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STRATEGIC ANALYSIS OF ORGANIC FOOD (SCM) WITH SPECIAL REFERENCE TO THE SSM IN INDIA: A DESCRIPTIVE STUDY

Prof. Renu Jatana* Mrs. Priya Soni**
**Professor & Head, Department of Banking and Business Economics, Mohanlal Sukhadia University, Udaipur (Raj.)*
***Senior Research fellow, Department of Banking and Business Economics, Mohanlal Sukhadia University, Udaipur (Raj.)*

Abstract
As consumers increasingly buy organic, the real challenge for them might be "finding organic" as organic food suppliers go to incredible lengths to secure their supply chains. Last week, the Wall Street Journal ran the article, "Hunger for Organic Foods Stretches Supply Chain," which highlights what companies are doing to meet demand as organic-food output has failed to keep pace.

As organic food producers continue to encounter serious challenges in meeting demand, consider the following definition from theOperations Management Body of Knowledge Framework: "The sales and operations planning (S&OP) process develops tactical plans that assist management in strategically directing the business to achieve continuous competitive advantage. It integrates customer-focused marketing plans for new and existing products with the management of the supply chain. The process integrates all business plans into a single set that meets all the needs of the functions of the business. The S&OP process is performed at least once a month and is reviewed by management at an aggregate level."

Supply chain partners for local organic food face uncertainties such as poor collaboration and communication that cannot be reduced through the application of traditional supply chain design and management techniques. Such techniques are known to improve supply chain coordination, but they do not adequately consider major aspects of local organic food supply chains such as ethics, sustainability and human values. Supply chain design and management approaches suitable to small-scale, local organic food enterprises are lacking and need to be developed.

The aim of this paper is to analyse and understand Soft Systems Methodology (SSM) as a new and suitable approach to design and manage local organic food supply chains. We study how SSM can be used to reduce uncertainties within local organic food supply chains in India. This study serves to identify the benefits of using SSM, compared with ad hoc, pragmatic and less structured approaches. The major benefits are of thought, intervention and change, as well as action-oriented, meaningful and participatory decision making.

Keywords: supply chain management, supply chain design, organic food, Soft Systems Methodology(SSM), local organic food supply chains (LOFSCs), human activity systems (HAS),Supply chain design (SCD),problem structuring methods (PSMs),

1. INTRODUCTION

Demand for organic food is growing at a much faster rate than ever before, but not without numerous operational challenges. Farmers, retailers and food processor manufacturers are thus looking to streamline their supply chains while addressing ever-expanding market requirements.

Challenges across the supply chain are not necessarily exclusive to organic food. Conventional food also is affected by factors such as problems with the supply chain or inventory management. Organic farming, however, has unique challenges related to the cost and logistics of moving locally or regionally produced organic produce to the market.

Designing and managing local organic food supply chains is complex, and it faces socially bound uncertainties such as poor collaboration, communication and information sharing (Kottila et al.) Such complexity cannot be reduced through quantitative supply chain design and management techniques. Quantitative techniques have been found useful to improve supply chain coordination and efficiency, but they are inadequate for considering key aspects of LOFSCs such as ethics, sustainability and human valuesthat influence decision making and supply chain activities.

LOFSCs are mainly composed of small-scale enterprises (Milestad et al. 2010) that face limitations to implementing complex mathematical models and sophisticated software used in quantitative supply chain design and management (Dutta and Evrard 1999). Viable and well established approaches to reduce the inherent uncertainty, design and manage LOFSCs are lacking and need to be developed (Marsden et al.).

In practice, LOFSC partners mainly manage their relationships through personal communication, and reach agreement through hand-shaking (Marsden et al. 2000; Morgan and Murdoch 2000; Sage 2003; Stevenson 2009, 7). Organized and facilitated approaches such as work-shops and information meetings, however, have been found to be more successful, especially in a long-term perspective (Marsden et al. 2000). Some successful implementations of facilitated approaches have

been documented, but there is still a need to develop and explore systemic, structured, flexible, and practically 'softer' approaches to design and manage LOFSCs.

