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Innovation and Sustainability
of Agri-Food System
in the Mediterranean Area

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Social impact and sustainability in short food supply chains: An experimental assessment tool

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Abstract

In recent years, as global food chains have expanded, a wide range of terms has been used in the academic, political, technical or social debate to illustrate innovative re-organisation of food supply chains aiming at re-connecting producers and consumers and re-localising agricultural and food production. These include short supply chains, alternative food networks, local farming systems and direct sales. This paper presents a research carried out during the SMARTCHAIN project (Horizon project within the research line “Innovative agro-food chains: unlocking the potential for competitiveness and sustainability”). The research aims at identifying an assessment model for grasping the level of social innovation in Short Food Supply Chain (SFSC) taking into consideration the social and sustainability indicators. A specific tool, the Social Innovation Assessment Template (SIAT) was created for this purpose. The SIAT investigates five dimensions of SFSC: economic, environmental, socio-cultural, governance and influence (positive impact on other sectors & stakeholders) dimensions. The assessment has been tested in 9 European countries and 16th case studies. The findings show both managerial implications for the SFSC and policy implications for strengthening the SFSC ecosystem.

Keywords: Social innovation, Short food supply chain, Social impact, Sustainability.

1. Background and objectives

In the second half of last century, the agri-food system has been invested by rapid and radical changes. The dominant organizational model of the agro-food system was characterized by long distances between producers and consumers with a consequent high environmental impact. In fact, in the industrialized food supply model, large scale food processing firms and supermarkets chains dominated the scene, in the framework of a fast-growing globalized food system.

Consumers' behaviour and needs did change too, due to the evolution of society and economic systems. Urbanization was one of the main factors widening the gap between agricultural production and food consumption, asking for a growing number of connections (transport, storage, packaging, processing) carried out by a plurality of actors. Moreover, both income growth and changes in work organisation and family structure asked for improved services.

In order to achieve scale economies and cut

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production costs, the industrialized model of food supply forced farmers to gradually stop direct delivery to final consumers, as well as processing their products on-farm, thus delegating food processing and distribution to specialized firms outside the borders of the farm, increasing the number of steps between agricultural production and final consumption. In this way, this model allows distributors to enhance more and more their bargaining position, at the expense of producers, who do not find a fair return for their activity (Elghannam *et al.*, 2017).

In the last decades, this model raised concerns and has been subject to criticism according to many points of view, among which difficult access to market for smallholders and small and medium enterprises, environment pollution, and threat to food safety and nutrition seem to be the most important ones (Renting *et al.*, 2003, Sonnino and Marsden, 2006). The high number of steps, and the increasing distance between production and consumption, are at the basis of the “revolution” brought about by initiatives of short food supply chains (SFSCs), especially in Europe and in the United States, although a number of interesting opportunities is also identified for other countries, included developing ones (Moustier and Renting, 2015).

Cultural reasons rather than economic ones, a common vision on food, an increasing desire by urban consumers to access secure, high-quality and sustainable food, and the relationship among food, environment and territory, have generated a high level of innovation in the organization of consumption and have led to a better distribution of quality food production and marketing through alternative SFSC that allow to reduce the number of steps between producer and consumer and to enhance the interpersonal relationship among the actors of the chain. Often operating in urban and peri-urban settings, SFSCs respond as well to producers’ need to access a larger portion of the production added value.

Several the studies have investigated, in the North-European and North-American contexts, the most widespread forms of short supply chain: direct sales on the farm, farmers’ markets, weekly deliveries to households on subscription, collection of products on the farm by the con-

sumer, e-commerce and different ways of association between producers and consumers, from the most radical forms, providing a real sharing of business risk to «softer» ones which provide for the adoption of livestock. Very recently, even the use of social media is adopted by producers in order to build new short chains for promoting and selling their products in a rapid, low-cost and direct way (Elghannam *et al.*, 2017).

The EU’s rural development regulation (1305/2013) defines a “short supply chain” as a supply chain involving a limited number of economic operators, committed to cooperation, local economic development, and close geographic and social relations between food producers, processors and consumers. SFSCs are generally divided into three overarching types: “traditional”, “neo-traditional”, and “modern”. Furthermore, in a recent report by the United Nations Industrial Development Organization (UNIDO, 2020), six broad types of SFSCs are proposed: on-farm selling, farmers’ markets, farmers’ shops and box schemes, consumer-driven initiatives, public (collective) procurement, and hotels, restaurants and catering. These six categories do not grasp the immense diversity of existing SFSCs but help to highlight two types of SFSCs which are significantly more present in current literature: farmers’ markets and consumer-driven initiatives (especially community-supported agriculture). On-farm selling would therefore be considered traditional SFSCs, box schemes and consumer-driven initiatives would be considered more modern forms of SFSCs. Farmers’ markets are considered “neo-traditional” in some countries, and “modern” in others.

