Social and Solidarity Economy organizations as Bio-economic Systems? Insights from the case-study of the "Association Sahel Vert"

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Abstract:
Social and Solidarity Economy (SSE) organizations typically aim at societal innovation employing different values and modes of organizations. However, one of their major drawbacks is to consistently assess the sustainably of their initiatives and improve their organization accordingly. Again, since those organizations rely, more or less explicitly, on principles that cannot be reduced to the premises of the market-based rationale, a proper economic discourse should develop employing an alternative epistemology capable of moving towards a coherent logical analysis of their unique key features. Due to its systemic outlook and focus on immaterial target, the Bioeconomic epistemological proposition (Nicholas Georgescu-Roegen) seems appropriate to represent and asses SSE initiatives. Thus, is a Bio-economic informed conceptual framework a consistent epistemology to investigate SSE organizations and their sustainability? To answer, the study explores in a case-study at the Association Sahel Vert the opportunities and the limits to use a Bio-economic informed epistemology to qualitatively assess the sustainability of SSE organizations.

Keywords : Social and Solidarity Economy organization, bioeconomics, sustainability, case-study, systemic approach

1 : Introduction

Organizations of the civil society develop a multitude of typologies that continuously evolve interpreting the instances of their epoch spontaneously providing a collective answer to the needs perceived by a group. Social and Solidarity Economy (SSE) as well as Third sector can be mentioned as fundamental conceptualizations to differently refer to similar organizations. The voluntary organizations of bodies of the civil society can be very different, highly depending on their context and on the motive behind their specific evolution as well as their aim of reproduction. Each of those organizations are searching - through voluntary collective mutual effort - a proper way to achieve their purposeful objective which is important to highlight is not the sole reproduction and distribution of monetary profits. Whether their purpose is pragmatically oriented towards the satisfaction of goals or it is radically emancipatory, all voluntary organizations of the civil society finally rely on basic principles that are alternative by definitions. (EVERS A. & LAVILLE J.L. (2004); MOULART & AILENEI, 2005).

1.1 : Problem statement

Since Social and Solidarity Economy organizations (SSEo) rely, more or less explicitly, on principles that in the end cannot be reduced to the premises of the market-based rationales, a proper economic discourse should be developed employing an alternative epistemology capable of bringing forward a coherent logical analysis of their key features. Consequently, a suitable framework would imply employing their unique principles and assets in order to sustainably achieve

their specific purpose. In other words, as proposed by Dash (2014) the "challenge is to construct a coherent theoretical framework for SSE with a strong explanatory power to capture the wide and rich diversity of the scattered experiments and innovations on the ground" (p. 9). This epistemological limit is recognized as a fundamental obstacle in order to sustain these actors of societal transformation (DASH, 2014).

1.2 : Hypothesis

Due to its systemic outline and immaterial target, the Bio-economic theoretical proposition, firstly developed by Nicholas Georgescu-Roegen (G-R), seems suited to represent SSE initiatives and investigate about the sustainability of their activities. In his (incomplete) attempt to carry an economic theory, the so called bioeconomics opposed to the neoclassic mainstream, G-R offered an alternative epistemology[1] and an economic rationale here referred to as the Bio-economic paradigm. Basically, the latter, placing economics under the unavoidable physical and biological constraints, considers the economic process as evolutive and made of open-systems that employ available resources within its organization to jointly strive towards the reproduction of particular (fundamentally immaterial) goals through the proper maintenance and development of its constitutive systems (BONAIUTI, 2003). However, no study ever represented an organization of SSE employing such alternative epistemology.

1.3 : Research Question and Design

Therefore, the principal research questions became the following: is a Bio-economic informed conceptual framework a consistent epistemology to investigate SSE organizations and their sustainability? Consequently, which benefits are derived from the application of a Bio-economic-inspired framework representing a SSE organization as a hypothetic Bio-economic System?

To develop this research, the bioeconomic thought is introduced to advise[2] the construction of a framework for the usefulness of SSE organizations. The aim of this research is therefore to explore how the interpretation of an alternative epistemology and paradigm conduce towards a frame to qualitatively study the SSE organizations sustainability. In order to do this, the case-study of the *Association Sahel Vert* in Wittenheim (France) is used, as this association practices initiatives, research and education for sustainable integrated development of disadvantaged people.

2 : The Bio-economic[3] theoretical framework

The present work intends to experiment a qualitative analysis of an organization of the Social and Solidarity Economy informed by an alternative paradigm: the one consequent to Georgescu-

[1] In this study *epistemology* is intended as the way to acquire knowledge or "the science of knowing" (BABBIE, 2019 p.5). The fundamental epistemological question answers the following demand: "how can we know about reality and what is the basis of our knowledge?" (RITCHIE & LEWIS, 2003, p.13).

[2] In this regard, the Bio-economic paradigm here is not reproduced orthodoxically - no attempt to conduce economic analysis to its fundamental material basis would be offered; instead, it will inform one logical framework to represent and qualitatively analyze how high-specific valued-driven organizations could proceed towards their immaterial objective deeply accounting sustainability.