This paper analyzeshow SSM may be used to tackle problem situations within LOFSCs. The illustration and discussion is based on a case within the Indian organic cereal sector (Bahrdt et al. 2002) and serves to highlight the benefits of using SSM compared with less 'systemic' and structured approaches (e.g. expert interviews, telephone surveys and workshops that are not based on the application of a specific intervention methodology). It supports in making decisions and reaching agreement on action plans.A new contribution to the literature is achieved because SSM is here presented as a new problem solving approach which is useful to the local organic food sector.

2. RESEARCH OBJECTIVES

The main objectives of this research paper are:

1. Toanalyze and understand Soft Systems Methodology (SSM) as a new and suitable approach to design and manage local organic food supply chains.
2. To Study how SSM can be used to reduce uncertainties within local organic food supply chains in India.
3. To identify the benefits of using SSM, compared with ad hoc, pragmatic and less structured approaches.

3. LOCAL ORGANIC FOOD PRODUCTION

In the developed world, since the Second World War, food has mainly been produced through conventional, industrialized and resource intensive practices, which has caused environmental degradation, resource depletion, health scares and consumer anxiety concerning food safety. Farmers, consumers, policy makers and researchers recognized the need for environmental and human protection, and thus started to support alternative food systems such as organic agriculture (Sage 2003; King 2008). The International Federation of Organic Agriculture Movement (IFOAM 2005) defines organic agriculture as, "a production system that sustains the health of soils, ecosystems and people,Organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved".

Compared to conventional produce, organic food has to be produced, processed and marketed according to strict regulations and national legislation and it is often produced and sold within local food supply chains (Milestad et al. 2010). LOFSCs are mainly composed of small-scale enterprises that aim to maintain short distances between each other and to end-consumers. Enterprises are diverse and they focus on holistic production practices and often sell their products through alternative food purchasing venues (e.g. farmers' markets and box schemes).

2.1 Problem Situation in Local Organic Food Supply Chains(LOFSC)

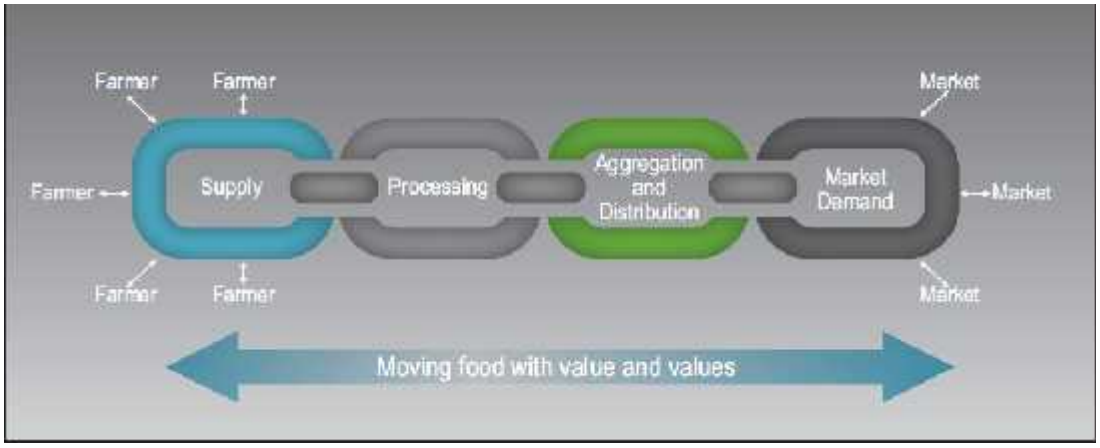
In general, agrifood supply chains are more complex to design and manage than most other supply chains (Ahumada and Villalobos 2009). Supply chain partners, for example may face

1. Uncertainties
2. Lack of information and knowledge about markets;
3. Isolation of supply chain partners;
4. Different perceptions,
5. Different Attitudes, values
6. Motivation among supply chain partners;
7. The limited size of enterprises (Bahrdt et al. 2000).