Indeed, SFSCs have followed different trajectories in developed countries. In Mediterranean European countries (e.g., France, Italy, Spain, Greece, Portugal), “neo-traditional” farmers’ markets developed in the 1980s, alongside with traditional open-air markets mixing at the same time producers selling directly their products and reselling other products, as well as retailers selling products in short and/or long chains. On the other hand, in Anglo-Saxon countries (the UK, United States, Canada), farmers’ markets had appeared earlier, in the 1970s, but are considered “modern” as there was no tradition of open-air markets in these countries. Inspired by the *teikei*

system invented in Japan in the 1960s, CSA were first seen in the 1970s in Northern America and later in Mediterranean countries, and in both continents, embodied a form of resistance to the industrial food system, thus they are often referred to as *alternative food networks* (AFN). In Eastern European countries (e.g., Hungary, Poland, Czech Republic), farmers' markets and community supported agriculture (CSA) have gained popularity alongside with already-present non-market-based food self-provisioning (FSP) practices (herein including home gardens and community gardens), which still play a fundamental socio-economic role at individual and community levels.

An interesting further differentiation present in literature considers AFN and Food Community Networks (FCNs), whose objective is to promote economic sustainability and to increase social and democratic equity among all members of the community, experimenting with new social paradigms and innovation system models (Forno *et al.*, 2014).

SFSCs also align with political efforts geared towards the localisation or re-localisation of food and agricultural systems. In fact, the development of different types of SFSC is one of the approaches of the Common Agricultural Policy to improve competitiveness in Europe.

In terms of social impacts, there is evidence that SFSCs play an important role in developing social capital and in promoting behavioural changes. When farm-based, they may contribute to revitalising rural areas and in urban contexts, among other positive effects, they promote social inclusion, education on sustainability and ethical issues.

Despite the general positive contributions of SFSCs in terms of economic, social and environmental sustainability, at present there is poor contribution of literature in identifying tools and methods for assessing the social value that SFSCs generate.

This paper aims at presenting the research carried out within the SMARTCHAIN project on the assessment of social innovation level of the organizations involved in the project as case studies, using a specific tool, the Social Innovation Assessment Template (SIAT) created for this purpose.

SMARTCHAIN, a 3-year project funded by Horizon 2020 program, aims at fostering and ac-

celerating the shift towards collaborative short food supply chains and, through specific actions and recommendations, to introduce new strong business models and innovative practical solutions enhancing the competitiveness and sustainability of European agri-food systems (<https://www.smartchain-h2020.eu/>).

Using bottom-up, demand-driven research, the SMARTCHAIN consortium performs a multi-perspective analysis of 18 case studies of SFSC in terms of technological, regulatory, social, economic and environmental factors; assesses the links and interactions among all stakeholders involved in SFSC and identifies the key parameters influencing sustainable food production and rural development among different regions in Europe.

According to the definition of the SMARTCHAIN project, SFSCs are “cooperative systems that include very few intermediaries, increasing sustainability, transparency, social relations and fairer prices for farmers and consumers. Such supply chains usually involve local producers working together to promote local food which, in many cases, only travels a short distance, so farmers and consumers can communicate with each other”.

Therefore, the short supply chain makes it possible to experiment with new forms of marketing, which can be modulated in relation to the interests of producers and consumers and with positive repercussions for the local community, shifting the centre of gravity to the territory, quality of production and consumption processes and a rural development model based on multifunctionality and sustainability. These forms of sale, in fact, are part of a virtuous circle of local development that goes through rural tourism, educational activity, exploitation of typical products, processing of agricultural products on the spot and on the farm, and several opportunities that are linked to the productive, environmental, landscape, cultural and social function of agriculture and to the diversification of activities and sources of income. Not forgetting that, shortening the distance travelled by food from production place to consumption place can reduce the environmental impact in terms of packaging, energy and transport.

