC people entailing quite rare occasions of sharing and cooperation.

The analysis about the level of operationality and possible measurement of the IR's HC definition was performed, streamlining and facilitating the responses through the aggregation of the HC indicators into different categories as follows:

(1) employee involvement, staff satisfaction rate, motivation, commitment;
(2) corruption, business ethics, respect for human rights;
(3) diversity of staff, gender equality;
(4) experience, training, education;
(5) average age/professional seniority/qualifications, education;
(6) productivity;
(7) turnover, staff loyalty/commitment rate.

Then the respondents were asked to order such indicators according to a Likert scale (1 most significant; 7 less significant).

The HR managers confirmed the difficulty of measuring and evaluating the HC, which is usually applied in a limited way by research companies and, in any case, requires large investments of time and resources generally not accessible by smaller companies.

It emerged that the HRs included multiple indicators that hold together employee involvement/staff satisfaction rate/motivation/commitment in the first place. The parameters of average age/professional seniority/qualifications/education were placed in the second position. On the other hand, in third place, there were some fairly different variables: productivity, staff turnover/retention rate, and corruption/business ethics/respect

for human rights. Finally, in the "last" position, there was the parameter diversity of the staff/gender equality, a theme that, although it is currently the page for academics and professionals (think also of the growing attention to the issue of diversity and inclusion as an engine for the enhancement of personnel and contribution to the creation of value [74]), from the answers collected it appeared relatively marginal compared to other more "conventional" indicators and macro-themes.

3.2. HC and Social Value Creation

In the light of the interviewees' insights, we tried to understand the usefulness of the components of the IR's HC definition to articulate a clear picture of the value generated by the HC management. We Considered, in fact, that the IR's definition of HC is based not only on people's competencies, capabilities, and experience and on motivations to innovate, but it also relies on specific components (such as alignment with and support for an organization's governance framework; risk management approach; ethical values; ability to understand, develop, and implement an organization's strategy; loyalties and motivations for improving processes, goods, and services; ability to lead, manage, and collaborate) that can be directly or indirectly linked with the company's social impact or social value created.

In this second perspective, the HC definition of the IIRC expresses a concept of human capital that is closely linked to the creation of value, and that goes beyond the economic/performance aspects, implying a more extensive concept involving wider areas and scales (as the social, environmental, cultural, etc.) also outside the company [75,76].

Therefore, the research hypothesized that the creation of value (as that described by the IR model) outside the selected organizations might in some way give rise to effects similar to those of the social impact.

The social impact of a company or organization can include social and environmental changes resulting from activities and investments. The impacts on society include issues related to the issues of equality, livelihoods, health, nutrition, poverty, security, and justice [77]. Investments that create social impacts can take various forms and consist of time, skills, material resources, network connections, reputation, and other valuable resources.

Based on the feedback of the HR's responses, we could identify two main dynamics/attitudes.

Firstly, on the one hand, the realities of SMEs explicitly declared that they do not contribute to either of these two effects/phenomena. If this answer could be partly explained by perhaps a limited knowledge and/or mastery of these concepts, on the other hand, an interesting aspect emerged. That is the fact that, although these companies denied contributing in a positive way to the creation of value and/or social impact, in reality, they did so in practice. This contribution could pass primarily from the economic and social benefits that come directly to the families of their employees, to have shown attention to the times of corporate, social, and environmental sustainability since before it became a sort of moral obligation for all business realities, but also to the fact of using a network of expressly local suppliers and sub-suppliers, thus, helping to keep the reference production district active both in terms of employment and relationships of trust.

Secondly, on the other hand, the larger companies (with more than 100 employees) showed that they know these two concepts well and recognize the contribution of their companies without doubts/hesitation. This different attitude could certainly be attributable to greater marketing and communication skills but also certainly to attentive and well-organized corporate welfare policies that see their contribution in terms of social impact as a mix between the transmission/acquisition of skills, attitudes and positive values, stable employability levels over time, and a combination of different corporate welfare tools. Namely, positive policies that place the 'social impact generated as the starting point and ultimate goal of these business realities, although sometimes it can mean making more efforts and having slower reactions in terms of performance/reaction on the market' (R5).

A controversial and unexpected point that emerged during the research is that of how we cannot always talk about HC and the "incremental" creation of value, but how sometimes the opposite can happen: that is, a decrease in value '*in terms of loss of social/ethical/skills . . . impoverishment of the HC due to the company . . . there may be business contexts in which this occurs*' (R3). What emerges is that this negative dynamic/vision, which associates a strong moral/social connotation with the concept of value, that is the cause of this impoverishment and should be sought more from the managerial point of view than from that one of the people who are part of it.

3.3. Value Creation through HC between Conventional Firms and Social Cooperatives

Partially connected with the topic of the loss of human capital was the specific point of view expressed by the implicit nature of the social cooperatives: '*if you count 1 when you are part of the cooperative when you live it you don't count 0.5 or other, you count 0*' (R6).

To compare with the for-profit organizations, the interviewed social cooperatives more easily recognized the social impact of their organization. An exhaustive example was offered by R9, who described a quite paradoxical situation where '*people entering in the buildings to collect waste paper were maybe those who before committed crimes inside the same buildings [. . .]. The same happened with some supermarkets where our former laborers were then employed*'. This is to say that quite often, the people/human resources appeared as the first direct witnesses and proof of the social impact generated by the social cooperatives, first, in terms of self-determination, employment, and welfare opportunities. Such employees also expressed a large and shared corporate spirit made of positive and virtuous behaviors to avoid negative effects on the whole organization to which they belong.

Obviously, it is not possible to make a significant comparison between the social impact generated by a social cooperative and a more conventional firm because of their different nature, vision, and mission. However, such findings allow to undermine a series of common key points between these two types of organizations:

- a quite hidden acknowledgment and awareness of the generated social impact;
- a quite general lack of shared and effective quantitative metrics to measure and assess the related social impact;
- a general impression that the external social impact of the organization may, in some cases, appear more easily catchable/caught than the internal social impact.

Some respondents expressed several doubts regarding the efficacy of the social impact concept, which appeared as a quite vague and trend model, rich in quantitative metrics (e.g., increased number of beneficiaries; the scope of the carried-out activities; etc.), not well adapted to be used to assess the actual management of human people and to represent the value creation process inside and outside the organizations.

4. Discussion

The first aspect that clearly emerged from the research is the limited mutual knowledge between these two sectors, which, therefore, entails visions strongly conditioned by the backgrounds or personal/social networks of the interviewees. In some cases, the opposite vision between profit and not-for-profit emerges more: '*I can say that we are the polar opposite of the not-for-profit, we belong to an investment fund and we have to soak the return in coffee and milk every morning*' (R1).

One of the priority aspects that emerged from the analysis is the vision of a not-for-profit/social enterprise sector more attentive to the ethical dimension of work, in which people are valued more for their level of sharing the mission and values of the organization rather than their skills and performance. About the skill topics, indeed an interesting aspect to be co-opted by the conventional firms should be the skills enhancement process, sometimes "sacrificed" *by the social cooperative because 'once you enter there, you adapt yourself, [. . .] we don't make treasure of those who are innovative*' (R8). Another aspect that could be by the for-profit sector is a more organized and structured process of staff selection. Social cooperatives indeed would tend to privilege the empathic concept than the performance

or the attitude of people. Conversely, an interesting insight that social cooperatives could bring is the ability and experience related with fragile and marginalized people, those, which normally would be excluded by the conventional labor market.

Closely linked to the theme of the performance was how, among the points in the profit sector that could constitute a virtuous example to export/apply to the non-profit sector, there was a better company organization, respect for deadlines, and deadlines. While, on the one hand, this interpretation could be partially confirmed by the literature on the subject, which describes the difficulties of the not-for-profit sector to approach the issue of the corporate organization more efficiently, on the other, it reflected a vision of the non-profit sector as a sector almost aside; it must not work willy-nilly within the market dynamics of large companies.

Secondly, another relevant aspect of the interviews was the importance of the company size. That is, if at a qualitative level the social impact of the non-profit sector is often seen as greater, at a quantitative level, according to some respondents, larger profit companies would seem to be able to count on a greater reach in terms of social impact. From certain points of view, this vision could find partial confirmation in the past industrial reality of the Italian north-west (see for example how some large historic companies such as FIAT, Olivetti, etc. have in the past largely influenced the human, social, and entire cities through an intense loyalty-building action of its employees, through ad hoc services, and benefits), on the other hand, two possible objections could be outlined. First of all, it was necessary to be careful not to confuse the social impact with the positive effects linked to economies of scale and production districts; furthermore, it could be observed how these large industrial realities have radically changed over time and currently have a territorial presence and an economic (and social) impact, not comparable to the past. The attention that more and more SMEs and social enterprises are showing towards the need to be accountable to the more social and environmental aspects of their activities, despite not representing a legal obligation for them, made us understand how much human capital and value creation, even outside companies, is becoming an increasingly transversal aspect, regardless of company size. Another contact point between the SME and the social cooperative was the existence of less hierarchical relations to compare with the large conventional firms, for instance, '*the HRs know all (employees) by name and surname, . . . we are as a big family*' (R8).

Despite their different approaches towards human capital and value creation dynamics, both conventional firms and social cooperatives expressed similar points of view about a series of common topics (Figure 2).