These uncertainties need to be controlled and reduced in order to design and manage supply chains, ensure supply chain coordination and achieve competitiveness and customer service (Stadtler 2005). In addition, reviewing the LOFSC-related literature, the following types of uncertainties are identified:

- Difficulty in choosing the right supply chain partners (Kledal and Meldgaard 2008, 309- 315);
- Difficulty in finding skilled supply chain partners (who have specific knowledge concerning organic food production and processing and management and economics) (Mid-dendorf 2007);
- Difficulty in establishing contacts and dialogue with buyers (Hindborg 2008, 347);
- Inefficient and lack of information sharing between supply chain partners (Kottila et al. 2005;);
- Difficulty in communicating differences between organic and conventional products to end-consumers (Kledal and Meldgaard 2008, 309-315);
- A lack of agreement among supply chain partners (Stolze et al. 2007);

- A lack of cooperation among suppliers causing shifts in raw-material quantities and quality (Kledal and Meldgaard 2008, 309-315);
- Barriers to accessing supermarkets for small-scale enterprises (Bahrdt et al. 2002, 28).



Compared to conventional producers, LOFSC partners have different needs concerning supply chain design and management (Marsden et al. 2000; Morgan and Murdoch 2000). The local distribution of organic food, for example through alternative food purchasing venues, is based on supply chain relationships which are different from conventional food distribution which occurs through global, larger companies.

Local organic food suppliers, furthermore, require flexibility in supply chain activities as they may be distributing food through different channels ranging from farmer stands to restaurants and supermarkets. The presence of different channels opens up the opportunity to approach a broader range of customers and find a suitable niche for organic products.

4. SUPPLY CHAIN DESIGN AND MANAGEMENT

Supply chains are networks of organizations that are connected with each other with the aim of processing and selling products to end-consumers. Supply chains include suppliers, producers, customers, and end-consumers, but also transporters, warehouses, and retailers, depending on the specific supply chain configuration. Agrifood supply chains are networks of organizations that produce and sell fresh or processed products from vegetables, crops or animals (van der Vorst et al. 2007). In order to ensure materials, information and financial flows between supply chain partners, supply chains must be dynamic and flexible, built on cooperation, coordination, control and trust (van der Vorst et al. 2007). Challenges across the supply chain are not necessarily exclusive to organic food. Conventional food also is affected by factors such as problems with the supply chain or inventory management. Organic farming, however, has unique challenges related to the cost and logistics of moving locally or regionally produced organic produce to the market.

Supply chain design (SCD) is a process to build supply chains. It consists of:

- The choice of supply chain partners;
- The identification of customer segments;
- The location of production and distribution facilities; and
- The identification of facility capacity and transportation means (Stadtler 2005).

SCD as the basis for supply chain management (SCM), which is "…the task of integrating all units along a supply chain and coordinating materials, information and financial flows in order to fulfill (ultimate) customer demands with the aim of improving competitiveness of the supply chain as a whole". Supply chain partners achieve competitiveness and customer service through enacting supply chain activities such as managing relationships, defining supply chain leadership and advanced planning (Stadtler 2005).

The application of quantitative techniques to control and reduce uncertainties within LOFSCs is limited. Quantitative supply chain design and management techniques require the application of complex mathematical models and advanced software. Besides, decision making to reduce uncertainties and to design and manage LOFSCs also depends on ethical, moral and sustainability aspects that are not adequately considered by quantitative techniques.

Considering the nature of LOFSCs, new supply chain design and management approaches need to address:

- The development and support of relationships between supply chain partners;
- The consideration of financial and intellectual capabilities;
- A focus on ethical, moral, and sustainability, as well as on satisfying goals; and
- Flexibility in supply chain activities.

As LOFSC partners lack information about markets and supply chain activities and face limitations in adopting complex mathematical models, it may be appropriate to focus decision making on satisfying – acceptable and rational goals (Douma and Schreuder 2008, 125-126) instead of on optimization.

The problem structuring methods (PSMs), designed to reduce complexity and uncertainty and to support group-decision making (Rosenhead 1996), provide a candidate group of methodologies which meet the identified requirements for new approaches to design and manage LOFSCs.

