FARM SMEs SUSTAINABILITY ASSESSMENT BASED ON BELLAGIO PRINCIPLES.THE CASE OF MESSINIAN REGION, GREECE

Ilias P. VLACHOS
Northumbria University, UK
ilias.vlachos@northumbria.ac.uk

George P. MALINDRETOS
Harokopion University, Greece
gmal@hua.gr

Abstract

Purpose: *Sufficient support of the sustainability of farm products embedded in a region (such as Products of Designated Origin / PDOs) to overcome significant obstacles to access domestic and remote markets. Main research question is how to overcome such inherent difficulties and transform them into challenges and opportunities to the new market environment.*

Design/methodology /approach: *Combination of simplicity with the complicated issue of sustainability for awareness of small farmers SMEs and their collective representatives. Improve the understanding of the Sustainable Supply Chain Management (SSCM), to facilitate sustainability through use of the 'Bellagio Principles' for assessing sustainability of local farm products and facilitating further enhancement. Use of certain PDOs farm products of the Messinian region of Greece, such as local Sfela Feta cheese, olive oil, olives and raisins, to assess sustainability and improvement. Formation of a conceptual constructive action R&D framework of broader use in building-up and performing implementation of holistic supply chain strategy.*

Expected Findings: *Providing better understanding of the SSCM. Insights on how SMEs co-operatives can collectively apply holistic strategies concerning local farm PDOs to fulfil competitiveness and sustainability requirements, under variant product and market conditions.*

Originality / Value : *Improving the know-how, focusing on the sustainability of regional, traditional products and its effects upon supply chain performance and market access. Practical implications for regional-based farm SMEs in the design of holistic value creation strategies to produce sustainable competitive advantage. Interactive cause and effect dynamic implications of sustainable development on social, economic and physical environment.*

Keywords : Products of Designated Origin (PDOs). Sustainable Supply Chain Management (SSCM). Sustainable Development (SD). Belagio Principles (BP). Small and Medium Enterprises (SMEs).
***JEL classification*: R10, R11.**

1. Introduction

The issue of improving sustainability performance in meeting the 'historical challenge' of adjustment to the new, irreversible and ever changing business, economic, social and physical environment, has increasingly attracted the interest of many academics, management practitioners and policy makers. Meeting the sustainability challenge seems yet a largely unsettled actual problem, calling for collective use of all available resources, know-how and continuous study. This has critical importance for farm Small and Medium Enterprises (SMEs) that produce traditional premium agricultural products and seek for promoting them in local and foreign markets. In particular, supporting the building-up value-chain networks by regional farmers has been the main issue addressed in this paper. The structure of this study is presented in figure 1.

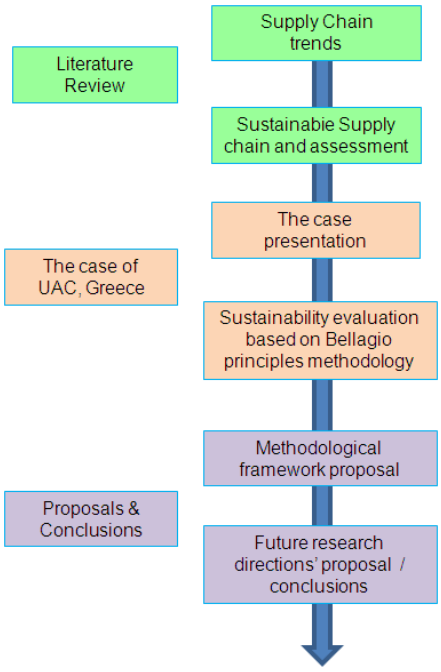
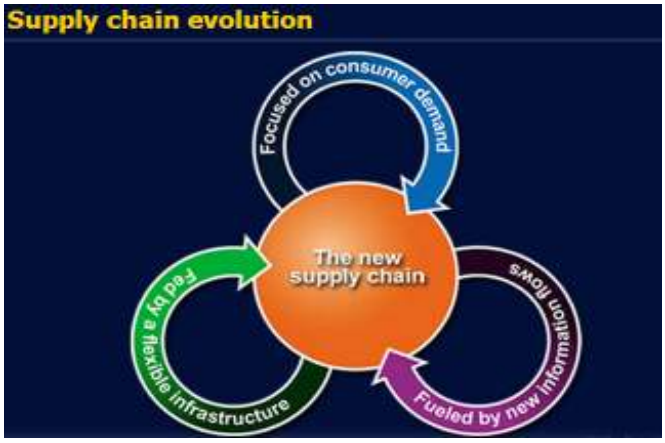


Figure 1 – The study structure

This paper starts with a literature review of the sustainable supply chain management (SSCM), in order to help better understanding of the sustainability issue in respect to its alignment with the integrated character and principles of supply chain management (SCM).
The next section is engaged with 'Bellagio Principles' methodological tool that links theory and practice, through assessment of sustainability and provision of useful directions towards the goal of SD. This methodology is applied in the case of a cooperative scheme of SMEs in the Messinia Region, Greece, which represents a interesting example of SMEs in regional areas that manage, among others, products with designation of origin (PDO).
In view of the yet unsettled issues concerning the challenge of sustainability, the formulation of a simple R&D framework follows, addressed mainly to small size farmers and based on the literature review and the sustainability assessment case. This conceptual constructive action framework has a broader use in building-up and performing implementation of holistic supply chain strategy, under variant case conditions.
The paper ends with discussion of the conclusions, and direction of future research, along with main study's paper limitations.