In another perspective, the results showed HC and IC as two different but complementary concepts (in line with the IR vision of capitals) and both difficult to be measured and assessed. Strongly connected to the link between HC and IC was also the common topic of the intergenerationality, namely the challenge of balancing innovation and creativity of the younger with the expertise and the usual and "traditional" organizational way of the most senior human resources. In this sense, it may appear significant that both the social cooperatives included in the study decided to involve also some younger colleagues in the interviews, in a general view of skills and duties handover. In Addition, the importance of transferring the knowledge to the new generation is a core value of social enterprises in general.

In this context, the contribution to value creation (whose definition largely varies among the different respondents) and social impact was not easily recognized, especially by the smaller-sized conventional firms. It was quite largely recognized as the mission of the organizations to provide '*thought the job, opportunities of growth, and development of capabilities within a company that partially can be yours*' (R6). Conversely, the social cooperatives appeared more conscious of the internal and external value created by its activities because '*the social cooperative must respond to the needs of the local community in terms of fragility and social disease, but also the need for job opportunities*' (R6).

OUTCOMES/INSIGHTS	MOTIVATIONS/IMPLICATIONS	CONVENTIONAL FIRMS	SOCIAL COOPERATIVES
Difficulty to measure, assess, and communicate the HC implications, effects		x	xx
Limited knowledge of the IR Framework	Not surprising considering that most of the selected organisations are not requested by law to provide any type of NFR	xx	xxx
Unclarity and unknowledge of the social impact concept	Due to different reasons i.e. because the organisation is not completely conscious of its social impact; because it appears a quite "fashionable" model not applicable in the realty, etc.	xxx	x
Presence of reciprocal bias and unknowledge/misunderstanding each other	May impede an effective exchange of possible best practices around HC and value creation	xx	xx
General good sharing level towards the HC definition provided by the IR model and quite shared vision on the need to include also the emotional component of people/employees in such definition		xx	xxx
Positive social effect for all categories of employees (first the most disadvantaged and the less skilled) generated by the actions and by the organisational model of the selected organisations	Despite such effect is not well reported though specific metrics or standards and despite the several criticisms shown by the HRs on a well-recognised and shared model (as that of the social impact)	xx	xxx
Close link between HC commitment and value creation dynamics		x	xxx

Figure 2. Similarities between conventional firms and social cooperatives. Legend: x = not very evident; xx = evident; xxx = very evident.

Regarding the truthfulness of the paper's initial assumptions, which state a similar effect between the HC and value creation process and the social impact, at this stage of the research, partial veracity could be observed. Indeed, for the social cooperatives, this assumption appears more easily confirmed since they highlighted a mission strictly connected to dealing with people's diseases, increasing at the same time their wellness; for the conventional firms, such a link diverged according to the type of sector, organization, etc. In this sense, the most conscious of their social impacts ('*we generate value because people live experiences together, exchange, grow together, confront each other*', R3) were the companies that, by nature, employ the most qualified people (i.e., as the intellectual capital property consultancy or the human resources management company). Conversely, the most "traditional" and manufactured companies showed more limited awareness and knowledge about the concept and the scope of their social impact ('*we cannot speak of a contribution to the creation of value, [here] there is too much gratuitous malice . . . everyone looks only at their own reality*', R2). A separated discussion should be done with the unique family and SME company (see R5), where the limited number of employees could be translated into an in-depth knowledge and attention both to people's needs, characteristics, and to the local value chain and the environmental and socio-economic milieu as well.

Both the categories (conventional firms and social cooperatives) showed quite diffused HC biases, firstly related to the different levels of commitment and engagement and the

organizational management and performance. The IR appeared a quite suitable option of NFR also for the social cooperatives, firstly because of its "flexibility". The main challenge relied on how to equilibrate value creation and social effects granting more comprehensive accountability, including both private and social entrepreneurship needs and perspectives. One possible solution could be to overcome the traditional distinction between social and conventional enterprises, focusing mainly on '*good enterprises which means good and accurate management, leaving to the sons a healthy enterprise, valuing its human capital and future generation as well*' (R6).

Concerning the initial research questions on the basis of the main findings, we can say that the IR definition of HC can be applicable to both the organizations (RQ1), despite many respondents highlighting its better application to the management level and less to the basis of the workforce, while about RQ2 we can state that the social cooperatives appeared more conscious of the social value creation process generated through their HC management. The same happened in relation to the bigger conventional firms, which presented a more confident attitude, knowledge, and awareness around such topics to compare with the SMEs.

Findings showed that the issue of integrated thinking is still a controversial and quite complex topic to be clearly and effectively explored (in line with Dumay and Day [16]). In some ways, the social cooperatives stressed more the strict connection between financial performance and attention to the environment and the social aspects of their organizations, first, the employee's welfare and commitment. The same happened in relation to their quite strong attention to the relationship with the main stakeholders, suppliers of the territory. Conversely, the bigger conventional firms are more used to operate in an integrated way because of their complex and interrelated structure.

Finally, it could be observed that the IR model (and its definition of HC) has undoubtedly some potentialities for both types of organizations (RQ3), firstly, because of its flexibility 'that in practice seems designed to fit all organizations into the same framework' [78]. Nonetheless, the IR model still presents some limits of application and diffusion.

5. Conclusions

The qualitative study analyzed the points of view of a selection of human resources managers to test the connection between human capital, value creation, and social impact.

It seemed that the IR definition of HC is able to define a link between human capital, value creation, and social impact. It is not only based on people's competencies, capabilities, and experience. It is focused on motivation to innovate and on an explicit focus on ethical values, loyalty, and motivation. Even if the contribution of human capital to value creation is not easily recognized, especially by smaller-sized companies, the results suggested that the HC definition of the IR in the for-profit sector seems to be more applicable to the top management than to the whole workforce, while it appears as "fitting" for the managers of social cooperatives.

The research contributed to the theoretical debate on value creation [79,80] and to the more technical discussion on the difficulty of valuing the intangible aspects of organizations [81]. The value creation, its social effects, and its link with HC and IC [82] allow opening possible channels of dialogue between profit and not-for-profit organizations. In this sense, the research responded to the call launched by Girella and Dameri to apply the IR model to the third sector, social enterprises [83]. The research produced practical recommendations to make the IR's HC definition more operational and understandable and has made it possible to outline some steps that can be used to set up a sequential and circular model based on:

(1) recognizing that HC is an asset for the company (i.e., all respondents speak about HC but no one looks at it as capital, preferring the use of other concepts such as value, skill, etc.);
(2) evaluating the stock of HC based on personal skills, education-training-attitudes (a phase that normally occurs during the staff selection and hiring);

(3) acting in order to implement policies aimed at HC stock growth in order to improve the company's performance (in practice, it seems that some larger companies make this operational effort more evident/concrete than others);
(4) assessing the results/impacts of the company actions and policies in terms of increasing the individual sub-components of the HC definition. This is a phase very rarely carried out by organizations, primarily for reasons of excessive complexity and difficulty in measuring intangibles or partly also due to a mismatch between costs and benefits. Further investigations are needed to provide a more complete picture of such critical points.

Considering that most of the analyses have mainly considered the IR preparers' point of view [84], this analysis proposed the inclusion of the non-experts' opinions (like HR managers) around the IR. The positive effects of involving external staff (not normally included in the sustainability and non-financial reporting tasks) to enhance the institutionalization of IR and the integrated thinking in practice has been stressed by scholars (as Guthrie et al. [81]; Dumay et al. [75]), who highlighted the limited research related to the IR practice (instead mostly focused on the normative level) and the lack of the practitioners' contribution to the IR debate. The paper intended to contribute to filling such gaps.

An interesting insight offered by the research was the attempt to propose some categories of KPIs for measuring/evaluating the link between HC and value creation. The orientation of most of the HR managers towards the importance of commitment and the level of involvement of their HC was shown to be consistent with the definition of HC of the IIRC, which revolves around the key concepts of sharing and support of the governance, loyalty, and commitment. The results of the semi-structured interviews showed that the definition of HC provided by the IIRC represents a good level of completeness and recognition by the HC professionals. However, from an improvement perspective, such a definition should also include the most personal and emotional components of people and be integrated to become less abstract and complex.

The main final aim was indeed to make the non-financial reporting process more transparent, shared, and accessible (and consistent with a logic of dialogic polylogic accounting, see De Villiers et al. [18]; Brown and Dillard [82]), and get it out of the usual circuits of experts and large companies accustomed to dealing with the issue. On the other hand, the attention that SMEs are recently showing towards the choice of the IR model justifies the inclusion of SMEs within the research reference target [13,14].

A limitation of the research was represented by the non-inclusion in the respondents of representatives of SMEs, a category of companies which, despite being increasingly attentive to the issue of enhancing the HC and narrating its sustainability, is less used to dealing with the metrics of non-financial reporting.

In this context, an interesting starting point for future investigations concerns the inclusion of specific parameters on HC health issues within the KPIs proposed for measuring/evaluating the link between value creation and human capital. An innovative contribution, which could enhance the current IR definition of HC, mostly focused on the "traditional" aspects of human capital (i.e., skills, sharing of values, experience, etc.).