5. SOFT SYSTEMS METHODOLOGY (SSM)

The main reason for suggesting SSM lies in its potential to enable stakeholders to define problems logically and in detail, and to systematically take action for improvement (Checkland 1981). In particular, SSM addresses the four requirements for new approaches to design and manage LOFSCs listed above. As a PSM, SSM addresses the requirement:

- To develop and support relationships between LOFSC partners. The use of SSM enhances stakeholders´ participation and group-decision making, whilst it also supports inter-organizational cooperation, communication, negotiation and agreement.
- SSM is a learning process that is not solely reliant on a facilitator's skill as it can also be taught to the stakeholders involved (Checkland 2001, 88). also adapt SSM to stakeholders' needs and capabilities in such a way that all feel comfortable and can make their way through intervention (Checkland and Scholes 1990, 302).
- To focus on ethical, moral and sustainability, as well as satisfying goals, because it is based on soft ST and may also include hard methods if appropriate and necessary (Checkland and Scholes 1990, 25).
- SSM is flexible to use and can be shaped throughout intervention (Checkland and Scholes 1990, 1-7). Therefore, it enables flexibility, not only during intervention, but also in the implementation of change and the carrying out of supply chain activities.

4.1Soft Systems Methodology – An Example

In this example the possible application to local organic food supply chain management based on Indian case within the organic cereal sector (Bahrdt et al. 2002). The case serves to demonstrate how SSM may be used to intervene in problem situations and deal with uncertainties.

An X company completed a project with the aim of describing the organic cereal sector in India and identifying challenges, barriers and uncertainties within related supply chains. Literature studies, expert interviews and telephone surveys with stakeholders were carried out to describe the organic cereal sector and to identify problem situations. The advisory company looked at India as a whole in order to get a rich description of the organic cereal sector, but then narrowed down the perspective to the federal level to better understand the problem situations. For the latter purpose, the advisors carried out inter-views and workshops with a limited number of representatives (1-5) from different supply chain stages and federal states. The representatives contributed especially with information from their local, regional environment.

The Indian organic cereal sector is unstructured and includes supply chains that are mainly based on small-scale enterprises. Therearethree major problem situations:

- Poor communication between supply chain partners and end-consumers and poor communication and collaboration among supply chain partners;
- Lack of access to information about markets, supply chain partners and necessary supply chain activities;

Process stage (i) Rich Picture	*Process stage (ii) Cultural Analysis*	*Process Stage (iii) Defining Relevant Systems*	*Process Stage (iii) Modeling Relevant Systems*
The process of SSM starts with the composition of a rich picture to describe (ideally also pictorially) a problem situation of common interest (Checkland and Scholes 1990, 45). The stakeholders jointly draw the rich picture and aim to understand the problem situation from different perspectives, to emphasized structures, processes, relationships, conflicts and uncertainties to get a feeling of the situation. Stakeholders get a feeling of the situation because they express concerns, judgments and values and visualize abstract aspects through symbols (Checkland and Scholes 1990) (Fig. 1).	Cultural analysis views the intervention itself as being problematic and identifies: (a) the structure of the intervention and its roles – A 1, (b) connections between roles, values and norms – A 2, and (c) political dimensions – A 3 A 1 shows stakeholders identify who is going to initiate the intervention and reason take place, who intends to change and improve the problem situation based on what perceptions, knowledge and resources.	Relevant systems, also called root definitions, describe in one or two sentences transformation processes of some entity into a new form of the same entity (Checkland and Scholes 1990, 33). Root definitions as planning statements describe the system to realize transformations, enhance change and improvement. This system should suit the problem situation of concern and its stake-holders in order to enable meaningful and innovative change. First,stakeholders identify trans-formationsto reduce uncertainties. Second, the detailsofthe transformationsare defined. Finally, the root definitions are formulated (Georgiou 2008).	Relevant systems are modeled as conceptual models (Figure 2), which are also known as purposeful human activity systems that show the inter-linked human activities necessary to realize transformations. Human activities formulated as verbs depend on and influence each other, thereby building a structured plan for action (Checkland and Scholes 1990, 35-36). The HAS model (Figure 2) shows human activities to carry out the transformation T, i.e. to improve knowledge, information and expertise sharing between supply chain partners. Action plans need to be evaluated before implementation in order to ensure their maintenance under uncertain, complex and dynamic circumstances. Checkland and Scholes (1990, 38-39) suggest the logical analysis including the 5 Es' to evaluate the feasibility of transformations and related human activities: • *Efficacy* identifies whether the means work to realize ; • *Efficiency* identifies whether the minimum resources are used to realize ; • *Effectiveness* identifies whether H meets long-term aims; • *Ethicality* identifies whether H is moral; • *Elegance* identifies whether H is aesthetically pleasing. •