2. Supply Chain Management trends

During the last decade there has been a trend of increasing number of articles and studies that have been published in top scholarly journals in the fields of operations management, logistics, purchasing and SCM. The literature has been dominated with the advance from firm's logistics distribution functions to the integrated character of Supply Chain Management (figure 2), evolved into a more prominent area of research (Guinipero et al., 2008).



Source : Walker (2004)

Figure 2 - Integrated processing of the Supply Chain Management

The rise in the research on SCM, especially over the last decade, has been accompanied by special attention to realignment in the 'strategy-structure relationship' and further connection among strategy, structural planning and operational processes at supply chain level may lead to maximum improvement of the financial performance, with increasing role of the strategy and strategic planning has an increasing merit in the literature on SCM. Moreover, the existence of 'relational flows' of planning and measurable integration of the structural, technological and operational flows has been supported, including all activities that touch the product or add value by the time of delivery to the end users (Bowersox and David, 1996; Miller, 2002). However, concerning the application of strategic theories in the SCM, there still remain significant possibilities for research (Cheng et al., 2006).

The systematic and strategic coordination of the SCM, aiming at improving long-term performance of the participating companies and the supply chain as a whole (Mentzer et al., 2001), addressed research attention to the relevant concepts and corresponding issues, particularly, 'system' , 'strategy' and 'processes'. The supply chain issue has also been connected with the 'value-chain concept' as a chain of activities for a firm operating in a specific industry, introduced by Porter (1985). This concept has been extended to whole supply chains and distribution networks and has become a powerful analysis tool for strategic planning. In general, supply chain strategies require a total systems view of the linkages in the chain that work together efficiently, for value creation, customer satisfaction and competitiveness (Hines, 2004). Also, although the management has been inventive in use of more advanced techniques and tools like Simulation, Artificial Neural Network, Fuzzy logic and 'mystery methodology', for optimization and decision making in SCM, analyzing and monitoring performance, has not to undervalue the critical importance of collaborative relations between the participant agents (Chiu and Lin, 2004; Koh and Tan, 2006; Shukla et al., 2011; Borgström, 2012). Thus, as firm's survival lies on value network integration, a good understanding of the integration process is a key aspect in SCM (Gunasekaran and McGaughey, 2003). However, Mouritsen et al. (2003) has doubted that the basic hypothesis that 'the more integration (wider the scope) – the better the management of the chain', since this depends very much on the 'environment' and the power relations between the participants in the chain.

Special attention has been attributed to the processes of the SCM, as well as to presence of misalignment of SC processes, structures and major differences in SCPs' business culture, expressing managerial complexities (Fawcett et al., 2008).

Concerning the viability of supply chains by SMEs collaboration, a 'perplexing paradox' has been confirmed, using contingency, resource-based-view assessment paradigm. In particular, managers of small firms as a rule suggest that the majority of the benefits of SCM are within their reach and that the barriers to implementation do not intimidate them. However, they are not actively pursuing SCM as a strategic weapon. The best way to avoid this is to create the 'collaborative capabilities' for promoting SCM, for the choice among alternative holistic SCM strategies based on the small firm's participation (Fawcett et al., 2009). It is noticed that the majority of research in SCM in the past focussed on large organizations and the benefits of SCM can be realised by small businesses are not clear enough. Arend & Wisner (2005) have argued that SCM can provide quality, cost, customer service, leverage and even

risk reduction benefits for the SMEs. On the other hand, SCM can expose the SME to greater management and control hazards while reducing its private differentiation advantages. However, although the SMEs have been neglected in the value chain research, the chance to introduce innovative value added services and/or products by leveraging supply chain can create significant value for SMEs. Provided properly integrating SMEs, barriers to internalization and competitiveness maybe eliminated and pave way for collaboration among supply chain partners. A road-map has been proposed to integrate supply chain strategies with the competitive strategies of SMEs for effective value chain management (Susanu et al., 2009). In the increasingly globalizing market, innovation is an important strategic tool for SMEs to achieve competitive advantage. Use of appropriate methods and processes with trustful co-cooperation can contribute overcome the barriers chain networks of SMEs and to the enhancement of the innovation capacity (Kühne et al., 2010). To increase the small share due to lack of efficiency, 'the choice to implement supply chain and supply chain management by SMEs will lower costs and increase efficiency, which will eventually help in lowering costs and increase gains to both SMEs and the country' (Katunzi & Zheng, 2010).

