

Social Life Cycle Assessment in a constructivist realism perspective: a methodological proposal

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1. Introduction

Social Life Cycle Assessment (sLCA) emerged in the last decade as a methodology to evaluate social impacts deriving from the life cycle of a product or service. However, there is not yet consensus on a specific procedure and many different methodological proposals have been developed (Wu et al., 2014). This diversity is mainly observable in the use of different semantic meanings (such as in the definition of impact, effect and performance), in the underlying social sustainability concept (even if not always explicit) and in the perspective of the assessment, that can concern the product, the firm, the affected actors, the decision-makers. Actually, it is arguable that the main reason of these methodological differences has its roots in the underlying paradigms, inherent every research process. A paradigm can be considered as a set of basic beliefs concerning the worldview of the researcher, i.e. the nature of reality (ontology), the relation between the knower and what is under study (epistemology), and how the researcher can find out knowledge (methodology) (Guba, 1990; Guba & Lincoln, 1994; Mertens, 2007).

The present work is part of an ongoing three years research project, whose aim is to bring the methodological debate on sLCA to a paradigm level by analyzing the current approaches applied by sLCA practitioners and by comparing two different methodological proposal based on divergent epistemological premises. This choice has been made according to Guba & Lincoln (1994:105) who affirmed that “questions of method are secondary to questions of paradigm, which we define as the basic belief system or worldview that guides the investigator, not only in choices of method but in ontologically and epistemologically fundamental ways”. In this direction, the research project will compare two different methodologies for sLCA (i.e. two ways of obtaining indicators for the assessment) based on opposite paradigms, namely a positivism-oriented paradigm, and a interpretivism-oriented one. The present work represents the development of this latter. The methodology here proposed will be applied to an important agricultural supply chain in Southern Italy, i.e. citrus growing in Calabria region, the second agricultural sector in terms of surface and the most important in terms of average standard production¹, but unfortunately also renowned for social problems.

¹ Expressed in €-farm-1-year-1 and calculated as the total value of standard productions divided per number of farms.

2. A constructivist realism paradigm for sLCA

While positivism-oriented philosophies have dominated scientific research in the field of the so called “hard sciences” (Tacconi, 1998), in the development of sociological theories it is difficult to recognize a dominant paradigm and more worldviews have been hold simultaneously (Batty, 2008; Tashakkori & Teddlie, 2010), that is why sociology is considered a multiparadigmatic science (Ritzer, 1975; Corbetta, 2003; Batty, 2008). As the lines between paradigms are often very fine, Table 1 shows two main orientations - positivism and interpretivism - that can be considered the umbrellas to which almost all of them tend.

Table 1: Examples from two of the principal research paradigms.

	Positivism-oriented		Interpretivism-oriented	
	Positivism	Post-positivism	Interpretivism	Constructivism
Ontology: What is reality?	Naïve realism. Objective reality.	Critical realism. Reality is imperfectly apprehendable.	Subject and object are dependent. The real essence of the object cannot be known. Reality is constructed.	
Epistemology: How do you know?	Dualism researcher- research. Replicable findings are “true”. Reality can be explained.	Dualism is not possible. Replicated findings are “probably” true. Impossible to fully explain reality.	Knowledge is interpreted. Reality can be understood.	Knowledge is constructed. Reality can be constructed.
Methodologies: How do you find it out?	Experimental, deductive. Mainly quantitative. Relationship cause-effect. Statistical analysis.	Experimental. Mainly quantitative methods, manipulative. Scientific Community plays an important role of validation. Statistical analysis. Probability sampling.	Interpretation. Mainly qualitative methods. Purposive and multipurpose sampling.	Mainly qualitative methods. Purposive and multipurpose sampling. Stakeholders involvement.
Goodness or quality criteria	Rigorous data produced through scientific method.	Statistical confidence level and objectivity in data produced.	Intersubjective agreement and reasoning reached through dialogue, shared conversation and construction.	