The next step of the research could be to analyze how much the management and protection of people during a period of global emergency can make a difference, both to make companies more performing but also more accountable and appreciated by customers, investors, and lenders. In this sense, it seems necessary that the internal debate within the IIRC also considers the need to include a reference to the healthier aspects and the protection of workers' health, along the lines of what has already been done by the 403 (Occupational Health and Safety) standard of the Global Reporting Initiative (GRI).

The research conducted lay the foundations for investigating, in more detail, the role that marginal actors can play in the debate on the degree of accountability and affordability of Integrated Reporting in companies such as SMEs and social enterprises, both in terms of the definition of contents and metrics that are closer to reality and more inclusive of their potential as possible users of this non-financial reporting tool.

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Appendix A

TRACK FOR INTERVIEWS—ENTERPRISES AND SOCIAL COOPERATIVES

a. BRIEF INTRO WITH OBJECTIVES AND PRACTICAL IMPLICATIONS OF THE RESEARCH: Focus on the non-monetary value of "human capital" in order to reach a common/shared model but also adapted to the needs of social cooperatives to improve personnel management, decrease turnover, enhance the role of conventional enterprises and social cooperatives in the creation of value for society, and social impact through the enhancement of the HC.

b. PRELIMINARY INFO
   - Company/cooperative name
   - Typology
   - Position held
   - Years of seniority in the company
   - Number of employees

c. HC AND INTEGRATED REPORT
   1. Do you use the term "human capital" (HC) in your organization?
      - yes (1)
      - no (2)
      - in part (3)
   2. If you don't use it, why?
   3. Alternatively, which term do you prefer to use?
   4. Based on your experience, could you give us a personal definition of "human capital" (HC)?
   5. For your work, have you ever heard of the Global Reporting Initiative (GRI) or Integrated Reporting (IR)?
      - yes (1)
      - no (2)
      - in part (3)
   6. The IR defines HC as "People's competencies, capabilities and experience, and their motivations to innovate, including their:
      - Alignment with and support for an organization's governance framework, risk management approach, and ethical values
      - Ability to understand, develop and implement an organization's strategy
      - Loyalties and motivations for improving processes, goods and services, including their ability to lead, manage and collaborate ".

      What do you think of this definition? Do you find it suitable for your organization?

7. Based on this definition of HC, in your opinion what are the best indicators to measure/evaluate the impact of HC on the creation of value for your organization (in order: 1 = most important, 7 = least important)?

   _____ employee involvement/staff satisfaction rate/motivation/commitment
   _____ corruption/business ethics/respect for human rights
   _____ staff diversity/gender equality
   _____ average age/seniority/qualifications/education
   _____ productivity
   _____ experience/training/education
   _____ staff turnover/retention rate

8. In your company/cooperative, the social report or another form of a non-financial report:
   - is required
   - you prepare it even if it is not mandatory
   - if you do, which standard do you use?

9. In your opinion, why is it (or not) important to prepare a non-financial report?
10. If you prepare it, what is the most difficult aspect to measure/value/tell when you talk about your HC?
    - Measure/evaluate
    - Valuing/telling

d. HC AND SOCIAL IMPACT

11. If you refer to the "social capital" of your organization, what comes to your mind?
12. How does the human capital of your company/cooperative influence its social impact?
13. How could the connection between HC and the social impact of your company/cooperative be measured?

e. HC BETWEEN NO PROFIT AND PROFIT

14. In your opinion, what are the main differences of HC between profit and non-profit?
15. Please indicate a positive aspect of the profit sector that should be co-opted for the management and enhancement of HC in the not-for-profit/world of social cooperatives.
16. Indicate a negative aspect of the profit sector in your opinion that should be avoided or in which the not-for-profit can instead set a good example for imitation.
17. In your opinion, is the social impact generated by the not-for-profit sector greater/lesser/equal to that of the profit sector, or it is not possible to answer this?
18. How can the world of research/university help you to improve your work of valorization, measurement, description of the HC?

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Article

Social Finance and Banking Research as a Driver for Sustainable Development: A Bibliometric Analysis

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Abstract: Social finance and banking with an embedded social purpose have been on the rise in recent decades. Social entrepreneurs have repeatedly stressed the critical need for financial support from social banks. This study aims to provide a bibliometric analysis of the status of the field in social finance and banking, recognising main topics from existing research and establishing future re-search challenges. Our study used science mapping workflow and multiple research questions to investigate the broad literature about social banking and finance. With in-depth bibliometric analysis, authors examined qualitative and quantitative variables as primary research infor-mation, relevant sources, subject areas, authors data, social, thematic and intellectual structure. The data was retrieved from Web of Science (WOS) and then analysed using Bibliometrix R-package. The analysis was based on a sample of 270 articles and demonstrates a multidisciplinary vision of the research flow investigated. Our results show several insights regarding journals, authors and geographical interest of this research stream. Specifically, the literature, although dwelling on social finance and banking, includes five theoretical and practical clusters as (1) people's well-being, combined with technological innovation, (2) governance, (3) ethical investment and sustainable development, (4) corporate social responsibility (CSR), and (5) transparency. The authors also note a line of research that observes technological solutions for the response to social and environmental problems. These results may be useful for researchers, practitioners, and policymakers to foster social finance and financial system tools.

Keywords: social finance; social banking; sustainable development; bibliometric analysis

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1. Introduction

Investment of capital for social and financial creation has ancient roots. Cooperatives, religious institutions, credit unions and mutual societies have been managing capitals for the social project for many years back. However, during recent times, new ways of managing finance for achieving positive social impacts have emerged, which have been classified under the term "*Social Finance*" (SF).

Past literature reviews have defined SF as an alternative financing tool for projects and ventures with financial returns that are also able to generate a positive impact on society, the environment and sustainable development [1–4].

On the same line is the definition of Périlleux [5] who explains SF as the sum of financial institutions, products and practices in which not only the maximisation of profit is sought but also social, ecological or ethical results. Additionally, SF includes initiatives such as savings groups, microfinance and collaborative finance (such as social crowdfunding).

More generally, the term SF indicates different models and approaches, such as crowdfunding, alternative currencies, social investment, microfinance, socially responsible investments, social impact bonds and venture philanthropy [5–8]. Therefore, as suggested by the latest results of Rizzi et al. (2018) [9], two forms of SF have emerged, including primarily social impact investment and ethical banking.

Moreover, when talking about SF, it is important to mention "Social Banking" (SB) as well. As is the case for SF, there is not only one correct definition of SB. For many people, SB could sound like an oxymoron, which is to combine two words that do not belong together. To others, SB refers to these institutions directed to charitable clients.

SB is also associated with governmental institutions, in addition to microfinance. Thus, Frans de Clerck, co-founder of Triodos Belgium and former head of the supervisory board of the Institute for Social Banking, concludes that there is no clear and unique interpretation of SB, as social, alternative, and ethical banks are definitions which refer to methods of giving money. According to the authors, therefore, there is no precise definition of SB as it belongs to different financial traditions [10].

Although De Clerck's definition remains interesting, for this paper, we adopt a more technical explanation. As defined by James Niven, from the Global Alliance for Banking on Values it is possible to actively engage in wide-ranging discussions about the future of the financial sector in order to have a direct impact on organisations which invests in social, environmental, and cultural issues. Hence, in line with Niven's argument, we define SB as banking where the main purpose is to have a positive impact on people and communities [11].

All these premises give the idea of two parallel research models that overlap in practice but demonstrate the inability of the literature to provide an analysis of the research flow conducted so far. This research gap has recently been highlighted by Rizzi et al. (2018) [9], which in its conclusions calls for the convergence of the two models in order to advance the development of the sector concerning commercial finance. Additionally, also the recent publications highlight the importance of sustainable financing tools for social purposes [12–14].

Therefore, this article proposes a broader investigation that includes the study of the primary bibliometric data [15–20] on peer-reviewed papers listed on the Web of Science (WOS).

The main results denote a multidisciplinary vision of the field of research studied. The literature includes an interesting discussion of the tools of social finance, sustainable development, social responsibility, and human rights challenges. Also, we note a research strand that observes technological solutions for the response to social and environmental problems. Our analysis is innovative for the topic of interest as it applies a methodology not yet used. Moreover, and more importantly, it affirmed that the social and right approach is not only related to the person but also the environment.

Focusing on SF and SB, our paper aims to map, discuss, and critique the research discussion on these topics answering the following questions: (1) what are the main features of these research streams considering authors, citations and geographical interest? (2) What are the most frequent issues and topics of this literature? (3) What are the possible implications for future research in this field?

The rest of the paper is structured as follows. Section 2 defines the current literature and debates why a bibliometric analysis using open coding methods may be useful to reach our research aims. Section 3 establishes the methodology flow. Section 4 shows the results of our research. Section 5 provides an in-depth data interpretation, commenting on and critiquing the main findings. In conclusion, Section 6 concludes this paper considering present implications and suggesting future research paths.