Process Stage (v) Comparison of Conceptual Models with the Real World

Table 1. Comparison of Conceptual Models with the Real World **Activity in Model**	Exists?	How?	**Who?**	**Good or Bad?**	Alternatives?
Organize regular discussion meetings	No, not regularly	Occasional discus-sion occurs between individual SC partners	SC partners	Current discussion is bad	Organizing regular meetings along the entire SC is a new opportunity
Introduce a common mailing system	No	Introducing a mailing system is innovative			
Organize social events	No	Organizing social events is innovative			
Exchange information	Yes	Information is exchanged as part of traceability requirements	SC partners	Current exchange of info concern-ing traceabilit y is good	Exchange of info should also occur apart from traceability

Process Stage (vi) Formulation of Changes :

How	**Desirable?**	**Feasible?**	**Possible Action**
Organize monthly discussion meetings	Yes	Yes	Find location; select an organizing com-mittee; select discussion topics. Who will carry out the actions and by when?
Exchange employees	Yes	Yes	Describe employees' profiles; exchange profiles; set up a plan. Who will carry out the actions and by when?
Organize product information days	Yes	Yes	Find location; provide product descrip-tions; discuss production and marketing practices. Who will carry out the actions and by when?
Exchange product information	Yes	Yes	Provide product descriptions; circulate e-mails. Who will carry out the actions and by when?

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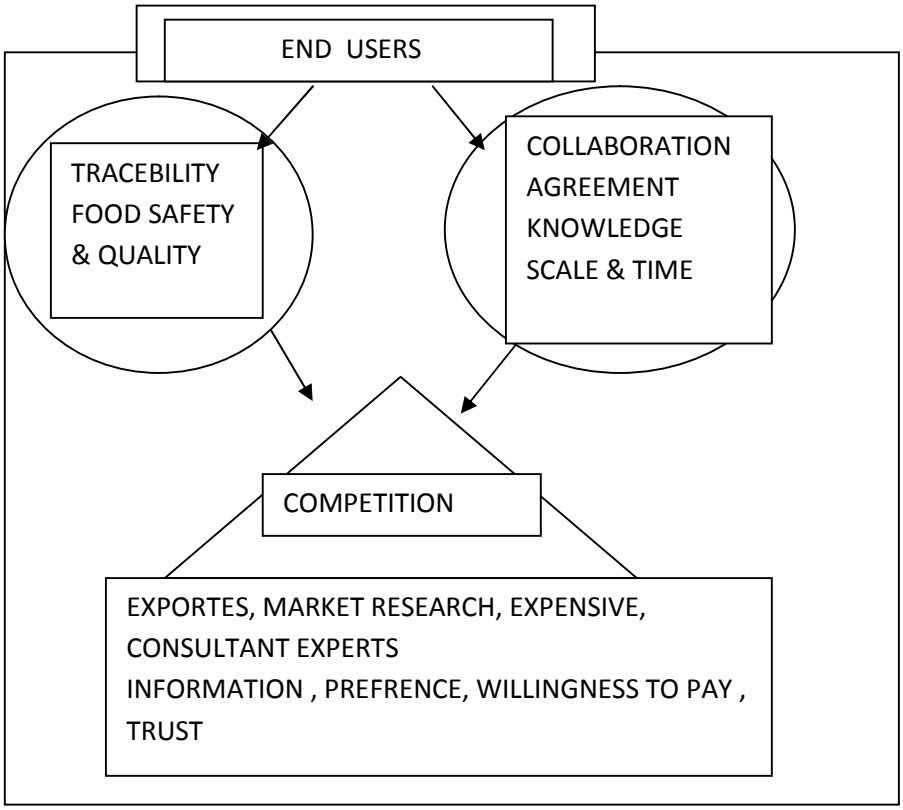