A review of the literature relating to Interpretive Structural Modelling (ISM) and its deployment for modelling variables of supply chain management (SCM) has shown that SMEs can be benefited by use of IT enablers for Indian SMEs, by supporting other enablers ("driving enablers") and those which are most influenced by others ('dependent enablers') (Shahabadkar et al., 2012). This is in line with prior research finding that using ISM and fuzzy analysis 'information sharing' can become key criterion and the main enabler that influence trust and innovation in SCM (Welker et al., 2007; Khurana et al., 2011). Similarly, a structured literature review used a three-stage refinement, with 'agency theory' and 'principal-agent relationships' reduced the number of articles from 86 to 19. This is helpful to 'our understanding of the dynamics surrounding supply chain behaviours and relationships' and the need 'to understand and mitigate abnormal behaviours across the supply chain' (Fayezi et al., 2012). Apparently, more recent literature comes up to the need to overcome 'asymmetric information' and consequent 'adverse selection' and 'moral hazard', though advancement of information technology eases information integration, effective innovation and development of SCM. This is compatible with the literature review on supply chain risk management (SCRM), which has classified 82 articles covering the period after 2000. As SCRM is a growing area, technology was the first of four research directions, besides managerial and organizational perceptions, influence on decision making and collaboration among companies in the supply chain. With many areas still unexplored, and thus, there is plenty of research opportunities for the future (Vanany et al., 2009). More particularly, attention has been to e-SCM especially after year 2000, acknowledged as an outstanding topic in the supply strategies field (Gimenez, 2008).

Interest in green and now sustainable supply chains has been rapidly growing for over a decade and the topic is becoming mainstream (Corbett and Kleindorfer, 2003; Corbett and Klassen, 2006; Srivastava, 2007; Linton et al., 2007). Supply chain managers have seen the integration of environmental and social issues, including those embedded in related standards (e.g., ISO 14001) into their daily tasks (Beske P. et.al, 2008). The so more clearly identified sustainability issues are better integrated with SCM through amendments to the purchasing process and other opportunities (Min, and Galle, 2001; Carter and Jennings, 2004; Storey et al., 2006) (figure 4). Finally, there are still numerous opportunities available to extend and enrich what is known about supply chains, given the breadth and scope of SCM (Stock, 2009).

3. Sustainable supply chain management content and assessment

Globalization has initiated the SCM to reach, beyond pure economic issues, direct link with the 'sustainable development' (SD), which is usually comprehended in an economic, an environmental and a social dimension (Lemonic, 2009; Fauzi and Rahman, 2010). The term 'sustainable development' has been dominantly defined as an ongoing process of evolution in which people take actions leading to development that meets their current needs without compromising the ability of future generations to meet their own needs (Brundtland Commission Report, WCED, 1987). There have framed roughly three dimensions of sustainability as the business case (economic), the natural case (environmental), and the societal case (social) (Dyllick and Hockerts, 2002).

Attempting to combine sustainability and supply chain management goals a more explicit definition has been the following: *sustainable supply chain management (SSCM) is the management of material,*

information and capital flows as well as cooperation among companies along the supply chain while taking goals from all three dimensions of sustainable development, i.e., economic, environmental and social, into account which are derived from customer and stakeholder requirements (Seuring and Müller, 2008a). The term 'value-adding' has been used in a broader sense than the firm's 'customer' met the main concern in the supply chain and logistics literature.

A relevant literature review for the period 1990 to 2007 included a total of 191 papers in significant scientific journals, revealed a clear deficit in SCM and purchasing literature concerning social issues as well as on the amalgamation of the three dimensions of sustainable development (Seuring and Müller, 2008b). The sample of this literature review has been more recently extended to 309 papers related to green and sustainable supply chain management (Seuring, 2012). The paper summarizes research on quantitative models and points out that the social side of sustainability is not taken into account and that life-cycle assessment based approaches on the environmental side, and impact criteria clearly dominate. The central role of integration with the social dimension is in more need for better integration, while there is further strengthening the prior research results about the role of inter-organizational resources in the SSCM (Gold, Seuring and Beske, 2010a), alongside a wider set of constructs in SCM (Gold, Seuring and Beske, 2010b). It is also supported the need of closer link to lean management and globalization issues (Mollenkopf et al., 2010), and re-evaluating particularly related to empirical research (Carter and Easton, 2011).

The design of SD depends on an operating set of values, which may change over time and vary within communities and from place to place. Today, communities, governments, businesses, international agencies, and NGOs are increasingly concerned with establishing means to monitor performance and to assess progress toward SD. It presumes corporate social responsibility (CSR), public awareness and involvement and commitment of decision-makers (Ghoshal et al., 1999). Particular care must continually be taken to ensure that substantive conceptual and technical issues are considered within the context of value-driven processes in real, day-to-day decision-making. This consolidates new innovative insights in a feedback process of disruptive "technological and strategic innovation" (Markides, 2006; Bhan, 2010).

While diverse comprehensions of sustainability exist, one central concept helping to operationalize sustainability is the 'triple bottom line' approach (3BL), where a minimum performance is to be achieved in the environmental, economic and social dimensions (Elkington, 2002). Succinctly describing the 3BL delineates three critical factors to the goal of sustainability (3ps: people, planet and profit). Some important models that have been developed internationally for the sustainability goal, are the Dashboard of Sustainability (IISD, 2001), the Sustainability Assessment Model (Baxter et.al, 2002), the ABCD four steps method (Robert et al., 1997).