2. Social innovation and short food supply chains: a summary of the literature

The concept of social innovation (SI) has been often invoked as a game-changer that has the potential to influence future thoughts about the Anthropocene (Olsson *et al.*, 2017). The ever-growing interest about this topic shows a relation between the rise of a “crisis society” (Moralli and Allegrini, 2021) and the need to radically rethink capitalism (Jacobs and Mazzucato, 2016). SI has drawn the attention of several scholars since the years immediately following the 2007-2008 crisis, and this cannot be considered as an accident. It has gained a prominent public policy foothold (Periac *et al.*, 2018), transcending national borders and political divisions (Sinclair and Baglioni, 2014).

On the basis of political initiatives undertaken by the British and US governments (the Big Society and the White House Office of Social Innovation and Civic Participation), social innovation is more and more considered as a paradigm that allows us to rethink social and economic relations in order to respond to social needs with new ideas, processes, products and services able to balance 3 essential characteristics:

- 1) higher efficiency compared to traditional solutions
- 2) higher effectiveness compared to traditional solutions
- 3) creation of new social relationships enabling the actors to take part in collaborative processes of value creation.

The European Commission (2017), with an institutional definition, has focused its attention on the need for effectiveness of social innovation processes, while Murray (Murray *et al.*, 2010) stresses the dual social meaning of this innovation (social for the challenges it addresses, social due to the typology of relationships that are triggered by the processes). Phills, changing point of view, shifts the attention from the processes to the generated value, believing that the peculiar characteristic of social innovation initiatives is the primarily social, rather than individual, destination of generated value (Phills *et al.*, 2008). Herrera emphasizes the consequences on the behaviour of organi-

zations and the opportunity for these processes to meet CSR (Corporate Social Responsibility) strategies of companies which, precisely because of this hybridization, become institutionalized strategies of corporate social innovation (Herrera, 2015) and in the same way, but from another point of view, Nicholls and Murdock (2012) lead SI back to the need to re-contextualize the public function to pursue objectives of public value, justice and equity.

The complex nature of SI raises the issue of evaluation (Hervieux and Voltan, 2019), questioning the role and characteristics of social impact assessment (SIA). How to grasp the system's changes due to SI is at the core of a lively debate. According to Westley and Antadze (2010) multiple outcomes should always be considered, and standardized metrics are neither possible or desired. Hervieux and Voltan (2019) describe SIA as the lens that must encapsulate systems' change interrelated with the complex nature of social problems.

Westley and Antadze (2010) claim that, in order to structurally change routines and construction of previous authorities, processes of social innovation require durability and impact. This aspect, particularly peculiar for our analysis, is declined in social impact and, in this sense, can be seen as something broader than a mere completion of instances of accountability: it represents the signal that enables interaction between multiple social actors with the aim of transforming previous relationships towards new collaborative forms that generate impact and therefore can last over time, as Westley and Antadze suggest.

How to assess the achievement of social goals leads to the stream of studies related to SIA. SIA is a challenging topic as it combines social research, public involvement, planning, and management of social change (Bakar *et al.*, 2014) and is at the centre of social innovation debate. The main challenge of SIA consists in the conversion of qualitative data regarding the achievement of a social mission into quantitative metrics (Grieco *et al.*, 2015). Arvidson and Lyon (2014) state that social impact can be perceived as a social construction. The complexity of SIA lies in the lack of a clear definition of what is meant by ‘social’ (Barman, 2007; Lyon

and Sepulveda, 2009; Hall, 2014). This opens social impact to interpretations of the concept as measured through its evaluation (Arvidson and Lyon, 2014). Around the world, 76 models for SIA have been mapped (Grieco *et al.*, 2015). Theory of Change (ToC) and the Impact value chain (Clark *et al.*, 2004) logic are usually behind the most used SIA models.

As far as the aim of this research paper is concerned, it is crucial to frame the concept of social innovation within SFSC debate as well as the indicators for assessing the changes provoked (how to assess the social impact to measure effectiveness of SI processes). Firstly, it is important to underline that SI has entered mainstream debate and it involves different fields of study – such as sociology (Heiskala, 2007; Moulaert *et al.*, 2013), welfare economics (Pol and Ville, 2009), territorial development (MacCallum *et al.*, 2009), and organizational studies (Grimm *et al.*, 2013). Because of this broadness, SI is considered an umbrella concept that can find different definitions according to the field of study (Neumeier, 2012; Edwards-Schachter and Wallace, 2017).