[3] In this study the adjective referred to the *Bio-economics* is written in capital letter and *italics* and with a "-" in order to help in the precautional distinction between the original though of G-R and the present use of an informed but different conceptualization.

Roegen's conceptualization of bioeconomics. The bioeconomic theory is the final outcome of a deep epistemological reflection[4] conducted by G-R in order to overcome the limits of the reductionism, especially in the economic science (GIACOBELLO, 2012; MOLESTI, 2006).

Thus, how to sustain a rigorous scientific discourse accounting for complexity? For G-R, **logic** is the only domain that have rigid and well-defined boundaries (MAYUMI, 1995) Consequently, his epistemology concerns "mainly with the problem of valid analytical representation of the relations among facts" thus, any theory within this paradigm should be "a logically ordered description of [a reality's] mode of functioning"(MAYUMI, 2009, p.1244).

The science of complexity may provide us with useful concepts. For example, applying the ontology of David Lane (LANE, 2006, 2011) to organizations would help in order to logically frame specific organization in a consistent manner. Accordingly, the concepts of *structure*[5], *process*[6] and *functions*[7] can be used to frame a complex understanding of organization (BONAIUTI, 2014; LANE 2011). Finally, employing an epistemology informed by the thought of G-R, the economic analysis should be: interdisciplinary/systemic and recursive/evolutive. Again, it should account for complexity/quality of the phenomena and be represented as a logically ordered description of reality's mode of functioning.

2.1 : The Bio-economic paradigm

Bioeconomics is the original theoretical proposition that G-R provided in order to overcome the (epistemological and theoretical) limitations he encountered in the mainstream (*standard,* as he was used to call it) neoclassic economic theory and its resultant paradigm. In his masterpiece "The Entropy Law and the Economic Process" (1971) and in the consequent issues, he delivered the conceptual cornerstones of a new economic discipline. He referred to it as bioeconomics so as to recall the fundamental natural substance of any scientific economic understanding. In fact, according to G-R, biology, as well as the physics of thermodynamics, is the ground into which the economic science finds its roots (BONAIUTI, 2013; MAYUMI, 2009; MOLESTI 2006).

3.1.1 : An understanding of the economic process

The recognition of the Entropy Law as foundation of the economic process is probably both the most famous and debated contribution of the Romanian scholar, G-R claims that the **economic process**, as any other living process, is **irreversible**. Paraphrasing the eminent academic, the Law

[4] Georgescu-Roegen lived, in all its profundity, the scientific breakthrough of the early years of the XX century brought for example by Heisenberg and Einstein. For the relevance and coherence of his innovative effort, scholars agree in placing him as eminent actor of the first articulations of the complexity framework (GIACOBELLO, 2012; MOLESTI, 2006).

[5] "The *structure* of an organisation describes its parts (energetic, material and informational), the interaction modalities among its parts, and the modalities through which the organisation interacts with other organisations. In other words, it comprises the set of *rules and relationships*[5] among the parts. Generally speaking, a structure 'sustains' one or more processes. Some types of structures comprise what we define as '*representations*[5]'" (BONAIUTI, 2014, p.15).

[6] *"Processes* describe the transformations (typically in structures and functions) in which the organisation *may* participate. The analysis of flows (of matter, energy and information) that cross the border of a process represents the way in which, for example, we can offer an analytic description of the process itself. Processes condition and modify the structures and, frequently, the functions of the organisation" (BONAIUTI, 2014, p.16).

[7] "By the *functions* (of an organisation) we mean that which provides the actions of the organisation with *directedness* (ends, values, etc.). In other words, functions attribute a 'weight' to the various processes and determine which process the organisation will enact (when it is in a context in which it is possible to enact more than one process)" (BONAIUTI, 2014, p.16).

of Entropy recognizes the qualitative distinction between valuable input resources (low entropy) and output with no value (high entropy) (GEORGESCU-ROEGEN, 1973). The second Law of thermodynamic (the Entropy Law), affirms that in a thermodynamically closed-system (system that only exchange energy with his environment) there is unidirectional qualitative change towards disorder (high entropy). In a closed-system, as it is considered the planet Earth domain, living beings in order to animate takes low entropy from the environment to ensure their entropy constant. Similarly, human transforms resources into mechanic labor as well as in object (BONAIUTI, 2003, 2017). However, as stated by G-R, in the Earth closed-system is valid the 4th thermodynamic Law so that the entropy of matter will eventually reach the maximum. In other words, the incoming solar energy flow will not be able to sustain labor (life activities) endlessly since "it is impossible to recycle matter completely" (MAYUMI, 2009, p.1243). As G-R was used to say: "matters matter too" so to point the attention to the irreversible utilization of matter (BONAIUTI, 2003; GEORGESCU-ROEGEN, 1971; HAMMOND & WINNETT, 2009).

It is concluded that the real **output** of the economic process (as it is for life process) it is not the consequent degraded material flow, instead it is complement, the **immaterial flow**: what Georgescu-Roegen name as the **enigmatic** "**enjoyment of life**" (BONAIUTI, 2017, p.58). Here comes the central *Bio-economic* question: what is then the true outcome for which economic organizations strive dissipating their available resources? Although enigmatic[8], the true output of economic system **must be immaterial**.