Adapted from: Guba & Lincoln (1994); Girod-Séville & Perret (1999); McKenzie & Knipe (2006); Lincoln et al. (2011); Phoenix et al. (2013).

Since sLCA is yet a methodology under debate at academic level and many new methods are ceaselessly proposed, it is important to state which is the underlying paradigm. A literature review conducted among about 74 scientific papers and grey

literature published on the subject of sLCA and papers that took into account social aspects as part of a Life Cycle Sustainability Assessment (LCSA), revealed that the choice of methods applied is hardly explicitly justified by epistemological reasons. The results of the bibliographic survey (here not fully reported for reasons of space) showed that ontological and epistemological issues have been explicitly taken into account just in two papers by Sala et al. (2013a; 2013b) on LCSA.

To build the present methodological proposal the study has been based on a constructivist realism paradigm, as constructivism-oriented research approach that embeds at the same time some positivism-oriented foundations and looks for their methodological complementarities (Cupchik, 2001). Indeed, this study starts from some assumptions typical of interpretivism-oriented paradigms, e.g. that subject and object are dependent and that knowledge can be constructed through participation; and from positivism-oriented assumptions, e.g. that reality can be explained, but not totally, and that the scientific community plays an important role. In particular, the authors have looked for similarities among what has been traditionally considered contrasting, building bridges between different social ontologies, as proposed by Cupchik (2001).

The aim is to verify the constructivist realism paradigm as an epistemological option for developing sLCA, fulfilling requirements for: (i) completeness, assessing a wider variety of impacts; (ii) objectivity, by involving external experts; (iii) legitimacy, by involving local actors and stakeholders as active subject in an iterative and inclusive process and not as passive receivers. To do this, the authors borrowed different methods and tools from yet existing methodologies and approaches, chosen for their relevance or efficacy to solve each step. Moving from Patton (1999) that rejects the methodological orthodoxy in favour of an appropriateness of methods, we propose an approach for sLCA where each step is developed through the application of an appropriate tool or technique borrowed from different families of research methods.

According to the literature review conducted, the resort to different methods chosen for their relevance to each step is quite new in the field of sLCA. Actually, following Previte et al. (2007), it is important to highlight that it is not in the typology of methods to be applied that our ontological and epistemological position is revealed, but in the choice of applying different methods together, the willingness of involving local actors, stakeholders and external expert, and in the interpretation of results. Indeed, Patton (1999:1207) affirmed that “the issue need not be quantitative versus qualitative methods, but rather how to combine the strengths of each in a multimethods approach to research and evaluation. Qualitative methods are not weaker or softer than quantitative approaches; qualitative methods are different”.

As the development of sLCA is still under debate, the authors are aware that the present study should be considered a methodological option among others for sLCA: the aim, indeed, is to lead the debate at an ontological and epistemological level, on how the knowledge is reached and how the indicators are chosen.

3. Material and methods

Following the typical phases of Life Cycle Assessment (LCA), the present methodological proposal for sLCA (Tab.2) is tailored for each step with the help of specific tools borrowed from qualitative, quantitative and multicriteria research methods, taking advantage from their complementarity, as inspired by the constructivist realism approach (Cupchik, 2001). As it is in other LCT tools, this methodological process is iterative, and each phase can be revisited in the light of results from subsequent steps. A key role is played by participation (of local actors, stakeholders and external experts), that is emphasised to both legitimate the choice of impact categories and to make the assessment relevant to local urgencies. Once the product or service to be assessed will be chosen, data gathered from official statistics and local surveys will enable to define the territorial contexts associated to the functioning of the product life cycle.