Social innovation in SFSCs is a niche issue compared to the general debate. During the SMARTCHAIN project a two-step systematic review has been carried out by the University of Create (UoC) to investigate all possible definitions of SI in short food chains. This piece of research was based on the major electronic databases (Google Scholar, WorldCat, Web of Science Plus, AGRIS, and SSRN) using a combination of 39 keywords both from SI literature and SFSCs. The process of selection from the initial 5,597 was restricted to 114 documents and more than 200 definitions. After a process of review and analysis of these papers, SMARTCHAIN partners have developed a definition of social innovation within SFSCs:

Social Innovations (SI) are processes that change short food supply chain systems by altering the collective perspective of the actors involved and their corresponding action mode, thus leading to the achievement of, primarily, social goals that benefit all short food supply chain participants in sustainable ways.

This definition highlights the social goals pursued by the groups co-creating SIs and, at the same time, it maintains the need for these innovations to generate benefits in sustainable ways. The terms collective perspective and action mode are the ones characterizing the perspective of the definition that looks at the collective awareness of SFSC participants. Social Innovation processes within SFSCs should enable the achievement of social goals and therefore sustainable/blended value creation, that imply (positive) social and economic performances. The purpose of this paper is to present the tool developed to assess the level of social innovativeness of SFSCs according to this specific definition of SI.

3. Methodology

Social Innovation Assessment Template (SIAT) is an independent and self-consistent tool that enables self-assessment in SFSCs in order to measure the level of ‘social innovativeness’. SIAT has been created and tested on 16 case studies in 9 European countries.

Table 1 - Case studies involved in SMARTCHAIN project per country.

<i>Case Study</i>	<i>Country</i>
Couleurs Paysannes	FR
ZALA TERMÁLVÖLGYE EGYESÜLET	HU
Foodhub.hu Nonprofit Ltd.	HU
Biofruits SA	CH
Chèvrement bon	CH
Natuurlijk Vleespakket BV	NL
Local2Local	NL
DOO Polo	RS
AFV	RS
Bauer Banse Hofmolkerei	DE
Biotop Oberland - SoLaWi	DE
Latengui Batuak, NAIA	ES
La Trufa de alava	ES
Gaia producers-consumers' cooperative	EL
ALLOTROPON - SYNPE	EL
ARVAIA, Soc. Coop Agricola	IT

To achieve this aim, SIAT takes into consideration five dimensions:

- economic dimension;
- environmental dimension;
- socio-cultural dimension;
- governance dimension;
- influence dimension (positive impact on other sectors & stakeholders).

These dimensions have been identified in coherence with literature on SFSC assessment (Malak *et al.*, 2019; Vittersø *et al.*, 2019; Jarzębowski *et al.*, 2020) with the aim of providing a self-assessment tool for the definition of social innovation provided above. It is important to underline that SFSC assessment crosses with another stream of studies related to sustainability indicators (Marsden *et al.*, 2000; Galli *et al.*, 2015; Chiffolleau *et al.*, 2016; Malak *et al.*, 2019). Malak *et al.* (2019) identify three main dimensions of sustainability: economic, environmental and social. The model presented developed two additional dimensions (governance and influence) including the perspective of social innovation and SIA studies in each item of the analysis.

The main difficulty of SIAT is to function as an assessment of social innovativeness applied to SFSC. The measurability of social innovation itself has been researched and questioned widely (see for instance Baturina and Bežovan, 2015, in particular section “Social Innovation Impact – Unlit Road”). Impacts, through the measurement of outcomes, are defined as measurement of social innovation processes. Applying this perspective (to create SIAT) to each dimension considered relevant in SFSC literature (Marsden *et al.*, 2000; Galli *et al.*, 2015; Chiffolleau *et al.*, 2016; Malak *et al.*, 2019; Vittersø *et al.*, 2019; Jarzębowski *et al.*, 2020) impact hypothesis, outcome areas and possible indexes have been studied. The processes involving change (social innovation) are mapped in each of the five dimensions.

The final version of SIAT is the result of a co-design activity with case studies that has been carried out for 6 months during the project. In March 2020, after literature review analysis, a first SIAT model divided into 2 steps (evaluability and assessment) was created. The first step was designed by the 18 case studies and valuable feedback in order to re-design SIAT, in particular related to the typology of

data that the organizations had (originally the idea was to focus more on product data, but this option was not feasible because data were not available). Then, the second step was analysed and commented. Finally, in July 2020, the final version of SIAT was launched incorporating the suggestions by different partners and adjusting to the typology of data available.

SIAT is based on the following structure:

Profile - The purpose of this section is to profile the organization corresponding to its sizing (turnover, employees, etc.), strategic orientations (e.g., types of investments) and the characteristics of reference SFSC (sizing and actors involved). Moreover, it investigates if the organization operates both in SFSC and in Long Food Chain (LFC).