Figure 1. An example of a rich picture used as a facilitative device to support collective deliberation.

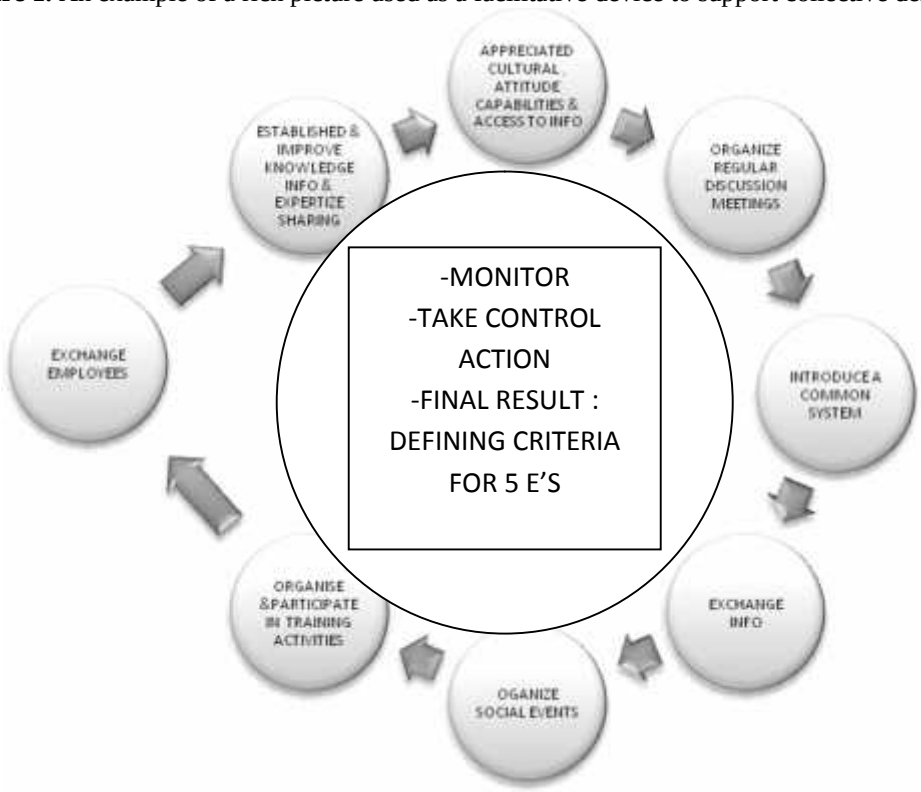

Figure 2. An example of a human activity system (HAS) used to facilitate collective design and discussion processes.

6. REASEARCH METHODOLOGY

To achieve the target objectives following hypotheses were developed. Hypothesis for Formulations of Transformations (H): Difficulty in implementing marketing activities .

H_1: Poor marketing activities → marketing activities met Poor knowledge, information and expertise sharing between SC partners .

H_2: Poor knowledge, information and expertise sharing → knowledge, information and expertise sharing met. The same exercise is performed for each uncertainty identified within the rich picture.