At any rate, there are still fundamental issues researchers need to address in order to offer managers prescriptive models of how to create sustainable supply chains (Pagell and Zhaohui, 2009). There are certain areas of increasing admission in that: (1) the firm performance and competitive advantage is to be linked anymore to performance at sustainable supply chain level; (2) there is broader turning of research attention to the role of social and institutional factors of sustainable development; (3) the importance of the human resource development and networking activities is still lacking in the literature; (4) executives in many companies need sufficient understanding of the supply chain business processes--and the linkages necessary to integrate those processes; there is still enough room to expedite development and adoption of information systems for sustainability and improve understanding of salient issues (Melville, 2010).

In retrospect, the literature converges to the conclusion that empirical research for increasing collective capabilities regarding SD has to obey to the principles of the SCM and of Sustainability. For the purpose of supporting the building-up a business plan and adopting a holistic strategy of performing implementation, the so called 'Bellagio Principles' (BP) for assessing SD have been more recently proposed under the aegis of the IISD (Hardi and Zdan, 1997). It is reminded that the main purpose of SSCM is not just the blind pursuit of cheap labour and material resources, as competitors can join the market and use the same labour and materials (Chopra & Meindl, 2001). The overarching of the BP were sought that would improve the link between theory and practice, for increasing collective capabilities in performing reaching the goal of SD.

The proposed ten BP serve as a set of practical guidelines for the whole of the assessment process from system design and identification of indicators, through field measurement and compilation, to interpretation and communication of the result (figure 4).

In any case, the frameworks, the categories of data, the information and the choice of specific measures, reflect the values, biases, interests, and insights of the participant designers. In addition, value-driven principles are often developed as part of strategic planning exercises linked to such interests and various initiatives. The provision of insights and guidelines for attaining competitiveness and sustainability requirements, under variant product and market conditions, is critical for regional SMEs that produce high quality agricultural products, like the following case of Union of Agricultural Cooperatives, in the Messinia region, Greece.

Figure 4 – The Bellagio Principles towards sustainability

4. Sustainability assessment of the Union of Agricultural Cooperatives

4.1 Location and Products

The Union of Agricultural Cooperatives (UAC) is located in Messinia region, Greece. Lying at the south-western most tip of the Peloponnese, Messinia covers an area of 2.991 square kilometres, has 210.000 residents and is administratively separated into 29 Municipalities and 2 communities (Map 1). It enjoys favourable climate conditions, in combined temperature, humidity, etc. for producing high quality farm products for health and special flavour, and recognition by the EU as PDOs for these reasons. The capital of the region is Kalamata, the most important harbour of the Peloponnese after Patras.

Map 1 - Messinia region , Greece

In Greece, as shown in Table 1, 96 products registered as Protected Geographical Status/ Protected Denomination of Origin (PDOs/PGIs), while 12 more products have applied for registration of which 6 have been already published (EU, 2012). Three (3) of them have Messinia as designation of origin: the

Olive oil of Kalamata and Olives of Kalamata are produced exclusively in Messinia, while the Sfela Feta cheese, a traditional Greek cheese, is also produced in other places in Greece. Olives and Olive oil of Kalamata (PDO), produced in the greater area of Kalamata, are top world quality products, associated with special climate conditions of this area. In addition, the Sfela Feta cheese (PDO) is also produced by genuine fresh Messinian sheep milk and characterized by outmost spicy and salty taste in a variety of version flavours. Characteristically, it has been acknowledged the brand name known as "Feta of fire".
Greece is the third largest olive oil producing country worldwide (after Spain and Italy) with production between 300 and 400 thousand tonnes annually (20% EU oil production). About 2/3 of domestic production is covered by Crete and the Peloponnese (especially Messinia). About 25% of olive oil production is sold in bottles and 75% is offered in bulk, with producers themselves trading up to 33%. About one half of the annual olive oil production in Greece is exported. There are a number of trading companies (wholesalers), while a number of cooperatives are involved only in production. The competitive advantage of Greek olive oil in relation to that of other countries is its fine quality: 80% of the olive oil produced in Greece is extra virgin (compared with only 50% of Italian and 20% of Spanish). In terms of bottled olive oil, Italy and Spain hold first place in the international market: Italy is the first in the oil marketing promotion, while Spain has become the largest industrial producer.

Table 6 - PDO products in Greece-total and Messinia region

	GREECE									Messinia	GREECE
	Applied			Published			Registered			Registered	Total
Product Categrory	**PDO**	**PGI**	**Sum**	**PDO**	**PGI**	**Sum**	**PDO**	**PGI**	**Sum**	**PDO**	
Class 1.1. Fresh meat (and offal)							2		2		2
Class 1.3. Cheeses				1		1	21		21	Sfela Feta	22
Class 1.5. Oils and fats (butter, margarine, oil, etc.)	3		3	3		3	16	11	27	Kalamata	33
Class 1.6. Fruit, vegetables and cereals fresh or processed	2	1	3	1	1	2	25	14	39	Elia Kalamatas	44
Class 1.7. Fresh fish, molluscs, and crustaceans and products derived therefrom							1		1		1
Class 1.8. other products of Annex I of the Treaty (spices etc.)							2		2		2
Class 2.4. Bread, pastry, cakes, confectionery, biscuits and other baker's wares								1	1		1
Class 2.5. Natural gums and resins							2		2		2
Class 3.2. Essential oils							1		1		1
Total	***5***	***1***	***6***	***5***	***1***	***6***	***70***	***26***	***96***		***108***

Source: DOORS database (http://ec.europa.eu/agriculture/quality/door/list.html)

Olive trees have been cultivated since the 12th century BC in Messinia, which is a vast Olive Grove, in a propitious climate of mostly sunshine and small holdings, which allows each grower to take loving personal care of each olive tree and to pick the olive fruit of superior quality.
Olive collection in Messinia Region starts by the beginning of October and goes on until Christmas. The olive oil supply chain includes the phases presented in figure 5.