2. Background

During the past decades, SF and SB have gained importance and popularity, growing starting to grow significantly and attracting the interest of different stakeholders ranging from governmental agencies to mainstream financial markets. Although the accessible data on SF is limited due to the fragmentation of sectors and investment approaches, the market potential has been estimated to be extremely prosperous. For instance, microfinance, which can be considered an earlier example of SF, is estimated to contain over over USD $50 billion of loans to over 100 million micro-entrepreneurs [21]. Another study conducted by

the European Investment Forum outlined that the European SF market showed around USD $21 billion in 2013 in France, Italy, Germany, the Netherlands and the United Kingdom (UK), representing the leading markets [22].

SF in Europe is developing in different ways and forms, driven by other actors. In the beginning, SF was created to assist social ventures with their financial needs. Even though SF can create both social and financial value, social ventures sometimes face difficulties accessing different financial markets due to their nature and high risk [23–27]. Secondly, most European governments have recognised the potential and possibile of growth of SF. In this case, governments have been sustaining the development of SF through direct and indirect investment or through developing particular policies to facilitate SF markets [28]. Thirdly, SF provides the perfect scenario for the growth and demand of corporate social responsibility (CSR), firms in the financing and banking sector [29]. Lastly, SF attracts socially-minded investors, such as philanthropic organisations, or socially motivated people, who are continuously researching new methods of allocating financial resources to socially motivated firms, to not only returns but also keep their main priority, which is the "bettering of the society" [3,30].

Nevertheless, accessing enough financial resources is highly challenging for social enterprises [31]. As conventional funding in the social sector is scarce and limited to specific projects, they do not allow investment in overheads or product and service development. However, recently social enterprises have been gaining interest from venture capitalists because of their fast growth in terms of generating income [32]. Financial instruments considered in the discussion are mostly private equity, unsecured debt and their hybrids [28]. Notwithstanding, investors do not solely value just financial returns. The concept of impact investing [33,34] refers to proactively perusing social and ecological features together with financial goals. In this investing, the creation of measurable social impact is the primary goal, and financial returns are considered as additional benefits. During the last few years, social impact investing has gained traction in the USA and UK with an increased number of private impact investing funds spread across the globe [35].

The growing interest in the literature and the intersection of SF and SB theories, however, are not accompanied by specific bibliometric studies. For example, recent studies have focused on vertical research flows such as social entrepreneurship [36], the social aspects of Islamic finance [37] and sustainable banking investments [38], leaving aside a relevant research gap in addition to what Rizzi et al. (2018) [9] have pointed out, as well as the social impact outlined in Sustainability journal [12].

3. Methodology

To generate a dataset of relevant sources, the authors started with keyword selection as the giant step after research questions were assessed [39]. Our analysis considered "So-cial finance" and "Social Banking" as a research strategy. This strategy allowed us to fo-cus the research inclusively and explore the two research flows [40–42]. Keyword selection was outlined by Chen & Xiao (2016) [43] in a paper which suggested an analysis from the top-down level, considering macro-field analysis for the identification of broad research links. Additionally, our dataset creation benefits from the study of past relevant mile-stones [17,37,44,45] which allowed keyword analysis to consider qualitative and more re-strictive criteria. Therefore, the ABS list (2018) with its 1, 2, 3, 4 and 4* ABS star classification was chosen as it has been widely adopted as a policy tool and researchers commonly use it for the identification of quality scientific articles [46–49].

Besides, the authors use more research's filter.

Our analysis is based on an emerging and continually evolving field of research, therefore we have focused on all sources in the database including not only peer-review articles but also conferences as a source of knowledge [50].

Moreover, the articles are selected from the business, management, and accounting fields due to the research questions strictly related to these three studied fields [51].

Finally, to increase the understandability and quality of publications, the authors considered only English language and peer-reviewed articles [17,20]. Therefore, all non-scientific sources such as non-peer-reviewed books, white papers and popular articles were not considered in our analysis.

Applying this previous restrictive research criteria, the authors selected 270 articles for further analysis. After the definition of the field of study considering the literature gap, the selection of the proper database, and the identification of the more restrictive research criteria, the authors began the analysis using Bibliometrix a statistical package available on R-Studio [52]. The software allowed us to retrieve relevant bibliometric qualitative and quantitative information such as authors, citations, country of production, or keywords. Figure 1 shows all the methodological flow followed by the authors.

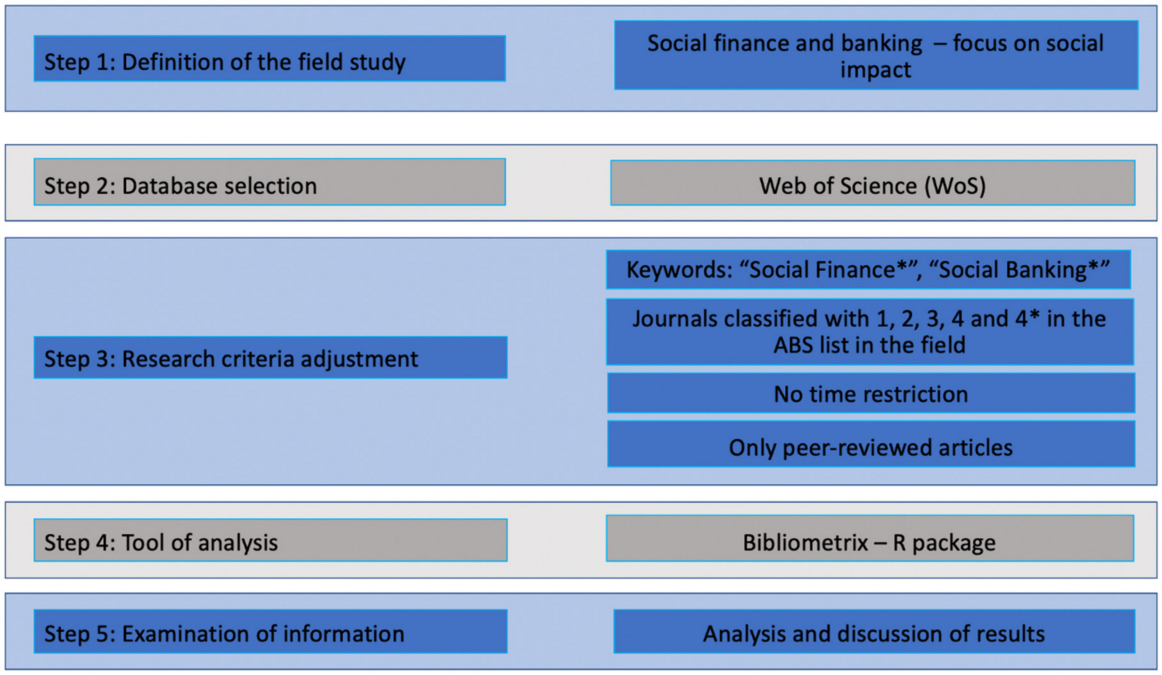

Figure 1. Characteristics of the bibliometric study. Source: Author's elaboration.

4. Results

As previously mentioned, this bibliometric analysis started by describing the dataset characteristics (and related implications) of the 270 records. The scientific production re-search of a specific field is relevant for understanding the evolution of the literature, de-tecting research trends and organizing past research to suggest future research lines. Therefore, in the next paragraphs, we present primary research flow information, relevant sources, subject areas, authors data, social, thematic and intellectual structure.

4.1. Main Information

The identified articles covered a period ranging from 1986 to 2019. It is only from 2015 that publications started to become systematic; the number of publications also be-gan to be consistent and steadily grew (Figure 2).

The reason for this research intensification is related to the fact that in 2015 all United Nations Member States adopted the 2030 Agenda for Sustainable Development, with the 17 Sustainable Development Goals (SDGs) at its heart. Furthermore, since that year in a more pronounced way, states and the scientific world have focused more attention on sustainability in all its forms. This can also explain the rise to the peak of publications on sustainability.

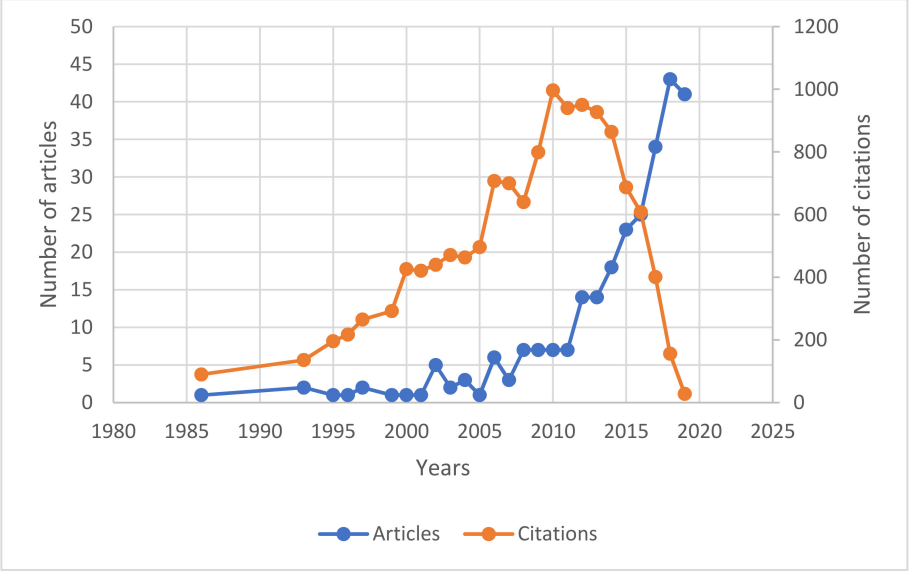

Figure 2. Distribution of publications and citations. Source: Authors' elaboration.