CATWOE Based on H2:
C (customers – victims or beneficiaries): supply chain partners
A (actors who undertake T): supply chain partners
T: Poor knowledge, information and expertise sharing → knowledge, information and expertise sharing met
W (Weltanschauung – meaningful perspective): Knowledge, information and expertise sharing between supply chain partners supports collaboration and improves supply chain coordination. Openness benefits everybody and leads to increased financial returns
O (owners who might stop T): supply chain partners
E (environmental constraints): capabilities, culture, attitude, access to information

Explanation
A1:
a) *Client*: food producers and/or suppliers participating in the German case
b) *Client´s aspiration*: improve communication and collaboration between supply chain partners and with end-consumers
c) *Problem solvers*: involved facilitator(s) (facilitators´ names), advisory company, and sup-ply chain partners
d) *Resources available*: SSM; supply chain partners; information, knowledge and material available; duration of the project
e) *Constraints*: time; knowledge and information about LOFSCs; cultural environment
f) *Problem owners*: food producers and/or suppliers, involved supply chain partners, end-consumers, control authorities.
g) *Implications of problem owner chosen*: the results of intervention must especially be useful to supply chain partners and end-consumers. Therefore, information regarding supply chain partners, as well as end-consumers, must be available. Involvement of end-consumers in a representative way is difficult to achieve. Therefore, existing empirical data about end-consumers should be analyzed
h) *Reasons for regarding the problem as a problem*: loss in market opportunities; lack of product quality, supply chain coordination and efficiency:
A 2:
Socio-cultural behavior among supply chain partners and end-consumers is characterized by:
- Tension
- Low team spirit
- Disorganized
- Reluctance
- Desire to communicate, collaborate, and improve
- Desire to meet customer demand

A 3:
Supply chain partners have:
- Power to change
- Power to hinder collaboration and communication (e.g. lack of information and knowledge, isolation and different opinions)
- Low power in larger markets (barriers and competitors)

Consumers have:
- Power to change buying behavior
- Power to impact supply chain profit (low demand, buying frequency and expenditures; different preferences and lack of information)
- Power to impose demand (e.g. for information and prices)

Through A 3, stakeholders become aware of the contradictory issue of being responsible for poor collaboration and communication and of being capable of changing problem situations. Finding out why stakeholders are responsible for poor collaboration and communication may clarify the actions necessary to achieve improvement.

Logical Analysis for HAS in Figure 2:

Efficacy: Collaboration and supply chain coordination are increasing
Efficiency: Knowledge, information and expertise are shared at minimal costs
Effectiveness: Knowledge, information and expertise are shared
Ethicality: Supply chain partners act with social and moral responsibility
Elegance: Knowledge, information and expertise sharing enables obstacle free collaboration.

7. METHODOLOGICAL REFLECTIONS AND CONCLUSION

Local organic food supply chain partners are facing poor collaboration, communication and information sharing that cannot be controlled and reduced through quantitative supply chain design and management techniques. Such techniques are expensive and complex to use and do not adequately consider major aspects of LOFSCs such as ethics, sustainability and human values. Systemic, structured, and facilitated approaches to reduce uncertainties within LOFSCs, support supply chain design and management are lacking and need to be developed.

The suppliers should take the benefits of using systemic, structured and facilitated approaches for problem solving and decision making. Systemic and structured approaches enable stakeholders to enter in the supply chain system.

Their aim is to understand group life (Phillips and Phillips 1993, 541), and ensure suppliers free contribution and equal participation (Ackermann 1996). Free contribution and equal participation increase supplier's motivation, ownership and commitment to decisions and actions for change (Ackermann 1996; Gregory and Midgley 2000).

The aim of this paper was to suggest SSM as a suitable approach to design and manage LOFSCs. Based on theory and the illustration of a Indian case, the paper has illustrated how SSM may be used to tackle uncertainties within organic FSCs that are mainly based on small-scale enterprises.

Soft Systems Methodology is a structured learning approach that enables stakeholders to better understand and structure problem situations, evolve strengths, agree on action plans for improvement, and engage for intended change and innovation (Checkland and Scholes 1990, 3). The process of SSM is just about purposeful, every-day thinking, but it provides better organization and structure. Stakeholders explicitly formulate ideas, follow a path towards results and may share, trace and recall ideas at any time (Checkland and Scholes 1990, 300-302).

SSM might have supported the participants in agreeing on actions to tackle the problem situation and carrying out the suggestions they made.

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