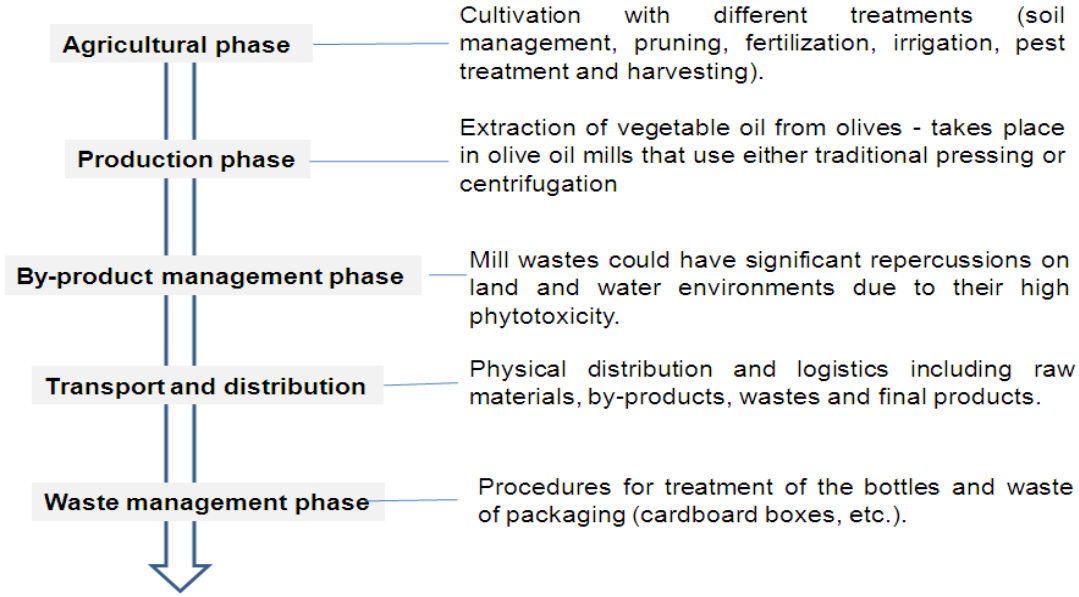


Figure 5 – Olive oil supply chain

Eight (8) companies in Messinia produce Sfela Feta cheese and fifty two (52) companies produce, process and market the Olive oil of Kalamata (PDO) and the Olives of Kalamata (PDO). Among these there are seven (7) companies that process only olive oil. Three (3) of them process only olives and the remaining four (4) process both the olives and the olive oil. Therefore, 45 companies are involved in trading olive oil. All in all, the olive oil of Kalamata is produced and processed in 86% of the total companies (45 out of the total 52).

4.2. The Union of Agricultural Cooperatives

The Union of Agricultural Cooperatives (UAC) of Messinia region is a second instance cooperative of farmers founded in 1987, when seven first instance farmers' cooperatives have joined together voluntarily and now it numbers 244 first instance cooperatives and 26,000 physical persons as members. It established as a NGO of social aim to protect collectively the interests of its members and to ensure superior quality of the crops produced in Messinia (http://www.messiniaunion.gr/en/theunion).
The farming and harvesting has previously used to continue traditional downstream, as it happens with the distribution system: traditional and extremely fragmented channels, without a collaborating wholesaling sector, and selling the produced olive oil largely directly to consumers using personal relationships, such as friends and relatives. However, since the establishment of UAC, this distribution channel was replaced by taking all the responsibility of the wholesaling and retailing processes by the UAC. In doing so, the UAC took a leading role in the regional supply chain. More specifically, the UAC has the responsibility of managing and operating the warehousing, the inventory control keeping and the transportation system. The UAC has nine regional centres that operate as a network of warehouses, packaging factories, and distribution centres. Recently, UAC has also impose control before the farm gate: it has developed a set of good agricultural practices to help farmers in controlling diseases and stop over-fertilisation, in applying common, simple accounting practices, and harvesting techniques.

Furthermore, the cooperative has started to apply advanced technologies (i.e. e-farmer, iknow visibility solutions to solve supply chain anomalies) using palm-pcs and smartphones to automate the information flows and support tracing and tracking. By doing so, UAC aims to extend its governance dominance from distribution channels to the farmers, which allows it to compete better with local commercial firms. The UAC is also attempting to extend its control to the other end of the supply chain: the consumer. For this purpose, it tries to take advantage of every possible marketing channel: own 2 retail outlets in the region of Messinia, exporting olive oil around the world, and selling it to wholesalers and retailers in Greece. In summary, the UAC has managed to expand its control and power to all stages of the supply chain: farming, olive oil extraction, distribution & warehousing, and marketing.

