My supply chain: intensification of sustainability orientations by virtual tools through anticipatory network dialogues

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Introduction

Food is simultaneously both an extremely mundane and intricate matter for the actors within the food system. Typically, the system actors engaged in supplying food are deeply embedded in the various performative aspects of the system, from busy cafeteria workers delivering service actions to pressurized executive directors responsible for economic viability of their businesses. The embeddedness of system actors within their everyday work becomes evident when contrasted against such an 'ephemeral' concept as the one of sustainable food system. This is understood as increased socio-economic well-being entailing environmental considerations (Morgan & Sonnino, 2008) and as such offers an aim towards which its "actor-promoters" may orientate themselves without being able to explicate any definite end point of these developments (Mikkola, 2011). However, as transformation towards sustainable food systems (Vellema, 2011) may be viewed as a current societal and global issue, the means to increase orientational capacities of these system actors (Mikkola, 2011) becomes highly topical.

The confidential, 'silent' and unknown aspects of social and environmental reality around food suggest circumstances, under which changing food systems towards sustainability is extremely challenging in terms of communications mediating 'practice shaping' concepts. Because there is scarce evidence regarding existing food systems' balanced 'tripods' of sustainability, and because this illustration cannot be inserted as such into any other food systems, it seems more productive to make use of the conceptual entity of sustainable food system as a generically disseminated frame and direction, which is to be achieved through co-development of actors running the systems and researchers of the system.

This paper presents reasoning and aims of a Finnish on-going research project, and seeks first to present current understanding about the system actors' orientations towards sustainability, emphasising their views and efforts as well as limitations within their embedded positions of the food system. The paper presents empirical findings from academic literature with emphasis on Finnish conditions. Next, the paper outlines theoretical principles of a co-creative virtual tool to be used to promote sustainability of the food systems by their actors and researchers. Then, the paper identifies anticipatory network dialogues as one the first user environments of this tool within supply chains. Finally, the paper discusses about future applications and usage of this kind of tool and its incremental possibilities to move the market towards sustainability.

Actors' structural conditions in terms of sustainable food systems

Retailers limitations towards sustainable food systems may appear in their competitive selections, aimed at gaining highest reward across shelf space (Atkins & Bowler, 2001). Hereby retail chains' alliances enable cost effective global volume sourcing (Hollingsworth, 2004). Albeit local and sustainable food seems to attract retail chains, this may be due more to their current social appeal than the chains' actual encouragement of increased market demand for local food (Mikkola & Hingley, 2011). Previously the position of local food on the retail market has been found to depend on the retail support (Jones et al., 2004).

Public caterers purchase according to the public procurement directives (EC, 2004), which do allow the use of environmental criteria for food as for any other product. However, the caterers lack technical specifications for sustainability of food to be shared with suppliers as the basis of competitive bidding. Thus the main technical criteria applied for sustainability of food is the one of organic food (CEC, 2004). In Finland, public caterers operating in government kitchens are dictated by national regulation to serve organic, seasonal and vegetarian food once a week by 2010 and twice a week by 2015 (Ministry of the Environment, 2009). Similar rules prevail as recommendations on the public sector in general, and some cities and smaller municipalities have decided for the use of local and organic food (Morgan and Sonnino, 2008) and particularly regarding organic food, up to particular percentages, like Copenhagen in 2000s and Helsinki in 2011. These regulations have created caterers a dilemma because they feel that several imported organic ingredients and products appear as counterproductive and ambiguous in terms of sustainability.

Processing industry's production of organic food has often been more or less restricted by the demand of organic food, which has not always been among the strong interests of the majority of consumers; hence the issue of needing to increase the market for organic food from niche to volume (Franks, 2003; Hill & Lynchehaun, 2002; Padel & Foster, 2005). Eventually, it seems, some organic producers do not aim at larger volumes while staying "strictly local" (Mikkola, 2008). These limiting factors prevent consumers buying (local) organic food at will, because only relatively limited number of consumers have become heavy or regular users (Kjærnes, 2000). The weaknesses of the matching of demand and supply seem to be reflected in the one percent market volume of organic food in Finland, while the share of agricultural land is about 7,5 percent (Finnish Food Industry Statistics, 2011). The food and farming sector is generally a field of low profits and the economic viability tends to be best on the retail sector, which benefits economically from the weaker position of the process industry which again repeats the relation with farmers (Atkins & Bowler, 2001). Due to the uncertainties in primary production and additional risky investments by processing SMEs, the markets develop slowly when there is strong competition, low profit level and system dynamics to very heterogeneous product orientations.