The principles that rule economic systems within the said Bio-economic paradigm, from the global economy to smaller organizations, might be summarized as follows. The economic processes (as life processes) are nurtured by environmental **resources** that, eventually, are scarce in the Earth closed system: economic processes are subjected to the law of entropy. Hence, the **output** of every economic activity could be understood as two **complement flows**:

- an ***entropic* cost,** composed of: degraded resources and waste (cannot be reused due to the G-R 4th Law of the thermodynamic);
- a **valuable *immaterial* output**.

Accordingly, socioeconomical scrutiny focus on the recognition of the enigmatic "enjoyment of life", intended as the purposeful flow of ***immaterial output*** (BONAIUTI, 2017At this stage it is important to remember that Georgescu-Roegen never endorsed[9] for a blind literal application of the concept of entropy in economics (MAYUMI, 1995). That conceptualization informs said Bio-economic approaches employing the paradigmatic vision of the human essence rooted into biological life structure and purposes. Accordingly, if the open-system framework is known as a structure to model living systems, the purposes remain subjective and highly enigmatic. Following the advanced epistemological conceptualities, approaches have been attempted in order to consider a *Bio-economic* process.

[8] The economic output is of the same order of complexity of the puzzling social life purposes.

[9] In this regard he stated: "While I thus insisted (as I said in the Preamble) that the economic process is entropic in all its material fibers, I hastened to add that it cannot be reduced to the degradation of low entropy" (GEORGESCU-ROEGEN, 1986, p.8).

2.2 : Towards a conceptualization of a Bio-economic framework for SSE qualitative research

Bioeconomics is intended as an economic theoretical framework issued by the complex understanding of bio-physical phenomena. Hence, as biologic living beings *convert* environmental resources into greater entropy to keep their entropy constant and thrive, the anthropic economic processes *convert* available resources into higher entropy targeting complex human immaterial purposes. What are these within an economic organization and how to define these complex immaterial objectives became the focus of a *Bio-economic* study. The mentioned purposes, yet enigmatic, seem to be more or less explicitly targeted by the SSE organizations. The great importance of immaterial drivers appears in the attitude of voice of these organization and, even more, it seems of clear relevance considering their value driven constitution. Bearing in mind that hypothesis, in the section would be presented how the mentioned epistemology might represent an organization of the kind. Thereafter, employing the *Bio-economic* logic, possible insights might occur. In order to undertake a *Bio-economic* study, few elements should be considered.

- ✓ An economic **association** is organized as an **open-system made of complex system**: such organization can be described systemically as combination of: *structure*, *process, function.*
- ✓ Economic **process** represents the **conversion** of all available resources to target the output intended as *immaterial.*
- ✓ **Outputs** of the conversion process are of two complemental types: ***immaterial*** as its *value* and ***entropic dissipation*** as its *cost* (made of: degraded resources and waste).
- ✓ **Sustainability** might be intended as the capacity to achieve the *immaterial* purpose efficiently organizing the available resource accounting for the minimal dissipation of the resources needed: considering that Flows alone cannot target the output, instead this rely fundamentally on the quality of the agents it depends.
- ✓ ***Bio-economic*** paradigm is based on **meta-concepts** that should be interpreted **depending on the context** of their application and eventually tested against the real world.

From this standing point, it seems open the opportunity to consider socioeconomic organization as *Bio-economic* system performing *Bio-economic* processes. A *Bio-economic* inspired framework might inform the framework for a qualitatively research that study organization in its process towards the realization of its ideal undertaking.

3 :The research design: a methodology for the qualitative research

Here it is proposed the whole research design in which to employ the mentioned epistemology to investigate the complexity of a given organization. That will conduce us to highlight elements about the sustainability of the organization subject of the study and therefore to produce insights in order to answer the research question. The appropriateness of qualitative research in order to answer the question is due its capacity to inquiry the fundamentals of an organization, to code its particularity and to employ theoretical framework in the analysis. Moreover, qualitative design is particularly suited to offer precious information about the complexity of socioeconomic phenomena as organizations (CRESWELL, 2009).

Case-study appears as suited research design to conduct such study. In fact, case-studies are a qualitative strategy of inquiry that allow to explore in depth activities and processes using detailed information and a variety of data collection procedures over a continued period of time (CRESWELL, 2009). In the present study the case is the *Association Sahel Vert*. This association has been chosen because can be easily identified as typical organization part of the Social and Solidarity Economy. Moreover, since the first contact the representatives of the organization genuinely recognized the need of a new epistemology to represent their organization differently. Sharing purpose statement enable cooperative attitudes that assured full access to precious information regarding their complex organization.

3.1 : Data collection

The present qualitative research strives to gain deep understanding of one particular organization of the SSE: the *Association Sahel Vert*. The data were collected in an extensive field period in which the researcher had the opportunity to have complete access to the data of the organization. More than one year of research experience as active participant of the activity of the organization enabled the writer of this study to acquire profound knowledge about the whole organization, especially about the immaterial representation shared in the organization.