The first step of our methodological proposal will concern the selection of stakeholders to be involved, here intended as affected actors. The “stakeholder theory” (Mitchell et al., 1997) is applied to identify three criteria from a normative perspective: their influencing power, the legitimacy of their relationship with the system under study and the urgency of their claims towards not a single firm, but the whole supply chain. A web questionnaire will be set up to interview a wide range of typology of actors (belonging to the territories previously selected) and gather their opinions about which typology of stakeholder is concerned in each life cycle phase² and with which intensity, assigning a score on a scale from one to five for each of the three criteria. The life cycle phases corresponding to the stakeholder typologies with a score higher than the average will be included in the system boundaries. Both statistical and territorial analyses and the choice of system boundaries will guide the definition of the scenarios to be compared, according to discriminating factors emerged during the above mentioned phases.

The second step will concern the definition of the dimensions of social sustainability, i.e. what is worthwhile sustaining from a social point of view. A sample of stakeholders will be involved into a “Q-methodology” application (Stephenson, 1953), a tool for the analytical study of subjectivity (Brown, 1993) and people’s own perspectives, meanings and opinions. The Q-methodology will enable to define the so called Areas of Protection (AoP) for sLCA.

² Life cycle phases are designed at researchers’ discretion according to a supply chain perspective. For example, the present methodological proposal will be applied to citrus growing sector in Calabria region (Italy), and the corresponding life cycle phases will be: input supplying, farming, conditioning and transport, retailing, wholesaling, industries, consumption, waste management.

Table 2: Methodological steps

Step	Actors involved	Activity	Tool	Result	sLCA phase
1	Researchers	Stakeholder identification	Stakeholder theory	Actors groups affected by the system under study, scenarios	Goal and Scope
2	Affected actors	Identification of social sustainability dimensions	Q-methodology	Areas of Protection (AoP)	
3	Independent experts	Taxonomic ordering (AoP, criteria, indicators)	Delphi	Social Impact Matrix construction (SIM)	Life Cycle Inventory
4	Researchers	Data gathering and calculation of indicators		SIM filling	Impact Assessment
5	Researchers, Affected actors, Experts	Normalisation and weighting	AHP	Ranking	Interpretation of results

In the third step, external experts will be involved, through the Delphi technique, in a group decision-making process to select and taxonomically order criteria and indicators to be used in evaluating the scenarios, according to the social values previously selected by stakeholders. The choice of this qualitative method is based on its ease of use and its suitability for complex problems for which there is not exact knowledge about a phenomenon (Miller, 2001, Skulmoski et al., 2007; Vidal et al., 2011).

Once criteria and indicators linking the functioning of the life cycle to the AoPs will be defined, a Social Impact Matrix (SIM) will be constructed (De Luca et al., 2013) and then filled in by researchers with elaborated indicators. Finally, life cycle impact assessment consists in normalising and weighting each indicator according to the preferences of the actors, derived through the application of an appropriate multicriteria analysis tool, the Analytic Hierarchy Process (AHP) by Saaty (1990). This weighting process will permit to compare different categories, to rank the scenarios, and to quantify social impacts of a product life cycle in a comparative way.

4. Expected results and conclusions

The present study follows the assertions of McKenzie & Knipe (2006) that a purity of methods is potentially impossible in social research, and agrees with Teddlie &

Tashakkori (2010) and Howe (1988) that a wedding of methods is possible, and different paradigms can be compatible.

Starting from these assumptions, a constructivist realism paradigm has been the base upon which the current methodological proposal has been planned. Qualitative, quantitative and multicriterial methods will be used in a complementarity perspective to analyse the whole complexity of social impacts deriving from the life cycle. Participation will play a key role to make the assessment legitimate and adherent to reality.

Expected results concern the accommodation of the strengths of positivism and interpretivism as proposed by the constructivist realism (Cupchik, 2001), here assumed to assess the whole social impacts of a product life cycle, that would mean reaching objectivity and generalization, typical of positivism-oriented approaches, and richness in meaning, holism and comprehensive understanding, typical of interpretivism-oriented approaches. Nevertheless, it is in our opinion that the current debate on sLCA development should concern ontological assumptions and epistemological positions, before than methodological issues.

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