The data suggests that the topic has ancient origins. As can be seen, the quotations did not follow precisely the same trend as the publications—the citations up to 2010 were on the rise and reached over a thousand, after which there was a decrease. These findings suggest poor productivity in the early years. Table 1 indicates that researchers are aiming to solve this issue with a developing number of collaborations. In comparison, the number of publications and countries reporting on this issue has been gradually growing.

Table 1. Main information.

Variables	Explanation	Results
Timespan	Year of publication	1986–2019
Sources (journals, books, etc.)	The frequency distribution of sources as journals	19
Documents (articles)	Total number of documents	270
Average years from publication	-	5.96
Average citations per document	The average number of citations in each document	19.19
Average citations per year per document	The average number of citations in each article	2411
References	Total number of references	13.964
	DOCUMENT CONTENTS	
Keywords plus (ID)	Total number of phrases that frequently appear in the title and on the article's references	832
Author's keywords (DE)	Total number of keywords	1.065
	AUTHORS	
Authors	Total number of authors	741
Author appearances	The authors' frequency distribution	774
Authors of single-authored documents	The number of single authors per article	43
Authors of multi-authored documents	The number of authors of multi-authored articles	698
	AUTHORS COLLABORATION	
Single-authored documents	-	44
Documents per author	-	0.364
Authors per document	-	2.74
Co-Authors per documents	-	2.87
Collaboration index	-	3.09

Source: Authors' elaboration.

4.2. Sources

The top ten sources corresponded to more than half of the scientific production. Table 2 indicates a cumulative number of papers, with 40 articles and 649 citations, in the Journal of Cleaner Development. Furthermore, 23 articles and 618 quotes were included in the Journal of Business Ethics, listed second in the list. In turn, three journals with 10, 8 and 5 articles respectively (see Table 3), for sustainable entrepreneurship, were among the most quoted. They are Energy Policy, Ecological Economics and Tourism Management.

Table 2. Journal analysis.

Journal	Number of Articles	H-Index	Citations
Journal of Cleaner Production	40	14	649
Journal of Business Ethics	23	13	618
Physica A: Statistical Mechanics and its Applications	17	7	189
Journal of Business Research	13	6	230
Journal of Social Entrepreneurship	11	4	35
Social Enterprise Journal	11	3	37
Technological Forecasting and Social Change	11	6	143
Energy Policy	10	6	371
Human Organization	10	7	135
Computers in Human Behavior	9	6	157

Source: Authors' elaboration.

Table 3. The top 10 most productive authors.

Authors	A	C	C/A	1st A	Last A	H-Index	Country	Affiliation
Aseem Kaul	3	28	9.33	2018	2019	11	USA	University of Minnesota
Jiao Luo	3	28	9.33	2018	2019	9	USA	University of Minnesota
Jarrod Ormiston	3	14	4.67	2015	2019	4	Netherlands	Maastricht University
Jing Shao	3	26	8.67	2016	2016	8	China	Northwestern Polytechnical University
Frank Vanclay	3	46	15.33	2017	2018	57	Netherlands	University of Groningen
Irene Bengo	2	18	9.00	2016	2018	7	Italy	Politecnico di Milano
Mario Calderini	2	18	9.00	2016	2018	17	Italy	Politecnico di Milano
Jana Dlouhà	2	36	18.00	2013	2018	13	Czech Republic	Charles University
Bob Doherty	2	2	1.00	2019	2019	29	UK	The University of York
Daniel M. Franks	2	39	19.50	2012	2014	28	Australia	University of Queensland

A: Number of total articles; C: Number of citations for all papers; C/A: Average citation per article; 1st A: Year of first published article; Last A: Year of last published article. Source: Authors' elaboration.

4.3. Subject Areas

Figure 3 indicates the key topic areas for the online database on social finance and banking for science output. The figure demonstrates the multidisciplinary of the social finance and banking theme. The most relevant subject areas were Business with 16%, followed by Environmental Sciences with 15% and Engineering Environmental with 8%.

The other subject category refers to Physics Multidisciplinary, Anthropology, Social Sciences Interdisciplinary, Energy, Fuels, Psychology Experimental, Psychology Multidisciplinary, Ecology, Geography, Development Studies, Hospitality Leisure Sport Tourism, Rehabilitation, Business Finance, Health Care Sciences Services, and Information Science Library Science.

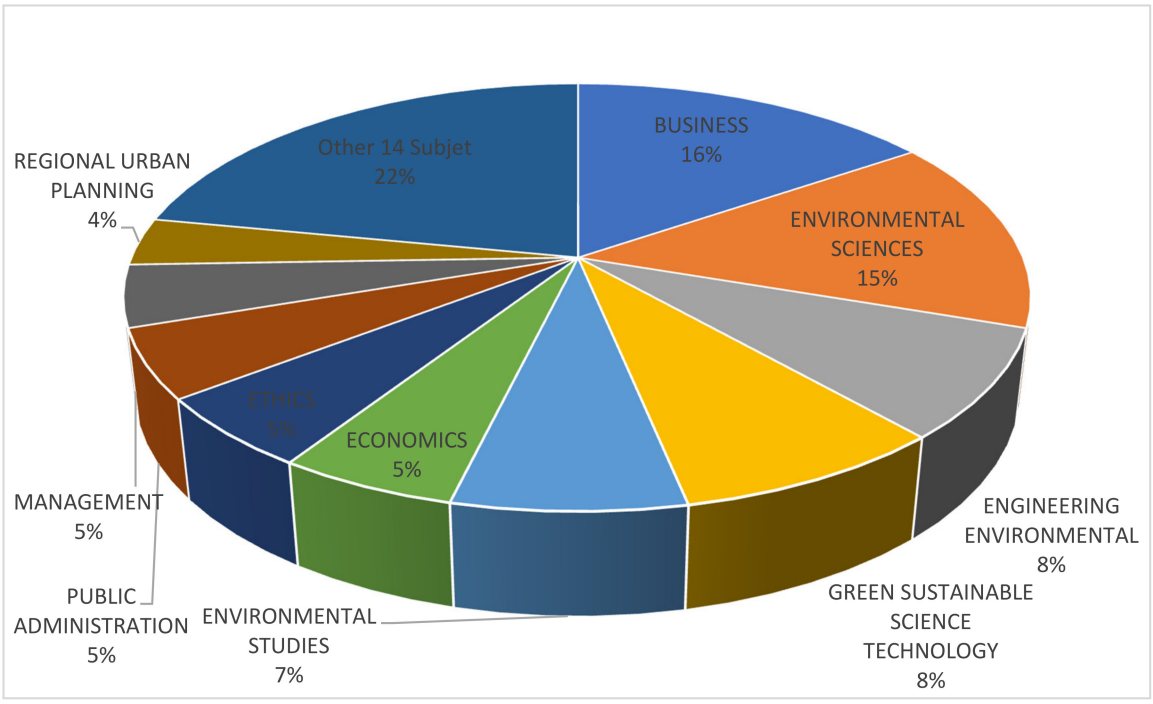

Figure 3. Subject areas that stand out in social finance and banking; Source: authors' elaboration based on Web of Science.

4.4. Social Structure (Countries, Institutions, and Relevant Authors)

As shown in Figure 4, several countries have published articles on social finance. However, most of the published articles were concentrated in a few countries. As expected, English-speaking countries (such as USA, UK and Australia) were the most represented. There was also a substantial presence of European countries. This may be due to the presence of a very developed financial/bank market [53,54].

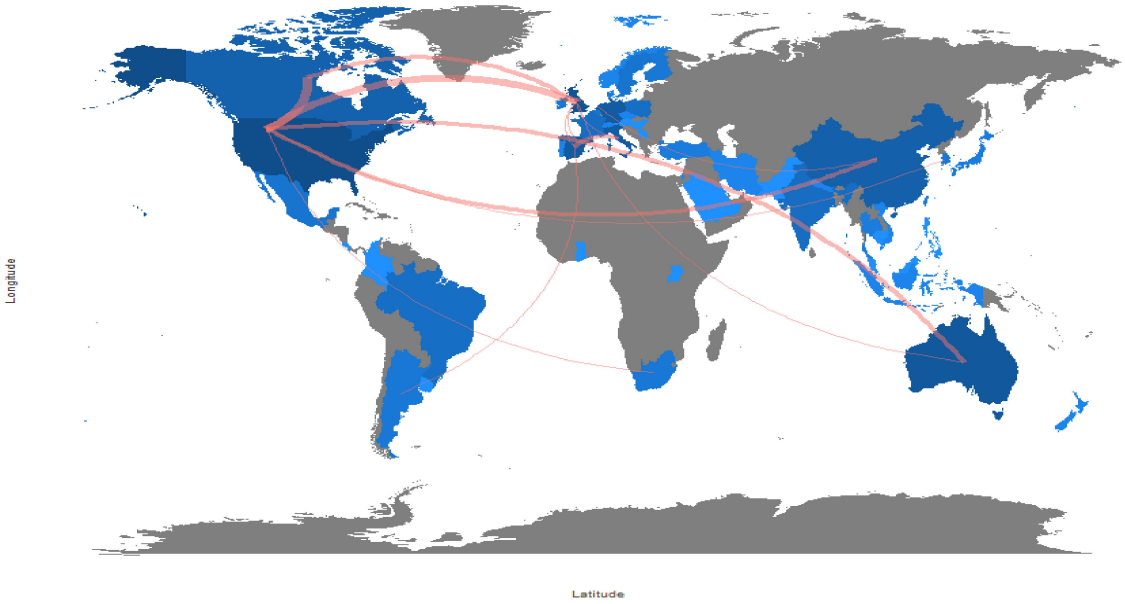

Figure 4. Collaboration WorldMap. Source: author's elaboration with Bibliometrix R-Package.