Prioritize - The purpose of this section is to directly involve the respondent’s perspective so that the most important dimensions driving the organization’s vision in SIAT output can arise. *5 dimensions (economic; environmental; socio-cultural; governance; influence)* - Each dimension is composed by different indexes based on items (item= translate the given answer into a % value). There are different types of answers: open answers; quantitative (number); qualitative (text); Likert scale 1-5 scale; binary answers 0-1. Most of them can be transformed into an item to calculate the index, others are just informative. The result of each dimension is summarized with a radar representation.

SIAT, as a self-assessment tool, gives the organization a final score that is calculated using the average scores of each dimension.

Table 2 - Distribution among dimensions, items, and questions composing SIAT.

<i>Dimension</i>	<i>Index</i>	<i>Questions</i>
Economic	11	15
Environmental	9	19
Socio-cultural	13	23
Governance	2	4
Influence	4	5
Sub-total	39	66
Profile		13
Prioritize		1
TOTAL		80

4. Results

The results of the application of SIAT tool to the project case studies have been processed in a double perspective: for each case study a single report has been prepared including a detailed item by item analysis. Then, a comparative analysis among case studies has been run through a business intelligence software, Power BI¹, that provides users with tools to aggregate, analyse, visualize and share data.

The comparative analysis is organized into different units that follow SIAT sections. The first one provides a descriptive analysis of the sample according to profile data. The variables through which it is possible to analyse data, are:

- Legal form;
- Operational area;
- Type of production;
- Operating supply chain (only SFSC or even long conventional one);
- Country.

Other control variables that have been considered are average members' values, workers, economic data and typology of production. It is interesting to notice that products mainly traded in this sample are fruit and vegetables, mainly fresh (75%), followed by dairy products (43%) and meat (37%). The average number of members in the SMARTCHAIN sample is 79, but if we consider only Northern European countries (Germany, Netherland and Switzerland) the average number of members rises up to 100; on the contrary, considering only Med European countries (France, Italy, Spain and Greece) it decreases to 85.

Most SFSCs of the sample sell primarily to local and /or regional markets: 52% of the organizations operate at regional level and only 4% export some products to international markets.

Most SFSC implement full or partial organic farming practices: 62% of the organizations

Figure 1 - Example of Power BI visualization of SIAT comparative analysis. Countries of analysis.



operating only in SFSC practice organic production, more in Med countries (75%) than in Northern Europe ones (63%).

SIAT allows us to evaluate the results for each dimension object of the analysis. Each dimension is shown with a percentage, which is the result of the average of all the indexes included in the same dimension. A value equal to or higher than 50% shows an average value of the dimension considered positive in a social innovation analysis perspective². The average value of each dimension for all case studies ranges between 56% and 61% with the only exception of the governance dimension that accounts for 41%, as shown in Table 3.

Table 3 - Average of SIAT dimensions.

<i>Dimension</i>	<i>Average</i>
Economic	61%
Environmental	59%
Socio-cultural	59%
Governance	41%
Influence	56%

¹ Due to readability issues in this paper the Power BI analysis it is not visualized. The main results are reported into tables and figures.

² How each item is converted into a % concurring to the final % of the dimension depends on the type of question. There are 3 main types of question in SIAT: (A) questions expecting binary: if the answer is 1, it corresponds to 100%, if the answer is 0, it corresponds to 0%; (B) questions with a Likert scale (1-5): the % values are distributed (for instance 4 correspond to 75%); (C) questions with a quantitative number are already expressed with % by the respondents.

Within each dimension, some drivers have been identified in coherence with the social innovativeness definition (named SI drivers), with the purpose to investigate the most transformative and collaborative items of SIAT.

The description of the single dimension and the drivers related to each of them will be presented in the following paragraphs.

4.1. The five dimensions of SIAT

4.1.1. The economic dimension

This dimension focuses on the economic relationships of the organization with its stakeholders, in the market and certain aspects of resilience and adaptability.

A set of items investigates the bargaining power

of the organization assessing: its influence towards specific aspects of the market (production pricing, supply pricing, quantity of products sold); the distribution of the generated value (is it the same in SFSC?); the type of economic relations (are they stable? with whom?); and issues related to pricing and costs of operating both in LFC and SFSC.