The objective of the data collection was to gather information and eventually gain knowledge about the whole function of the association so to gain rich data in order to source a systemic description and *Bio-economic* analysis. Information was collected so to generally respond to *what*, *how* and *why* questions regarding the association about to organize and sustain its activity. In order to gain the richer information, the case study is composed of a mix of data source as described in Table 1.

Data sources:	**Observations**	**Documents**	**Semi-structured Interviews**
Description	Field notes father during extensive field experience	Organization reports, internal documents and project drafts	Private talks had it with members of the organization. Those were guided by similar questions
To know:	what and how the organization actually is	what the organization is about	the intimate purpose of activities and deepening understanding by challenging the main shared complex representation
What	**X**	**X**	x
How	**X**	x	x
Why	x	x	**X**

Table 1 : Description and relevance of the data source mix. Capital X signify a greater relevance.

3.2 : Data analysis

How to frame qualitative data in order to be then analyzed employing a *Bio-economic* epistemology? In the following section the *Agent-Activity-Value* framework is offered as main reference to organize data to be analyzed.

3.2.1 : The "Agent – Activity – Value" framework

The *Agent – Activity – Value* framework (A2V) is an original conceptualization proposed in order to outline the qualitative data of a socioeconomic organization according to a *Bio-economic* understanding. Inspired by the *Bio-economic* extensions elements and the complex organization ontology proposed by Lane (2011) both offered in the theoretical framework, A2V combines qualitative data from different data sources in order to represent the organization in a way to facilitate engagement with concepts and logics related to the *Bio-economic* epistemology so to be analyzed accordingly. The proposed conceptual framework searches to reproduce the complex concepts of the *Bio-economic* paradigm in the context of a particular social organization.

The A2V is constituted by an outline that allows the qualitative data of case-study about a social organization to represent and analyze the organization respectively as *Bio-economic System* (BS) reproducing *Bio-economic Process* (BP).

- ***Bio-economic System*** (**BS**).

  BS is the **static** and systemic representation of the organization. That is constructed as interrelating *Agents* kept together by the organization boundary defined as its *Value*.

  - ***Value*** is considered as the *immaterial* boundary that identifies the organization and, at the same time, its ultimate purpose. Accordingly, *Value* has a double function:
    - to define the ***identity*** of the BS. *Value* is what constitute the ideal boundary of the organization defined by its socially accepted norms;
    - to explicit the ***immaterial purpose*** to realize through the BPs. *Value* is the ultimate end toward which the BP should strive for.
  - ***Agents***: is coded as '**agent of transformation'** acknowledged both as a system, *structure*, asset, part, entity or element of a the whole organization. It is possible to account for three main subcategories of *Agent*. These refers mainly to:
    - ***Material*** elements the organizations own/dispose (durable goods, economic assets, material resources the organization).
    - ***People*** and their specific role/configuration within the organization (human resource systems of the organization.
    - ***Immaterial representation***: codes representing the relevant knowledge for the function of the organization (share representations).

- ***Bio-economic Process*** (**BP**).

  BP is the representation of the organization (BS) in its qualitative **evolution**. That is described by the ***Activities*** performed by the organization.

  - ***Activity*** of the organization describe the dynamic interaction occurred between *Agents* to perform a task according some purpose (*Values*). Few subcategorizations of Activity are identified:
    - ***Typical***. Those relative to processes grounded on resources owned by *Agents*. They can be of two type: *Structural* (TsA) when *Activities* mainly targets *Agents*, and *Functional* (TfA) when *Activities* mainly targets *Value*.

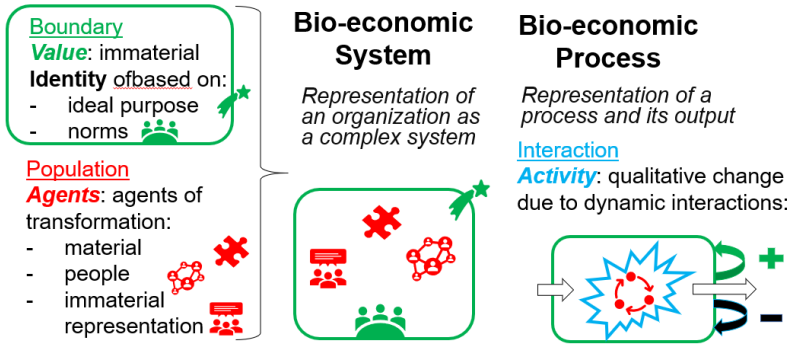
- ***Environmental***. Those describing transformations of *Agents* mainly due to flows of resources (material, immaterial, people) that comes from outside the organization. They can be of two type: *Shocks* (EsA) for unexpected events, and *Organized* (EoA) if they are due to certain planification.

Analyzing the A2V representation employing the *Bio-economic* paradigm, diverse insights might be presented. According to the *Bio-economic* logic, the organization processes (*Activities*) are about dealing with transformation of its main components (*Agents*) enriching or exploiting them for the sake of the immaterial end (*Value*). In order to visualize the composition of the various concepts introduced, Figure 1 graphically depicts the main components of the organization represented according to the A2V framework. Informed by the *Bio-economic* tradition, the whole edifice of a *Bio-economic* informed framework is an **open-system**. That it is simply to represent the continuous *Activity* of transformation of available resources used by interacting organization' *Agents* in order to enjoy the organization' *Value*.