The results of the collaboration were also reflected in the country of production; the first three countries confirmed to be those that natively speak English, the first in the

USA with 79 papers, the UK with 65 papers and Australia with 56 papers. Then followed European countries, such as Spain with 44 papers and Italy with 35 papers. The results were also reflected in the affiliations, the most relevant with seven articles published were Texas A&M University (however the citations amounted to only 11) and the University of Groningen, whose scientific production was cited 76 times. The third university in terms of production was the University of Sydney which published six papers, with the scientific output mentioned 99 times. As for the most cited affiliation, this was from the University of Washington, which published only two articles, but the paper Dyer et al. (2007) was the most mentioned of the sample analysed with 242 citations.

Considering the most productive authors, some useful insights have emerged from the bibliometric analysis. Although it has been verified that the theme had its roots already in the 1980s, there is no referenced author. Table 3 shows that the maximum number of articles written by these authors was five and three; also, five authors who wrote the articles: Aseem Kaul, Jiao Luo, Jarrod Ormiston, Jing Shao and Frank Vanclay. It turned out that the first two authors Aseem Kaul and Jiao Luo, collaborated on the same articles (which are Kaul & Luo, 2018; Luo et al., 2018; and Luo & Kaul, 2019). The same can also be seen for Irene Bengo and Mario Calderini who collaborated in writing the papers "Unlocking finance for social tech start-ups: Is there a new opportunity space?" and "New development: Are social impact bonds (SIBs) viable in Italy? A new roadmap" (Arena et al., 2018; Bengo & Calderini, 2016). Among the authors analysed in this paper, only 23 had published two articles, while the remaining 713 had only published one article each. It appears that the first ten authors had published their scientific production only in the last eight years, so we cannot identify an author who has contributed to the development of the topic over the years.

4.5. Conceptual Structure (Trends and Thematic Analysis)

The conceptual and functional structure to analyse the research field and to identify and visualise its conceptual subdomains (i.e., topics/themes or general thematic areas) is also achieved by analyzing its thematic evolution [55]. These topics can be interpreted as textual knowledge conglomerates or as semantic/conceptual classes with various themes discussed in the field of study [56]. Therefore, this section includes an analysis of trend topics thematically related in this field and the topic dendrogram.

Figure 5 defines the trend topics, based on the Keywords Plus, which are words or phrases that often appeared in the titles of article references, but not in the title of the arti-cle itself. Based on an algorithm developed by Clarivate Analytics, Keywords Plus in-creases the search power of cited references by searching in all disciplines for all articles that have cited references in common. Since Keywords Plus terms are derived from the ti-tles of articles cited by the author of the article to be indexed, articles without references and articles whose references are not linked to the source articles will not have Keywords Plus. Keywords Plus may also be present for articles that do not have the author's key-words or may include important terms not listed among the author's keywords.

Garfield claimed that Keywords Plus terms could capture an article's content with greater accuracy and variety [57]. Keywords Plus is as powerful as Author Keywords in the bibliometric study of the information structure in science areas but is less detailed in the representation of the substance of the paper [58]. Table 4 highlights the whole number of Keywords Plus in the top 20 positions.

Figure 5 highlights that, in the analysed period, there was a change in the trend of the issues; in 2012 researchers focused their studies on strategy and quality of life, from 2014 to 2016 they focused on social impact and, recently, they focused on sustainability, entre-preneurship and the performance of the third sector. As can be seen from the figure un-derlying the study of the social impact, i.e., the study of the effect that the actions of a fi-nancial organization have on the community of reference [59], scholars began to develop this consistently from 2014 onwards.

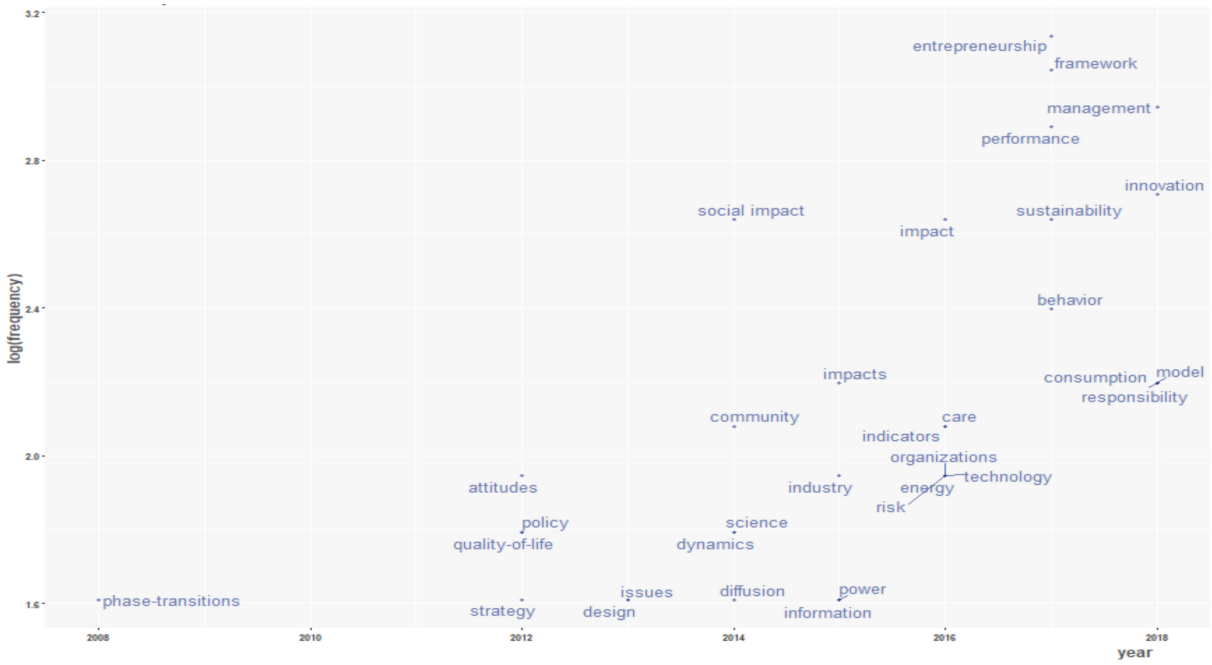

Figure 5. Trend topics. Source: Authors' elaboration.

Table 4. Journal analysis.

Keywords Plus (Top 20)	Articles
Entrepreneurship	23
Framework	21
Management	19
Performance	18
Sustainability	16
Innovation	15
Impact	14
Social impact	14
Behavior	12
Governance	10
Model	10
Perceptions	10
Challenges	9
Consumption	9
Impacts	9
Responsibility	9
Business	8
Care	8
Community	8
Energy	8

Source: Authors' elaboration.

Figure 6 explains the composition of the academic sector at the conclusion of the study. The thematic map shows each keyword in the two-dimensional space explained by the axes [60]. The scale of the points is proportional to the cumulative input of each key-word. Through applying a clustering algorithm to a keyword network, it is possible to highlight the various themes of a given domain. Each cluster may be depicted on a special plot known as a strategic or thematic map. For example, centrality can be read as the im-portance of the theme in the whole field of science, and density can be read as a measure of the growth of the theme. Therefore, considering the figure, in this research flow as high-ly developed and isolated themes, authors found the risk and the perception among stakeholders of social banking and finance. As necessary and transversal themes, authors

also found that performance of social finance was a highly repetitive theme. Moreover, considering the figure, the issue of sustainability is also acting as a "deus ex machina" towards this sector. Finally, as a declining theme, the following assistance was reported.