Today the Messinia UAC has three processing & packaging plants for olive oil, table olives and currant and separate covered storage and service spaces. Due to the special emphasis placed on the sector of foodstuffs, the Messinia UAC has created a fully equipped chemical laboratory. The Messinia UAC only uses the produce of Messinia and specifically that of its members in order to ensure the highest quality for the final product. It is one of the first Unions in Greece to have been awarded ISO 9001 and HACCP file.

In 2009, Messinia UAC developed the first cooperative climate neutral olive oil. Since it is not possible to create a product, even the olive oil, without releasing carbon dioxide emissions, Messinia Union decided firstly, to learn how much these emissions are. Calculations were made therefore from specialized advisors, in order to estimate what is called internationally "Carbon Footprint" of a product. Research showed that from the production of one litre of extra virgin olive oil of Messinia Union (from olive grove cultivation, olive oil production, bottling and delivery to the final consumer) approximately 2 kilos of carbon dioxide are being emitted. Therefore, Messinia union decided to inform consumers by printing the exact carbon footprint of the product on the back side of each bottle. Then, Messinia union voluntarily compensate the amount of emissions that correspond to the production of 200 tons extra virgin olive oil, according to the calculation of the carbon footprint. In this way it offsets the unavoidable effects of the product (http://www.messiniaunion.gr/en/news). The financial gains of the offsetting will support the development of certified projects that help the protection of the climate according to the Kyoto Protocol. For the 200 tons extra virgin olive oil, the union has acquired a certification by climatepartner a climate protection consultancy, which assessed that carbon emissions have been offset to the value off: 962,000 kg CO2 equivalents.

4.3 Assessment according to Bellagio Principles

The single-case research methodology was selected in order to examine the degree to which a sustainable regional strategy is effective, with multiple sources of information (such as documents, archival records, interviews, observation and artefacts) that devoted to intensively examine the relevant variables of the research. The information collected was then classified and assessed, according to the content of the principles addressed by the Bellagio methodology, in simple language (Table 2).

Table 2 - BP Assessment of Messinia UAC

BELAGGIO PRINCIPLE		ASSESSMENT
1	**Vision & goals**	Managers of the UAC – a second degree farm co-operative in the Messinia locality- foresee that the sustainability goal is within their strategic vision. However, they face two critical problems to overcome: relating to the history of the cooperative movement in the administration of the managing the CAP funds; communicating trustfully the new vision to individual small farm producers, particularly in view of the pressing adjustment requirements of the sustainability goal. As a result a main challenge of the UAC management is to overcome the resistance and postponement of the structural changes involved in the new strategic goal and to encapsulate the need of transforming the day-to-day operations.

2	**Holistic Perspective**	Holistic perspective of the case of UAC refers to the lead ahead at top level in acknowledging the need for rethinking about a whole system change and an holistic value creation strategy of PDO farm products, as a social responsibility of the primary farm cooperatives to proceed in product interactive feed-back process of continuous assessment for performing collective facing hard global markets competition. Pointing out the need to convince small farm members of the expected costs and benefits for human and ecological systems, in monetary and non-monetary terms. It presumes discipline in the built-up overall UAC supply chain and coordination of inter-firm collaboration, in search of new innovative communal ways to improve and promote the high physical quality products with favorable climate conditions of Messinian region; proceeding to design and building-up product supply chains, use of benchmarking and looking for ways of acquiring brand name, in the promotion of identified quality exclusive farm products to foreign markets, of a holistic strategic perspective of local regional supply chains.
3	**Essential Elements**	The UAC has more cleared-up the sustainability goals, while it goes on to detailed specification of the essential elements for their performing implementation. Turning to the essentials of sustainability as it regards to PDOs farm products of the Messinian region, it has acknowledged the need for reassessment by the small farmers that the attention to PDOs protection is over with the new globalized markets environment. Attention has therefore turned particularly: to terms that are considered self-evident like strategy, goals, system, sincere equal collaboration, vision, social values and corporate mission and responsibility. Secondly, to look at the disparities and gaps that need closing-up, particularly, intergeneration equity; equal chances to knowledge (farm and supply chain education system, in relation to labor market conditions); right to equal information overcoming 'information asymmetry' and the consequent market distortions and moral hazard (information system and inter-firm communication for 'information sharing'). Thirdly, concern over efficient total resources use, for turn to use of local renewable resources, ecological conditions and protection of physical environment. In addition the UAC has shown interest in adoption of a long term commitment to sustainability and get more active involvement of producers and suppliers, e.g. by producing and marketing the neutral-olive oil. In doing so, UAC aims to give a message to producers that resources need responsible management and coordination for monitoring performance and exchange experiences in search of collective innovations in farming techniques, including processing harvesting and distribution towards innovation and maximizing the collective capabilities.
4	**Adequate Scope**	The UAC has paid special attention in convincing the farmer members that by commitment and all agents' participation can ensure performance at a long-term horizon and its own leadership. It can capture both human and ecosystem time scales, thus responding to needs of future generations. In addition, it is assessed that the member farmers as being largely villagers of the same region, are known to each other, locality will facilitates the adoption the same vision and favours trust, the common scope and the collaboration, moreover as a matter of local pride. The clearance of the UAC long-term scope makes easier the communication, the commitment to sustainability.
5	**Practical Focus**	The UAC management has given particular emphasis to the empirical aspects of the sustainability issues altogether. Following collaboration with an environmental consultant in setting feasible goals, it proceeded to specification of performance measures in the case of the olive oil production, taking account of trade-offs for emissions. The clear sustainability vision set up by the UAC management has directed attention in its diffusion to the first degree product cooperatives and to individual farmers and to link with the practical indicators and assessment criteria. There is strong willingness to standardize the measures for facilitating comparison with achievements, as appropriate
6	**Openness**	The UAC is prepared for accessing to foreign markets by overcoming past cooperative introversion while keeping intact the superior quality of the Messinia oil. Otherwise stated, the UAC of Messinia has put the openness as primary goal to compromise the social character of the co-operatives with the economic imperative of sustainability in the new business environment of globalised competition