Figure 1. Bio-economic System and Process outlined using the *Agent – Activity – Value* framework

The picture schematizes the *Agent* the *Activity* and the *Value* of an organization represented as performing a *Bio-economic System* with a schematic example of *Bio-economic Processes*.

Source: The author. informed by the theoretical conceptualization discussed in the previous chapter,



The A2V outline represents the organization systemically (BS) as a value-driven entity composed of diverse material and immaterial systems. The outline is constructed to facilitate the use a *Bio-economic* **epistemology**. In other words, the A2V outlines the organization's data of a case study as a hypothetical *Bio-economic System* so as to enable the analysis to refer to the *Bio-economic* theoretical framework. Is then this epistemology beneficial to tell something about the sustainability of the association in question?

3.2.2 : Bio-economic insight using the Agent – Activity – Value framework

Sustainability is here intended as the combined capacity of the BS to promote its intended purpose recognized as *Value* pondering the quality of the main *Agents* involved in the *Activity*. In other words, an organization' BP (described in the research as *Activity*) could be said sustainable if it **sustains its *Value***, both:

- ✓ maintaining or **developing the *quality* of some *Agents*** (enriching systems, improve shared representation, increase in complexity) and,
- ✓ **with the minimal[10] degradation of other *Agents*** of the BS.

[10] Informed by the *Bio-economic* paradigm, we know that the entropic cost of any activity is unavoidable. Ideally, for a process to be sustainable, the entropic dissipation should tend to its asymptote. BPs will always convert useful resources both in a part of degraded matter/energy and in a part that is non-recyclable waste (something that is gone forever according the G-R 4th Law).

Within the *Bio-economic* paradigm, no valuable output might be attained by flow without the contribution of its structures. At the opposite, these fundamentally constitute to enjoy the immaterial of a BS. In fact, if these systems are functional, only minimal flows (*Activity*) are necessary to enjoy the *immaterial end* (generally intended as 'well-being' by Bonaiuti) (2003). s Therefore, fostering the organization identity and its immaterial end (*Value*) greatly relies on the maintenance and promotion of the *quality* of its structures (*Agents)*. Then, *Bio-economic* insights might be offered identifying what (*Agents*) to take care so to efficiently safeguard the quality of the structure of the organization in order to promote its most profound, yet complex and evolving, identity (*Value*). Ultimately, to account for sustainability, in the process must be identified the complemental unavoidable exploitation of resources (*Agents*) due to the processes (*Activities)* of the organization. That might be as a conceptual cost to minimize. In the following chapter the case study is presented so to provide more information about the context in which this qualitative research it is conduced.

4 : *Association Sahel Vert*: the case-study

The *Association Sahel Vert* (ASV) is an association of French law based in Wittenheim, a commune of Alsace situated in the northern area of the *Mulhouse Alsace Agglomération*, France. However, as its name suggests[11], the organization was born from the combination of diverse projects and people engaged in socially-integrated initiatives in rural disadvantaged zone of the Malian Sahel. Benefitting the opportunity given by the commune of Wittenheim and the local communities of potassium miners, in 2002 the ASV converted the area and the buildings used for the storage of dynamite into spaces hosting the ASV Pole of Initiative, Education and Research. Since then, that place, called "*la Dynamitiere"*, has constituted the main center of activity in France offering informal education and projects of training to offer disadvantage people a chance to both discover sustainable development and their hidden capabilities. Meanwhile the activities serves to maintain and improve the center it-self. In the last years, the association consistently grew in numbers of members and turnover as well as in responsibility and complexity. In the next chapter the qualitative data gathered are organized according to the A2V framework. Findings will present and order the organization's complexity so that insights will be discussed employing a *Bio-economic* rationale.

5 : Findings

In this chapter the results of the qualitative research are offered. Data regarding the *Association Sahel Vert* are presented employing the *Agent-Activity-Value* framework presented in the previous chapter. In the first part of this chapter the categories of *Value* and *Agent* are presented separately to finally be combined into the so-called *Bio-economic System* representing the organization in its French configuration. After the organization of data, in the second section of this chapter is showed their

[11] *"Sahel Vert"*, literally Green Sahel, was created in the august of 1991 to establish solidarity cooperation with the local people of Sofara, a rural village of the commune of Fakala, in the Mopti region, Mali. From the beginning, the activities of the ASV developed as grass-root collaborative-work initiatives. The ASV advanced as a grass-root shared governed working experience in which socio-cultural differences and technical exchange combines as fundamental assets for solidarity and sustainable actions. The same dynamic of self-help, mutual recognition and solidary exchange forged the initiatives of ASV in its subsequent development in France.

interpretations by presenting *Activities*. In conclusion, employing A2V category these processes are signified according to the proposed *Bio-economic* informed logic.