The sector's overview builds up on the basis of particular supply chains' developments, whereby individual businesses build up the economic supply network or chain, as it is often called in academic literature. However, particular and often unit as well as level specific measures represent pointillism rather than network approach in developments towards sustainability. As supply chains vary considerably regarding the quality of their internal economic relations, the aspect of compatibility or power, technology, volume and ability to learn within the supply chain become crucial. The economic viability or "weak" economic sustainability (Jacobs, 1999) of each individual business is the cornerstone of the continuity of the supply chain; therefore, the mechanisms of this continuity are interesting. The basic economic exchange relations become also the matrix for socio-cultural sustainability and environmental sustainability in an interactive manner; one source for chain level developments is the chain stability (Mikkola, 2008). Intriguingly, there are businesses which are 'self-elected' to promote sustainability, considered as ensuring economic, social and environmental sustainability (Mikkola, 2011). These premises are a favourable starting point, but among supply chain actors there are also companies which may not see this as an advantage but agree to 'sustainabilization talks', because they according to Hingley et alia (2005) adopt a weaker position under a stronger actor within the supply chain.

Actors' orientations towards sustainable food systems

Food businesses do feel the call for sustainability; the approaches towards it seem to operate on the level of individual businesses, label-based supply chains such as the organic ones as well as various other network configurations (Mikkola et al., 2010). However, as it may be regarded a remarkable achievement for a business to be independently engaged in strategic and operative sustainability issues, and even more so in case of business networks, these efforts may fall short of scientifically grounded and innovative approaches for sustainable food systems.

Along the supply chain, from primary production to retailing and catering, there are orientations towards more sustainable food systems which mainly are identified by the actors through concepts such as local and organic food. As the food demand dictates the suction into the supply chains, the purchasing behaviour of the retail, restaurant and catering sector becomes critical for suppliers (Jongen & Meulenberg, 1998). The sustainability orientations of the sector therefore appear as an important behavioural characteristic. Caterers seem to express professional identity for sustainability, which for them means mainly domestic, local or organic food (Mikkola, 2009).

Regarding the social and emotional forces impacting on caterers' activities there seems to be happiness due to successful endeavours within caterers' conditions. Eventually, there appears to be stress, criticism and distancing if caterers experience failures due to conceptual ambiguity or inability to act according to their sustainability views within their contexts (Mikkola, 2009). However, there are caterers who feel very critical about these attributes of sustainable food while looking for more profound and technical understanding about it on the level of supply chain (Mikkola, 2009).

Furthermore, caterers' occupational wellbeing seem to benefit if they are able in their positions to promote important issues such as sustainable food systems through regional and organic food, and gain wider recognition due to this (Mikkola & Post, 2012). However, caterers may also feel incapable of promoting sustainable food systems on more elaborated basis such as compositional quality or technically defined environmental friendliness; this situation may be particularly difficult for those aiming seriously towards sustainable food systems (Mikkola & Post, 2012). It also becomes obvious, that food trends and business interests may combine to efforts to serve local and organic food, while more profound grounds may remain fuzzy on the business level (Mikkola & Post, 2012).

Retailers follow the organic trend to some extent (Hill & Lynchehaun, 2002) and they currently seem to take more seriously the quest for local food, understood as more sustainable than food from across long transports (Hingley et al., 2011). In similar vein, processors have made efforts to expand the organic (milk) market (Fearne & Bates, 2003; Franks, 2003) in expectations for huge growth of the organic (Wier & Calverley, 2002). Customers, finally, may have ambiguous views about (Klöckner & Ohms, 2009) and difficulties in perceiving the value organic food (Barnes et al., 2009; Padel & Foster, 2006) seen from a perspective of moral pluralities (Andersen, 2010). Therefore, organic food has been identified as an object of learning by local organic producers in order to increase demand (Seyfang, 2006). While generally widely embraced by political texts (CEC, 2004; ICLEI 2008a,b), the sustainability aims on the food system level seem to become rather blurred on the actor level.

The analytical basis chosen for sustainability dimensions

When sustainability developments need be to be treated in terms of scientific and social scientific analytical terms, researchers need to offer conceptual basis for dimensions of sustainability as well as their operationalization. The environmental sustainability is approaches become operationalised as life cycle data and life cycle assessments (LCA) regarding different supply chains and industries according to standards (LCA ISO14040-44) and indicators as well as specialization on the field (PAS2050, Carbon Foot Print CD ISO14067, CD ISO14069), ecoefficiency (CD ISO14045) and water foot print (WD ISO14046). The product specific assessment is made within particular supply chains, and data may be amended and expanded on. The generic country specific (in this case, Finnish) knowledge basis regarding supply chains and catering is made use of with particular companies included in suppliers of the researched meal (Virtanen et al., 2011).

Socio-economic relations between particular supply chain's businesses are researched based on the characterization of market, power/hierarchy, partnership (Powell, 1990) and social (Granovetter, 1985) relations. These relations build the chain level coordination and yield various coordination modes (Mikkola, 2008), of which particularly strategic chains are a commonplace (Jarillo, 1988; Porter, 1985). These often seem to include power and hierarchy relations whereby socio-economic and technical competencies remain on rather high administrative level while ordinary workers' job environment is rather monotonous and physical (Mikkola, 2008). However, while these supply chains share rewards in rather inequitable way for owners and workers, the socially overlaid supply chains seem to offer more equitable rewards and risks, entailing mutual learning and social activities (Mikkola, 2008). Furthermore, there may be socially overlaid network's networks, whereby the business mode expresses considerable dynamics while entailing economic and competence flexibility under global price volatility, particularly in organic agriculture (Mikkola & Kahiluoto, 2011). There are several additional possibilities for the supply chain's economic structuring, and the research aims to clarify these in order to identify the mechanisms behind economic viability (Mikkola, 2011).