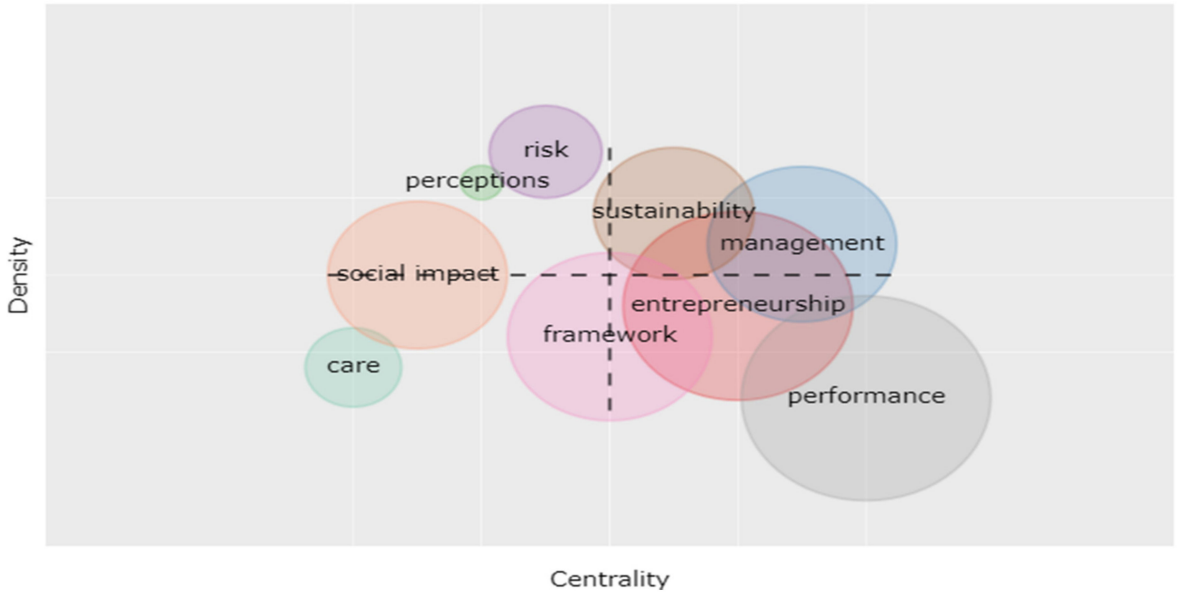

Figure 6. Thematic map in social finance and banking. Source: Authors' elaboration.

Authors often recognise problems that hold hybrid positions, i.e., they comprise two quadrants. For instance, the social impact theme occupied a position between emerging or declining themes and highly developed and isolated themes, which reflects the theoretical links about this topic. The need for a common framework occupying a position between emerging or declining themes and basic and transversal themes, and finally, entrepreneurship and management, occupied a position between motor themes and basic and transversal themes.

Figure 7 shows a dendrogram to observe the hierarchical relationship between keywords produced by hierarchical clustering [61]. The diagram shows two lines of analysis relating to the colours blue and red, respectively. It is used to assign objects to clusters by calculating the height of the various objects that are connected in the divisions. Humans are originally depicted in the dendrogram diagram by the researchers. The blue strand can be divided into four clusters, while the red strand consists of only one group. Each subdivision represents relevant themes and keywords. The results found that the flow of literature on social finance and banking included (1), peoples' well-being combined with technological innovation, (2) governance, (3) ethical investment and (4) corporate social responsibility (CSR). Finally, common to each of the above issues was the transparency (5) that the subject required. The combination of multi-disciplinary matters shows that social finance is an instrument aimed at improving peoples' well-being through entrepreneurial actions and projects. Moreover, the flow of re-search on social banking brings tools such as ethical investments and CSR vision to the previous literature. Also, the two themes at the theoretical approach level require greater transparency and consequently, governance of processes than the traditional financial system.

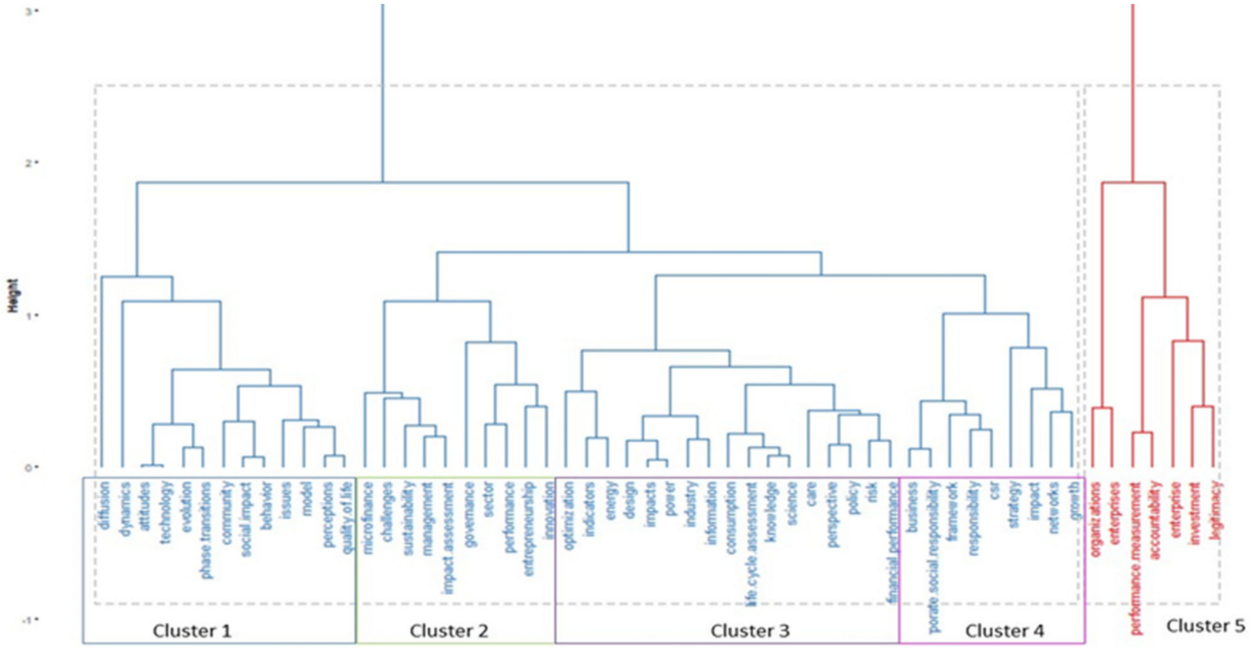

Figure 7. Topic dendrogram. Source: Authors' elaboration.

4.6. Conceptual Structure (Trends and Thematic Analysis)

The following paragraph aims outlines the results of co-citation analysis including historiographic parameters [44]. The author's co-citation analysis offers a variety of valuable perspectives to consider the effect of these scholars on the academic framework of the social finance and banking industry.

Figure 8 shows the social finance and banking impact co-citation analysis and the intellectual structure. The size of each cluster indicates the degree of co-citation of the authors, and the width of the lines shows the strength of the co-citation relations. The proximity between writers is seen by connections, not by spatial proximity to each other. Network edges can have varying meanings based on the citation type (co-citation or direct citation); citation analysis is the most common bibliometric analysis in the context of co-citation between authors or records. Co-citation research, as analysed over time, tends to discern a change in paradigms in schools of thought [62].

It is possible to classify three clusters from the following diagram.

Subgroups were identified in six teams of different colours: blue, purple, green, red, and orange. The brown sub-cluster was an outlier. The third orange cluster, composed of only two bi-univocal co-citations, was also defined as an outlier, for the distance from the centre of the co-citations. Above the centre of gravity, the first cluster was marked in blue, the theme of which can be described as theory and social structure. The purple cluster at the core of the study consisted of unique research on the effects of social finance and banking, comprised of specific studies. The green theme that formed around the purple theme and around the centre of gravity, was defined as the source of the focus of the study.

Moving on to historiographic analysis, it is possible to see chronological tables which highlight the most-cited works in and outside the collection. This is used to help scholars quickly identify the most significant work on this topic and trace its year-by-year historical development [63]. Historical path identifies a research topic and its core authors/documents, also, each node represents a document (included in the analysed collection) cited by other papers [64]. Each edge represents a direct citation. Nodes and edges were plotted on an oriented graph where the horizontal axis represents the publication years. Considering Figure 9, it is possible to identify three research paths, which were circled to make them easily identifiable.

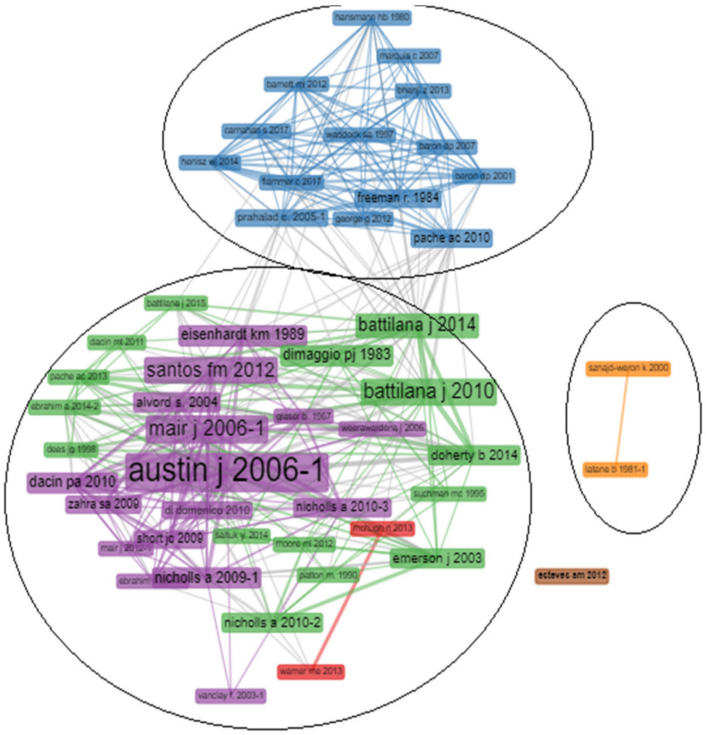

Figure 8. Co-citation analysis. Source: Authors' elaboration.