		markets. For this purpose, it turned attention to a marketing study, with special attention to benchmarking of Italian exporting methods; it has put forward to make known and changing vision of the product co-operatives members; addressing local and national authorities about the cost and the social benefits of its initiative.
7	**Effective Communication**	The performance in implementation of the openness goal, driven the UAC to proceed in a program of effective communication, addressed to the needs of the audience and set of users. Using modern ICT it has looked forward: a system of 'information sharing' to remove 'information asymmetry' and consequent 'adverse selection and moral hazard' undermining markets efficiency; using from the outset simplicity and any indicator useful in stimulating mobilization of co-operatives and small farmers members; making every effort to acquire differentiation as an organization to sustainable olive oil in Greece.
8	**Broad Participation**	The priority of the goal of sustainability by the management of the Messinian UAC has been based on inter-firm and inter disciplinary collaboration has been founded on equal active participation at network value supply chain level. Small farmer and family members will collaborate with agriculturalists and other professional and technical specialists in support of constant high quality of olive oil and other products, while keeping down cost and promoting their packaging and distribution up to delivery center and to retailers. There will be also care for customers complaints, provided awareness and new vision of common benefits to be gained from efficient use of all resources, including turning to renewable resources and eco-system preservation, etc.
9	**Ongoing Assessment**	The continuous follow-up, assessment and modifications are the leverage of a feed-back process necessary for the goal of SD adopted by the Messinia UAC. The UAC management is on the way to get familiarity with processing monitoring and co-ordination based on appropriate performance measures used in complementary ways.
10	**Institutional Capacity**	The management of the UAC commitment to sustainability is aware of the role of institutional flexibility for its sustainability goal and has expressed its willingness to persist in reform actions to elevate institutional capacity. As a part of its integrated SD plan, UAC aims to a leading role in sustainability of farming in its region and beyond this to become a powerful marketing tool. To achieve this end, UAC has clearly assigned responsibility and provide support in the managers involved in the decision-making process. Furthermore, the members of the sustainability team are also involved in marketing, production, and operations, therefore there is seamless integration with other functions of the organization that allows the exchange of data and information and its documentation to support development of local assessment capacity. The UAC has acknowledged the need for top/down and bottom-up approach, by complementary fourth party logistics (4PL) function of and consulting servicing the first degree cooperatives by product, in the goal of SD.

5. A conceptual integrated research and development framework

In historical perspective, the system of national accounts measuring gross domestic (or national) product (GDP or GNP) flows since 1940, 'development' and 'progress' are broader terms according to Barbier et al. (1990), that incorporate the three above-mentioned sustainability dimensions, including stocks of assets and resources and 'social capital' and a real wealth balance sheet which are important to value chain analysis of sustainability. The most critical commitment governments around the world could make to sustainability is to formulate a scorecard that would account for the physical, qualitative and financial well-being conditions of 'the five capital assets of a nation: human, social, natural, built and financial capital' (Anielski, 2010). An even more sophisticated view has maintained that measurement methods should be advanced towards not only helping the economy, society and the environment get back on track, but moreover in redefining what the right track is (Pinter, 2010).

In view of the yet unsettled issues concerning the challenge of sustainability, the formulation of a simple R&D framework would contribute in the understanding and effective collective participation of all involved parts within the value chain. Of course, taking into account that

'*few companies take the right approach*' when it comes to improving their supply chains (Lee et al., 2004; Ho et al., 2002), knowledge and skills of management have a critical role for reaching sustainable development (Esquer-Peralta et al., 2008; Malindretos, 2010).

The conceptual framework for guiding the assessment process is very important, since indicators emerge more naturally, and can be adjusted to the needs of a given locale or set of decision-makers. More specifically, the proposed here a collaborative action R&D framework (CAR&D) is based on 'constructive/collaborating action' methodology.

This study is addressed mainly to small size farmers and the framework proposed is oriented to implementation issues and process, according to literature and experience; any management solutions or developed tools are very challenging for practitioners in performing implementation of the sustainability concept (Bagheri and Hjorth, 2007).