Another set of items explores the economic sustainability of the organization (credit, investments, etc.) with a specific attention to possible collaborative solutions as a sign of resilience and innovativeness. For instance, both investigating access to credit and to ICT, the collective dimension is taken into consideration as well as the change that SFSC actors might bring about to shared investments.

Table 4 - Economic dimension.

<i>Economic dimension</i>		
<i>Index</i>		<i>Average %</i>
Bargaining power	<i>Influence on supply pricing</i>	39%
	<i>Influence on product pricing</i>	69%
	<i>Influence on quantity of product sold</i>	61%
Equal distribution of the generated value	<i>Equal distribution of the generated value among SFSC producers</i>	81%
Transparent communication	<i>Transparent communication</i>	83%
Perception of economic sustainability & adaptability	<i>Perception of economic sustainability</i>	72%
	<i>Adaptability to crises</i>	67%
Buying & selling local	<i>Buying from local suppliers</i>	80%
	<i>Selling to local customers</i>	77%
Product pricing compared to LFSC	<i>Product pricing compared to LFSC</i>	52%
Stable and durable economic relationships	<i>With suppliers</i>	72%
	<i>With customers</i>	81%
Operating in SFSC: Effects on costs	<i>Effects on production costs</i>	42%
	<i>Effects on distribution costs</i>	45%
	<i>Effects on prices charged by suppliers</i>	53%
Access to credit	<i>Access to credit</i>	53%
	<i>Requests for collective credit initiated by SFSC actors</i>	28%
Investments initiated by SFSC actors	<i>Investments initiated by SFSC actors</i>	31%
Access to ICT	<i>Access to ICT</i>	56%
	<i>Sharing tech solutions with SFSC actors</i>	50%
TOTAL		61%

Aside from economic items, this dimension grasps behavioural aspects in particular related to communication and trust with stakeholders. These aspects are analysed in other dimensions as well, because they strongly characterize SIAT.

For the comparative analysis, two SI drivers have been chosen: “selling to local customers” and “buying from local suppliers” because the focus is towards the local dimension exploring the economic relation among the actors.

It is interesting to point out that the lowest values of the economic dimension are related to collective investments (31%) or collective request for credit access (28%). This is significant since it highlights that there are some limitations in financial collaboration among the SFSC actors. Also, collaboration in terms of shared digital infrastructure is not diffuse.

4.1.2. *The environmental dimension*

This dimension focuses on environmentally responsible behaviour and choices that the organization and SFSC might put in place.

A set of items focuses on energy strategies: usage of different kinds of renewable sources of energy consumption, circular economy initiatives, and so on. A second set of items is related to distribution strategies, food miles, CO₂ emissions and reduced waste. The third set of items is related to the products: typology of production (investigated through different categories like organic, traditional, local etc.), typology of packaging, typology of suppliers (in compliance with social-environmental criteria).

As well as for the economic dimension, the collaborative/collective aspects are investigated in different items. For this dimension some items are not within the calculation routine since they are specific data that cannot be compared and weighed (for instance, quantitative information on food miles).

This dimension can be specifically investigated through two SI drivers chosen as key elements within the framework of social innovation: “distributing and selling with local actors” and “organic production”.

Table 5 - Environmental dimension.

<i>Environmental dimension</i>		
	<i>Index</i>	<i>Average %</i>
Distributing and selling with local actors	<i>Distributing and selling with local actors</i>	34%
Food miles	<i>km travelled by products for production & processing</i>	64%
	<i>km travelled by products to reach the final consumers</i>	73%
Selection of suppliers based on socio-environmental criteria	<i>Selection of suppliers based on socio-environmental criteria</i>	67%
Clean Energy	<i>Energy used from renewable sources (%)</i>	27%
	<i>Monitoring CO₂ emissions</i>	13%
	<i>Energy consumption</i>	52%
	<i>Initiatives / investments for energy efficiency measures</i>	41%
Reduced food waste	<i>Reduced food waste</i>	69%
Eco-Packaging	<i>Eco-friendly packaging</i>	69%
	<i>Less packaging</i>	72%
Organic production	<i>Organic production</i>	48%
Production of local / traditional products	<i>Production of local / traditional products</i>	75%
TOTAL		59%

The items showing the lowest average percentages are:

- CO² emission (maybe this is due to the lack of data or awareness)
- Energy from renewable source
- Collective investment for a greener transition.

This dimension has very different results if the analysis concerns only SFSC organizations or organizations that work in both chains. Actors operating in both chains are more advanced in circular

economy initiatives compared to those operating only in SFSC who are more advanced in setting socio-environmental criteria for their suppliers.