5.1 : The *Association Sahel Vert* as Bio-economic System

Following the proposed methodology, the present research organize data according to the A2V framework so to explore the consistency and the potential of the application of a *Bio-economic* logic to a SSEo. As showed in Table 2, the exhibition of data account for the combination of subcodes of 2 main categories: *Value* and *Agent*.

BIO-ECONOMIC SYSTEM	A2V CODING FRAMEWORK	ASV SUBCODES
Value	*IMMATERIAL IDENTY (ID)*	Solidarity (Solid), Mutual Help (MH), Engagement (E), Alterity relation (AR),Self-Expression (S-E), Share of Knowledge (SK)
	IMMATERIAL END (IE)	Integrated Social Development of Territory (ISDT)
Agents	*MATERIAL*	*La Dynamitiere,* Local Environment, Vehicles, Apartments, Monetary Budget
	PEOPLE	Minors: Minor with social (DRS) or justice issues (PJJ), Minor refugee (MNA) Adults (Beneficiary-Actor): Volunteers, Employees, Eu-volunterr (ESC), Researchers Collective of Work (CdT: Minor + Adults) Workers direction (DCO) Council of Administration (CA)
	IMMATERIAL REPRESENTATIONS	Status of Beneficiary-Actor (BA), Shared Governance (SG), Action-Refection-Formalization (A-R-F), Capabilities Rituals: Daily: Briefing, Lunch; Weekly: Reunion of functions (CdT+DCO), Reunion of reflections (Adults); Reunion of management (CA-DCO), Researchers presentation to CdT Rules: Respect ASV Values, Respect of Rule & Rituals, Conflict management

Table 2 : The *Association Sahel Vert* as Bio-economic System

Having identified the codes about categories of *Value* and *Agent*, it is possible to firstly outline the *Association Sahel Vert* as a *Bio-economic System*. The following description is represented in Figure 1. The ASV is outlined as a *Value* driven organization that struggle to reproduce a model of Integrated Social Development of the Territory in order to express its essential *Values*.

The BS is the punctual outcome of the global expression of its *Values* as defined, across years of *Activities,* by the actual *quality* of its essential elements, so called *Agents*. These were identified in 3 subcategories: Material, People and Immaterial representations. Their relationship says about the structure of the ASV as a *Bio-economic System*.

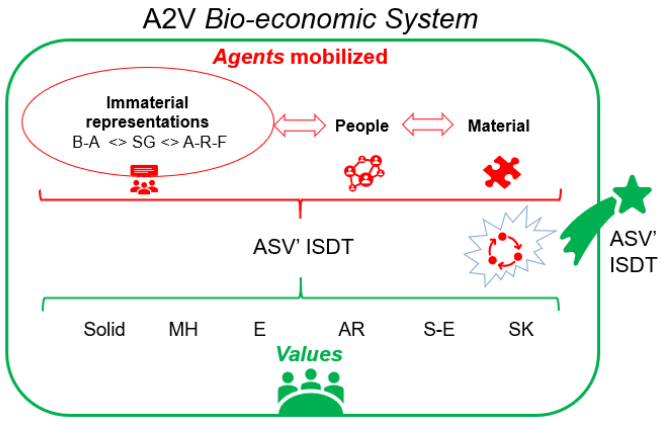


Figure 2. Representation of the organization ASV as a Bio-economic System

Source: The author.

To finally understand the quality of the interdependencies within the A2V through *Bio-economic* logic, it is necessary to identify the third category: *Activities*. The findings organized in the A2V framework allow to view the main component of the organization as a *Bio-economic System*. This architecture of data is essential to provide qualitative insights about how the organization performs. In order to do this, complex *Activities* can finally be presented employing *Agents* towards the reproduction of *Value*.

5.2 : The activities of the *Association Sahel Vert* as Bio-economic Processes

The findings organized in the A2V framework allow to view the main component of the organization as a *Bio-economic System*. This architecture of data is essential to provide qualitative insights about how the organization performs. In order to do this, complex Activities can finally be presented employing Agents towards the reproduction of *Value*. Mainly, data about *Activities* comes from the extensive observation of the organization. In the following section several examples of data are provided for every subcategory of *Activities*.

BIO-ECONOMIC PROCESSES	A2V CODING FRAMEWOKG	ASV SUBCODES Together with the relative *Values* employed & *Agents* in play
Activities	*TYPICAL STRUCTURAL* (TsA)	Horticulture & composting: Carpentry & recycling Farming Cooking Cleaning
	TYPICAL FUNCTION (TfA)	Thematic activities in school vacations Week permanence at MNA apartments Mobilities
	ENVIRONMENTAL SHOCKS (EsA)	MNA medical urgencies Donations Budget deficit due to missing payments
	ENVIRONMENTAL ORGANIZED (EoA)	Respond to Minors administrative needs Organized project in partnership