Main points in interchange are the following:

- Sufficient understanding going up to the frontiers of the knowledge (Kuhn, 1970) and zero start concerning the fundamentals and the new environment, in view of the historical challenge of adjustment to it.
- Complete removing of past partial approach that leads to biased conclusions and adoption of multi-disciplinary R&D methodology to achieve effective synthesizing and increasing capabilities of creating value adding at supply chain level (synergy effects, economies of scale, resources preservation, participating innovation, etc.).
- Clearing-up of strategic priorities re-ordering towards long time-horizon from short-term priorities in the past.
- Critical role of information flow and control, towards equal chances between SMEs and big enterprises, avoiding 'asymmetric information', through an effective information network between the partners in the supply chain, for knowledge and information sharing.
- High-tech possibilities and choice of proper modern technology and techniques. For example, e-practices, which 'bring the world one click away' or environmental technologies, taking advantage of the local renewable energy resources.
- Pointing out the role of the institutional flexibility for making feasible the collective utilization climate differentiation (e.g. Mediterranean area) and production of qualitative farm products. Adding enhancement of regional production and brand identity, against phenomenon of foreign concerns in exploiting products sourcing.
- Use of all the available know-how and the experience acquired from both academics and practitioners, for avoiding the pitfalls of conventional practices against sustainable competitive advantage. Awareness and human resource development through customised seminars, organised by local authorities in cooperation with Universities.
- Specification of assessment tools and indicators for attaining continuous follow up and identification of realistic solutions. Such indicators should derive from deep knowledge of SMEs development constraints in rural areas.

6. Conclusions and future research

The research conducted in this paper has been engaged with the need for deeper understanding the concept, necessity and the ways to achieve sustainable development within a new, irreversible and ever changing economic, social, physical and technological environment. The literature review of SCM and SSCM has shown various constrains and difficulties for performing implementation, more particularly for SMEs; most noticeable have been the lack of 'economies of scale', 'collective capabilities' and 'synergy effects', towards an 'holistic value chain strategy', as a source of value creation and competitive advantage.

The entailed complicated issues have attracted increasing attention of academics and practitioners making them mainstream. In general, specific intervention measures are often applied nowadays for environment protection towards greener environment, for instance, through reduction of CO_2, transformation of wastes into energy, etc. Although such initiatives are considered as 'good practices in the right direction', they are based on conventional past research methodologies, practices and interests. Hence, they must be incorporated in the interdisciplinary value creation approach towards meeting the complicated SSCM

requirements of sustainability and taking into account both obvious and hidden interrelations and conflicts. In this direction, the proposed operational R&D framework can further support significantly the decision making and the process concerning the continuous effort for SD. The exploitation of synergies throughout the building-up of a value chain is critical for the sustainability goals of SMEs in the agricultural sector. New 'strategic thinking' can initiate collective innovation, leaving aside attitudes and practices dominated in the past. The on-going assessment is expected to be embedded by alignment of the 'triple line approach' of sustainability with the so-called 'three Ds' triangular analysis (Decentralization-Democracy-Development) (Yongmei, 2009).

Further on, this paper highlighted the issue of assessing sustainability, focusing on the 'Bellagio Principles' methodology, adopted for identifying the sustainability progress, prospects and future policy and research suggestions. For the purpose of better understanding of such methodology contribution, an empirical research was conducted concerning the case of UAC, a farm cooperative scheme of the Messenia region, Greece. Main strength of the UAC has been the exceptionally mild climate of the geographic area of Messinia in the east Mediterranean basin, in producing high quality health and flavour farm products. In the weaknesses list, lack of experience, difficulties to diffuse a new vision and awareness for active broad participation of fragmented small size local farmers, use of modern marketing methods mainly for exports and finally, the issue of institutional flexibility at local and central public administration. A collective restatement of the design and building-up an integrated sustainability plan of the UAC from the start seems necessary, since experience has shown that unbalanced planning based solely on technology may end to bad records in implementation performance. Useful know-how can be granted by collaboration with universities, specialised in the agricultural chain and sustainability, giving special emphasis in the implementation phase and the continuous re-assessment and follow-up process of SD. These, together with the local and central state authorities can support the implementation of the proposed integrated R&D re-approaching framework in a pilot project concerning the UAC initiative.

Although the empirical research conducted is based on a single case in a Greek region, this can be used as paradigm for similar assessments and may have broader importance for regional SMEs. It is worth noting that the relevant research and policy recommendations by OECD and other international economic organizations attribute some importance to the issue of 'equal chances' and 'terms of competition' among the factors of competitiveness. More specifically, significant part in the overarching aim of the EU Competitiveness and Innovation Framework Programme (CIP) (2007 – 2013) consists of encouraging the competitiveness of European enterprises, especially SMEs, for meeting the Lisbon goals (Centre for Strategy & Evaluation Services, 2011).

Future research needs to shed light at first to the sustainability issue regarding the identification of realistic practices towards sustainability in the agricultural sector, and more particularly focusing upon the chains that start from regional rural areas and SMEs. In this direction, the participation of farmers and expertise of professionals and practitioners is necessary, for sharing responsible experiences in this rapidly extended domain of knowledge. Besides, the specification of indicators for the continuous evaluation of the progress of implementing sustainable solutions win the supply chain would contribute significantly in the monitoring process towards the sustainability goal.

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