4.1.3. The socio-cultural dimension

The socio-cultural dimension examines different aspects particularly coherent and in continuity with the definition of social innovation.

The whole purpose of the dimension is to assess the involvement of the organization within

Table 6 - Socio-cultural dimension.

<i>Socio-cultural dimension</i>		
<i>Index</i>		<i>Average %</i>
Disadvantaged workers (% and n. by typology)	<i>Disadvantaged workers</i>	38%
Redistributive balance: Salary levels of the last year (Max/Min)	<i>Redistributive balance</i>	91%
Equal pay (Gender)	<i>Equal pay (Gender)</i>	94%
Occupational resilience	<i>Occupational resilience</i>	75%
Participation of local actors in production & processing	<i>Customers</i>	16%
	<i>Local producers</i>	67%
Customers' trust	<i>Customers' trust</i>	89%
Customers' awareness	<i>Customers' awareness</i>	88%
New relationships	<i>With local actors not directly involved in the production and distribution processes</i>	63%
	<i>Quality of the relationships</i>	71%
Community involvement & activation	<i>Community involvement & activation</i>	70%
	<i>Community involvement & activation together with SFSC actors</i>	55%
	<i>Participation</i>	68%
Promoting knowledge & diffusion of SFSC	<i>Promoting knowledge & diffusion of SFSC</i>	75%
Corporate welfare (services for workers)	<i>Corporate welfare</i>	25%
Community welfare (services for the community)	<i>Community welfare</i>	19%
	<i>Service design considering and analysing the social needs of the community</i>	100%
	<i>Services created together with SFSC actors</i>	50%
Shared spaced/venues & services & regenerated spaces	<i>Using spaces/venues or services belonging to third-party organizations for organization's activities</i>	22%
	<i>Providing spaces/venues for activities or services of community actors</i>	23%
	<i>Regenerated spaces/assets/goods</i>	13%
	<i>Using spaces/venues or services belonging to third-party organizations for organization's activities</i>	22%
TOTAL		59%

Table 7 - Governance dimension.

<i>Governance dimension</i>		
<i>Index</i>		<i>Average %</i>
Involvement of SFSC actors in the decision-making processes	<i>suppliers</i>	46%
	<i>other producers</i>	70%
	<i>distribution companies</i>	47%
	<i>other actors</i>	55%
	<i>other producers</i>	42%
Customers involved in the strategic decisions	<i>Customers involved in the strategic decisions</i>	33%
TOTAL		41%

the community, the level of trust and shared initiatives (i.e., the action mode). There are two sets of items: one directed to the internal dimension of the organization and directed to investigate gender balance in terms of wages, the occupational resilience, the presence of disadvantaged workers and the salary level; the other addressed to the external one in order to assess the level of participation of local actors in the production process, the level of customers' awareness and trust, the level of community involvement and activation, the presence of corporate welfare (or SFSC welfare), the level of shared initiative within SFSC, such as the renewal of assets or the usage of shared venues etc., the creation of new relations.

Three SI drivers have been chosen within the framework of social innovation: "participation of local producers in production and processing", "new relationships with local actors or directly involved in production or distribution" and "community involvement and activation".

The first two items show better results within actors that operate in both chains, while the item related to community involvement has an opposite result.

The items that have lower average are related to the sharing of venues, or collective regeneration of venues/assets or usage of venues/spaces owned by third organizations. As confirmed by the economic and environmental dimension, shared initiatives that structurally involve collaboration and trust among the actors of the chain are not a habit yet.

4.1.4. *The governance dimension*

This dimension investigates the level of involvement of SFSC actors in the decision-making processes. The items focus on suppliers, customers (both people and companies), other producers, distributors and other actors. There is also a specific focus on the role of customers for strategic decisions.

Moreover, the typology of governance (formal/informal) of SFSC and its composition (number of members per typology) is also analysed. These aspects are not part of SIAT calculation routines but are reported in SIAT output, since they are useful to better understand the differences among SFSCs.

The SI key driver for this dimension is "customers involved in strategic decisions". Organizations working only in SFSC present a high range of this item (100%).

In general, it can be observed that this dimension shows significant differences in values correlated to the operating supply chain: a lower value (34%) for those operating both in SFCSC and long chain and a more positive value (50%) for those operating only in SFSC.

4.1.5. *The influence dimension*

The last dimension aims at assessing whether a positive impact is generated towards other sectors and stakeholders. There are few items but quite significant to investigate: if SFSC has influence on public policies (in their sector i.e., agri-food) or if it might influence other production sectors; if SFSC influences other local actors

Table 8 - Influence dimension.