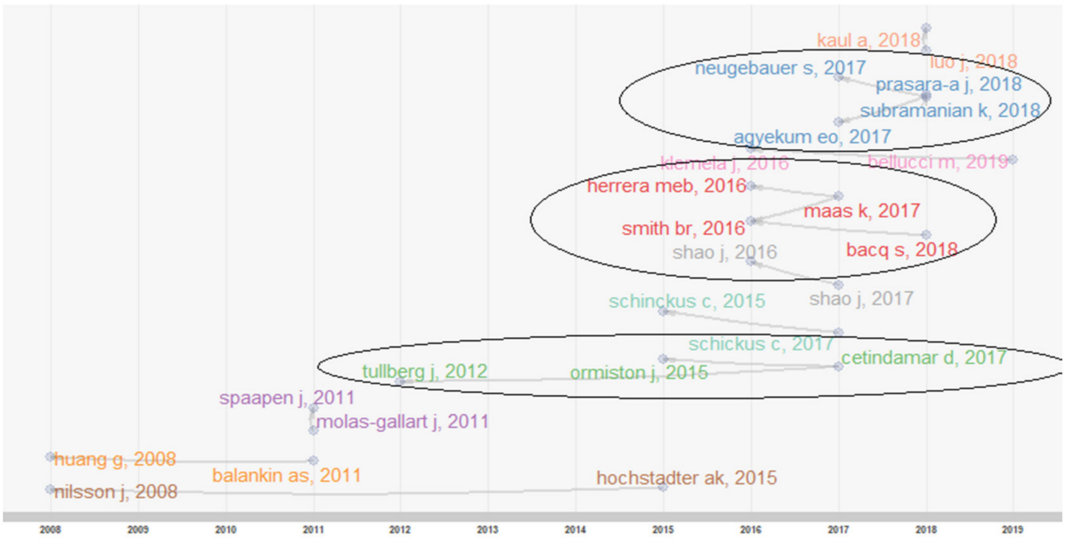

Figure 9. Historiographic parameters. Source: Authors' elaboration.

The first path is around the authors Cetindamar & Ozkazanc-Pan (2017), Ormiston et al. (2015), and Tullberg (2012) [65–67]. The first path was identifiable with the knowledge of the structure, and the publications that traced the main foundations of the theme of finance and banking impact, investment impact and the development of this sector. The second path is around the authors Bacq & Eddleston (2018), Herrera (2016), Maas & Grieco (2017) and Smith et al. (2016) [68–71]), and is about social entrepreneurship and its role and impact on social challenges. And the third path is around the authors Agyekum et al. (2017), Neugebauer et al. (2017), Prasara-A & Gheewala (2018) and Subramanian & Yung (2018) [72–75], with publications about future social finance guidelines.

The examined scientific production focused on the social issues of the community of reference concerning the standard of living and well-being of the same and the environmental impact assessment.

5. Discussion

Our bibliometric analysis focused on SF and SB research streams. The study aimed to investigate qualitative and quantitative variables such as authors, citations, journals and topics. Among them, some interesting insights emerged. For instance, Aseem Kau and Jiao Luo were the authors with the highest number of publications. Their contributions focused on corporate philanthropy as a form of reputation assurance; additionally, their work aimed to develop new theories for dealing with social issues. Other colleagues, such as Jarrod Ormiston, focused more on social impact investment as a social finance tool. Jing Shao focused mostly on sustainable development behaviour, seeing the link between social finance and the environment. Frank Vanclay recognised and addressed problems in implementing organizational human rights responsibility. Irene Bengo and Mario Calderini focused their scientific production on social impact bonds (SIBs) in Italy and financial tools that could be used to finance social innovation, with a particular emphasis on social technology start-ups that create and deliver technology-driven innovations to meet social challenges in a financially viable manner.

Additionally, our analysis shows that the journals with the highest number of articles on the topics were the Journal of Cleaner Production with 40 publications and the Journal of Business Ethics with 23 publications. Concerning the Journal of Cleaner Production, the publications referred to the link among sustainability, social impact and impact finance. At the same time, the Journal of Business Ethics considered ethical banking and social finance.

From the analysis conducted it was found that there was a consistent scientific production on ethical banking, finance impact and social impact, but only one paper was found to analyse what the social impact generated by the bank. Following the theories and historical processes of the bank's development in parallel with finance [4,76], it is undoubtedly of central interest to study the social impact it creates in ethical banking.

Keywords analysis on SF and SB revealed some important insights.

Cluster one related to peoples' well-being combined with technological innovation. The research strand confirmed the trend in the literature of collaboration between research centres to address and solve complex problems observed in the real world [45,77,78]. For instance, the paper of McCrea et al. [79] discussed community spirit and social investment in managing the development of new gas technology networks. Another topic was the analysis of the social impact of new fair wage models in the agricultural sector, showing how social impact assessment could be an essential decision-making tool for companies [73].

The second cluster related to governance, mainly concerning social impact. For example, as Luo e Kaul [80] discussed, efficient organisational forms are increasingly need-ed to address issues of social concern. The authors advocated the use of various governance instruments such as public-private partnerships as well as social enterprises. Ale-do-Tur and Domínguez-Gómez [81] also discussed this issue in order to stress how social impact assessment needs many tools from different fields, including governance.

The third cluster analysed referred to ethical investments.

Although at first glance, it could only refer to SB, the research area included a broad discussion. For example, the results of Schinckus [82] demonstrated how financial innovation in ethical investment (e.g., social bonds [83]) meets social impact by favouring funding for social projects such as rehabilitating prisoners rather than helping the homeless people. As authors, we believe that this paper is the academic and practical synthesis of how SF and SB can quickly meet. Finally, we also consider Revelli contribution [84] used a theoretical approach; it demonstrating how ethical and socially responsible investments require constant measurement of impact and extra-financial performance.

The fourth cluster concerned corporate social responsibility (CSR). Although it is a vast territory, the links between CSR, financial performance and social impact are many.

For example, several authors showed that higher CSR had a positive value on companies' financial performance, on the social impact created towards stakeholders, and on the environmental impact of companies [85–87].

Finally, the last cluster included all the previous ones. Several authors emphasised that SF and SB research topics require greater transparency of information, especially about projects with a social and environmental purpose [32,82,88].

6. Conclusions

To conclude, our study used science mapping workflow and multiple research questions to investigate the broad literature about social banking and finance yet unexplored. For accurately answering these research questions, we conducted a bibliometric analysis by using Bibliometrix R-package. Starting from the gap of the literature which saw two parallel literatures among the topics investigated [9], this paper provides an in-depth qualitative and quantitative analysis on bibliometric variables. Some useful theoretical in-sights can be made.

Firstly, scientific production in this area concerns social impact, social and sustainable finance and ethical banking. Therefore, as shown by Figure 6, banking and financial systems should engage and create useful tools for sustainable development, such as social and environmental projects, respectively [12].

Secondly, from a theoretical point of view, the analysis did not find parallel and competing issues. The research shows that social finance and social banking were not on different levels but instead that the banking approach provides practical tools to achieve more significant social impact for entrepreneurial choices. Therefore, we observed a union of the two pieces of literature and not a mere thematic division.

Thirdly, the keyword "social" does not only coincide with the aspect of caring for and fa-vouring others through social initiatives. The social element is linked to environmental good. For this reason, the topic has been widely studied by international journals such as Sustainability, which creates a tangible link considering sustainable development [89].

Moreover, our analysis also contained some practical insights.

Firstly, entrepreneurs and policymakers should aspire to and demand more transparency, as suggested by cluster five discovered in our article. The theoretical link between the topics discussed, has practical insights in terms of reporting. The social approach requires more transparency, and the social finance and banking sector needs to provide more answers in terms of writing. Therefore, more practical accountability may be required to include both social and environmental impact assessment methodologies created for funded activities.

Secondly, the contributions and critical words in this research flow call for multi-stakeholder and multidisciplinary governance that encourages social enterprises to convey their role as protagonists. Therefore, policymakers will be able to benefit from the analysis by noting how collaboration is valued at a scientific level and could enhance social entrepreneurship initiatives for the good of the community and the environment.

Our article opens exciting scenarios for future research.

The analysis shows the beginning of research in new technologies. Future studies could be conducted on blockchain technology and the ability to track investments within social finance. Furthermore, case studies could investigate the role of trust in sustainable investments, transparency, and decentralisation. Moreover, an interesting point for future research could be the way to deal with cryptocurrency transactions, which will most likely lead to a higher trust in the social finance sector activities attracting a higher number of donors or investors and benefiting the under-privileged communities.

Further studies should also be conducted to understand whether social and environmental impact assessments could be a tool to stimulate social finance initiatives. More in-depth studies could also be achieved in terms of the social impact created by the banking system. Researchers could verify the level of responsibility of financial institutions in solving social, ethical and environmental problems. Furthermore, the research should

focus on comparing academic perspectives of this research flow from our contribution, assessing the demands of professionals.

Finally, like all research, our study has limitations.

Firstly, to ensure a rigorous methodology, we have limited the articles within the sample. This may have caused us to lose interesting publications and proceedings for research. Secondly, considering the analysis of bibliometric variables, future studies could dwell on broader samples of literature also finalising investigations with open codes for better identification of the scientific topics discussed.

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