Table 3 : The activities of the *Association Sahel Vert*

BIO-ECONOMIC PROCESS	DESCRIPTION	OBSERVATION
Activity: **Horticulture & Composting**	The *Activity* entails for: planting different variety, practicing organic agriculture techniques, irrigating, harvesting, dry out and conserve tomatoes, seeds	> As a recurrent activity, garden workshop is well participated and usually is favored by the youngest. > CdT actually shares technical and agricultural competences. Share of perspective of cultivation between EU-volunteers, MNA and pensioners frequently occurs. Was observed that MNA teaches DRS and EU-volunteers too, inter-generation cross contamination of techniques happens. > It was also recorded that this is the place where visitors are firstly brought to demonstrate the qualities of ASV. Garden products are particularly appreciated.

	collection, general maintenance, compost management practices.	> Only in summer the production is sufficient to serve the kitchen for daily needs and B-A. Therefore, during the other months, the provisioning system greatly relies on the Food bank, moving from self-sufficiency to dependence. > A free-rider problem was noticed: products are not enough to serve every interested BA, therefore small conflicts might arise. > Maintenance and storage of instrument is an issue as SG do not clearly assign responsibility and authority to anyone specifically. Therefore, often gardeners lament lack of order, wrong usage of instruments and wasted time to search for the proper instrument. This causes episodes of frustration to daily gardeners. > Gardeners frequently work with joy and with good team spirit. In fact, they were observed more prone to express them self and learn during this workshop rather than during others.		
Agents	**Mobilized**	*Material*	*People*	*Immaterial representation*
		Garden care, maintenance	Group of Collective of Work (CdT) (usually 1 ESC, 1 BA, 1 MNA, 1 DRS)	People can participate as their BA vocation employing their relative technical Capabilities; the approach to the activities relies on A-R-F
	Modification			
	Positive	Garden care, production	People appreciation, enjoyment	Promotion of the status of BA, improves Capabilities of People
	Negative	Poor maintenance condition, disorder	People frustration due to lack of proper quality garden Materials	
Value	**Expression**			
	Positive	Share of perspective (SK); People talk and share a lot (S-E); different agricultural techniques are welcomed (AR)		
	Negative	The Poor condition of the compost suggest a collective lack of Engagement to sustain *Value* relative to environmental protection; free-rider issues demonstrate limits about the reproduction of MH.		
BIO-ECONOMIC INSIGHTS	The garden related *Activities* require lots of time and People efforts. However, those efforts are well reward in terms of *Value* outcome since People demonstrate to enjoy being engaged in these *Activities*. Moreover, People experience mutual Share Knowledge and Self-Expression. *Agents* are globally positively reward by the *Activities*: good quality production of food for CdT, Rituals and BA as well as People enjoyment were observed. Finally, garden is particularly beautiful thus, contrarily to the compost area, it positively promotes the model of the ASV to the external public. Accounting for the observed elements, one might consider garden as a fairly sustainable activity for ASV since it globally enriches its *Value* and *Agents*. To improve it, the ASV should explore more in profundity the value of environmental protection. Consequently, the organization would give more attention to activities that comprise the development of better *Agents* Capabilities that consequently would improve composting and waste management *Activities* and the relative *Agents*. Without this intervention, *Agents* Material and People would continue to be systemically exploited.			

Table 4 : The ASV performing as *Bio-economic Systems*: from observation to Bio-economic insights

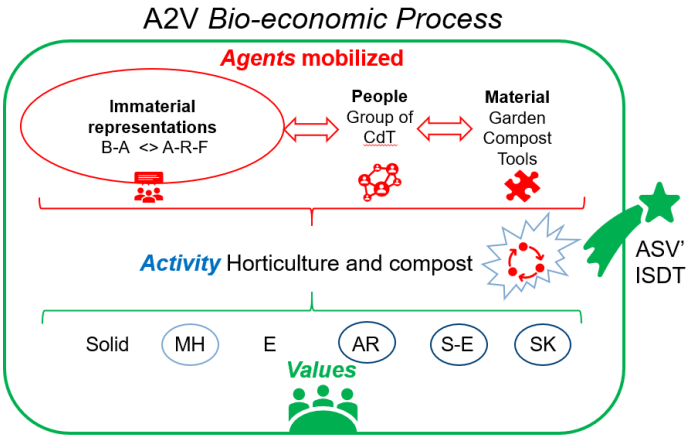


Figure 3. Horticulture at ASV as Bio-economic Process outlined using the Agent-Activity-Value framework

Source: The author.

6 : Discussion

Findings enabled to provide with insights about how the organization performs. One of the main contributions of such epistemology comes from the explicit representation of the typical logic of the organization. As a general conclusion, the more the organization rely on value based social infrastructure, the more the explored approach might be beneficial to represent their particular logic and structure. However, even those organizations that do not explicitly rely on immaterial characters might benefit from such research approach. In fact, since similar *Bio-economic* investigations would search for immaterial drivers and structures, any kind of organization (Third sector as well as Market and Public defined economic organization) that is studied accordingly would provide some clue of the actual, yet misinterpreted, ultimate immaterial end of their activity.

According with the methodology presented in the fourth chapter, findings represent data of the case study organized in category informed by the concepts of both the *Bio-economic* and systemic paradigm. The relationship between the findings and the concepts are summarized in Table 5.