<i>Influence dimension</i>		
<i>Index</i>		<i>Average %</i>
Positive influence on public policies in the agri-food sector at local or regional level	<i>Positive influence on public policies</i>	55%
Creation of local networks	<i>Creation of local networks</i>	69%
Positive influence on other local actors in their way of operating	<i>on companies</i>	53%
	<i>on citizens</i>	58%
Positive influence on other production sectors	<i>on other production sectors</i>	45%
TOTAL		56%

(like companies or citizens) and finally if SFSC contributes to the creation of local networks.

The SI key driver of this dimension is the “ability to create local networks”. This item generally shows high values, even more positive in correspondence of meat and fruit and vegetable sectors.

5. Concluding remarks

The SIAT tool has a great potential for comparative studies since it allows to take into consideration a variety of aspects that determine the social innovativeness of the chain. According to the 3 main characteristics of social innovation processes mentioned in the introduction, this study confirms the need of balancing higher efficiency, higher effectiveness and creation of new social relations as cross cutting drivers of the measurement model.

We may couple the indexes considered for the measurement doubly with the 5 dimensions and the 3 characteristics, thus binding the social impact evaluation method with the social innovation measurement.

The application of the model on the short food chains enables both the analysis of intra-chain relations and extra-chains relations.

In more detail, the intra-chain relations are the relations established among the actors within the chain, while the extra-chain relations are those one established between the chain and other stakeholders.

Within the SIAT, 9 indexes (used as SI drivers in the comparative analysis) relates to the analysis of these relations:

- 1) selling to local customers (economic dimension);
- 2) buying from local suppliers (economic dimension);
- 3) distributing and selling with local actors (environmental);
- 4) organic production (environmental);
- 5) participation of local producers in production and processing (social dimension);
- 6) new relationships with local actors or directly involved in production or distribution (social dimension);
- 7) community involvement and activation” (social dimension);
- 8) customers involved in strategic decisions (governance);
- 9) ability to create local networks (influence).

The capacity of interpreting at the same time the internal and the external relations brings out two levels of possible implications: the SIAT usage by the single chain and the usage for a certain territory to design public policies. The most interesting usage is indeed the second one – that cannot exist without the first one – since it could play a pivotal role in the next programming for rural development.

For each food chain, SIAT represents a strategic and managerial tool that helps the organizations within the chain to pinpoint its level of social innovativeness and to identify where there is room for improvement and possible change of strategies. Since it is a self-assessment tool, any organization can use it in an objective manner in order to evaluate its level of social innovativeness, and understand the social value generated by its activity. The results of the SIAT application give an

immediate and measurable picture of how the dimensions of the social innovation are perceived by the organization and how they are transformed in real actions during the production/market phases. Each of the results give the organization the possibility to reflect on its behaviour, its objectives and its vision and to take some corrective actions in order to make a transition to a more socially innovative SFSC, if this is its desire.

Furthermore, an organization has the possibility to see clearly which is its openness to its context in terms of involvement of customers, of other stakeholders of the chain, of the institutions. If it believes that this dimension is important, maybe it has to review some of its managerial behaviours or some aspects of its internal organization.

In general terms, the size of this sample and the heterogeneity does not permit to run a full statistical comparative analysis. Anyhow, the tools of analysis – both the Power BI and the excel file – have been designed to compare a much higher number of SIATs.

The potential, if applied to a significant number, is represented by the fact that it might help to reshape local policies considering the evidence of each dimension (either positive or “negative” results represent a precious information for the policy makers). Since it considers also the social, governance and influence dimension it could represent a concrete methodology to assess intangible values produced by SFSC aside from the economic and environmental effects that are usually known. It might bring a more complex picture of the effects that such kind of chains implies.

Interesting implication might arise if applied both in SFSC and traditional chains.

It could be also used as an accountability tool for a certain geographical area or sector (for instance meat or fish) directed to customers enhancing the relationship of trust.

Furthermore, this kind of self-assessment tool should be applied in a longitudinal way, each year for instance, both for the single application and the comparative analysis. A picture of one year might be interesting but the same information collected in a longitudinal way is much richer in terms of potential that might activate.

The limitation of this research consists mainly in the timeframe and size of the sample for testing the tool. Clearly the scale of our data demands further verification to draw more consistent policy recommendations and more specific managerial implication of the organizations.

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