	Agents	***Activities***	***Values***	**BS**	**BP**
Findings	*Materials* *People* *Immaterial representations*	EsA EoA TsA TfA	Solid MH E AR S-E SK	Static representation of the Association Sahel Vert employing *Values* and *Agents*	Dynamic description of the of Association Sahel Vert describing *Activities* employing BS
Complex organization concepts	*Structures*	*Processes*	*Functions*	Representation of an organization as complex system	
***Bio-economic* paradigm concepts**	Agents of the process of transformation	Flows	Immaterial end		Representation of an economic process and its outputs

Table 5 : The elements of the A2V in relation with the mentioned theoretical concepts

Firstly, the representation of the so-called *Bio-economic System* provides just for an early description of how principal systems could be logically structured according to the proposed epistemology. Thus, in order to employ a scientific analysis of the complexity of the system, the relationship between systems and subsystems (category and codes) should be further investigated to provide a consistent network eventually discovering levels of hierarchy (LANE, 2017). Secondly, the research design does not employ orthodoxically the G-R bioeconomic theory. In fact, since the research was not an orthodox analytical investigation[12], it is not possible to straightly refer it as bioeconomic contribution in line with the analytical proposition of G-R[13]. Again, in the findings there is almost no account[14] for the **environment**.

[12] Thus, based on material aritmomorphic concepts as the G-R Fund-Flow bioeconomic processes (BONAIUTI, 2012).

[13] That is also why the study refers to *System* and *Process* called *Bio-economic* but written with the first capital letter, space and in italic. That is to evidence how this approach, yet informed by the epistemology of G-R, advanced alternatively as defined in the study.

[14] That goes beyond the reach of a qualitative research. However, to conduce the research design closer to the original meaning, it would be possible to account for environmental impact (material as well as immaterial) employing, as precondition, Bonaiuti's Stock & Flow analysis of the regional context in which the organization performs its activities.

Consequently, the interpretation of the concept of **sustainability** proposed in the findings should be limited accordingly. In fact, no proper global *Bio-economic* sustainability might be claimed without accounting for the actual environmental degradation due to BPs. Instead, in a qualitative research, insights about sustainability and resource efficiency within the organization are identified. Since in the presented findings there is almost no understanding of the environmental context, the claim remains incomplete. However, a qualitative research conducted accordingly helps to define a broader area defining the sustainability within the organization itself. Accordingly, a *Bio-economic* informed interpretation of the sustainability of the *Activities* of the case study (BS) broadly emerges accounting for just *Value* and *Agents* outcome of the processes (BP). In other words, sustainability is evidenced when *Value* is achieved meanwhile accounting for the maintenance of quality of its *Agents* structure. As it is displayed in Figure 4, the area evidenced by the interpretation of findings (whole *sA* and S) integrates the concept of sustainability presented in the theoretical framework (S) without clearly distinguish it. In fact, a purely qualitative research as such goes towards the identification of sustainability (S), however it as no analytical support to define it accounting its environmental dimension In conclusion, analyses of BPs that will introduce environmental impacts would finally be able to add more accuracy to the identification of sustainability.

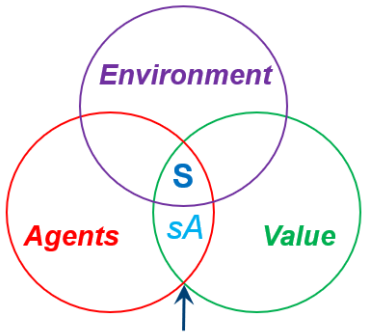


Figure 4. The area of sustainability identified in the study

The picture reproduced in a modified version the picture representing Venn diagrams of "The Three Pillars of Sustainability" as presented by Hammond and Winnett (2009, p. 1198). The concept of sustainability presented (here symbolized by capital "S") was situated in the interception of Social (*Value*), Economics and technology (*Agents*) and Ecology and thermodynamic (*Environment*). Since no account in the analysis was provided to the Environmental domain, the analysis of sustainability provide here account just for *Values* the *Agents*. Therefore, the offered *Bio-economic* interpretation of the *Activity* evidence its sustainability "*sA*" englobing S without clearly distinguish it.
Source: The author.

In conclusion, findings offer a qualitative interpretation of diverse theoretical concepts exploring their metaphoric meaning in the case study eventually providing for some meaningful insights. As presented ultimately in the findings, proper insights emerge from the continuous exploration of relationship between the elements of the Bio-economic System.

7. Conclusion

In the case-study, the explored epistemology succeeds to evidence the basic characters for which the different kinds of voluntary organization are identified in the literature, demonstrating in particular the consistency of a Bio-economic epistemology to study SSE organizations. On the other side, the investigation of sustainability consistently offers valuable insights about the quality of the initiatives of the organization; however, a qualitative research is considered insufficient to properly relate with the Bio-economic theoretical contribution. Therefore, a development of this epistemology is endorsed combining quantitative and qualitative approaches in order to give more accuracy in the statements accounting also for the environmental impact of SSE initiatives. In conclusion, the explored Bio-economic approach can be judged appropriate in order to guarantee the sustainability within the organization itself, while a more complete approach, both qualitative and quantitative, must be considered to properly recall the Bio-economic theoretical framework achieving strong sustainability.

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