Additional job satisfaction assessment may be made based on employees' own views and general wellbeing on their working places. So far, as part of the larger pattern, emotional satisfaction due to sustainability has been identified as one operationalization of social sustainability (Mikkola & Post, 2012). However, definitions and measurements of occupational health are a conventional way to characterize the wellbeing at work. In addition to these, personal work goals put into practice (Hyvönen, 2011) are an interesting way to approach social sustainability in terms of food system sustainability.

Co-creative virtual tool for sustainability

This paper takes a supply chain or network into focus as a demand led developmental unit.

While the interests of supply chain actors vary in terms of sustainability, the internal and external pressures felt by actors support their participation under the suction of demand. However, the business details are complex and depend on contextual aspects, only known to business actors, responsible for the future activities of the business (Bruges & Smith, 2008). Therefore, their participation within the developmental activities is a necessity, which entails difficulties such as sharing language with environmental and social scientists, particularly regarding sensitive aspects such as transports, animal based food production, prices and job satisfaction. The first issue in supply chain sustainabilization is 'getting in' into the chain by researchers and the supply chain actors as well, and to become regarded as an actor who is trusted and collaborative enough to be shared with business details. Second, the shared understanding (Porter & Kramer, 2011) needs to be built up between researchers and actors about sustainability, in order to create common ground for discussions about the operationalization of sustainability aspects. These may be shared first with the actors of the business itself and after that, with other businesses of the particular supply chain. The shared understanding is then visualized by researchers in a way intelligible for supply chain actors.

When building developmental activities for sustainability, it is crucial to collect the central businesses around the same table. However, the theoretical dimensions of sustainability as well as their operationalizations as measurements such as LCAs or relation of economic qualities within the network structures are not well known by SMEs, although large actors often have made estimations about their carbon footprints to develop their own processes. However, SMEs may have difficulties even in making clear for themselves what environmental aspects such as LCAs and carbon footprints may mean for them. Furthermore, as supply chain level is usually not well known by any of its constituent actors (Mikkola, 2011), the chain needs research results as basis for developmental work. Here the economic degrees of freedom are different in the way that economic position of businesses varies due to their financial burdens and carrying capacities, which implies again the developmental options by allocating them according to capacities and discoveries made within the chain by its actors and researchers.

Visualization of data into iconic and indexical signs

The data visualization as infographic is a new field which is to be applied in dissemination of the supply chain findings about sustainability. The technical-artistic method conveys possibilities to overcome the gap between professional and research knowledge as separate worlds, whereby both research-based background knowledge and professional in situ knowledge may be combined and visualized. The results are to be easily grasped, rendering viewers on a new level of understanding and negotiating about complex situations. Furthermore, these negotiations may result in new ways to change the supply chain both within and across companies.

The visualization may be either rather naturalistic or highly abstracted. In the case of an abstracted sign, meaning for instance the carbon foot print of a meal including various ingredients as main and side dishes, the infographic design could present the plate model as the basic pattern and increase the area of the dishes according to their carbon foot print (Personal communication, Saarinen, 21.02.2012). This sign could be understood (after learning) as an icon due to its sustainability meaning, but as it is based on measured and modelled data, the attribute ‘inforgraphic’ could be added. This infographic icon would also express indexical qualities in ways similar to food labelling by labels such as the organic one. The infographic icon could be designed to express environmental impacts but as well economic supply chain coordination modes, and be expanded to job satisfaction.

Anticipatory network dialogue as an application environment of the virtual tool

Networks may exhibit various relational features entailing important promoting or prohibiting negotiations about sustainability. This paper suggests that conditions for sustainability developments such as sustainability strategies, access and deployment of scientific expertise and commitment to dialogical learning and innovation processes are required to promote businesses in their advancement towards increased sustainability (Mikkola, 2009, 2011). This paper suggests a particular theoretically based method would support both simultaneous and consecutive changes in scientific, creative and systemic spheres towards sustainable food systems. The method is called anticipatory network dialogues for sustainability. The term is coined by Seikkula & Arnkill, 2009), who have experience about network negotiations about mental rehabilitation; negotiations about sustainable food systems may poignantly be regarded as rehabilitation.

The method takes as its point of departure first, the acknowledged and independent competence of networks of research and practice, both of which are needed in co-evolvement of sustainable food systems. It is accepted that all participants present valid perspectives, and that no discursive domination takes place as all participants are responsible for reflecting, suggesting and implementing manoeuvres for sustainability. Second, the anticipatory nature of the dialogues focuses on ‘ideal’ realizations of food system operations in terms of sustainability rather than just the problems hindering suggested developments. This stage includes particularly innovative changes within supply chain network. Third, the participants explicate their activities which changed their operations towards increased sustainability. Fourth, the difference made by actual changes on the supply level will be verified after the dialogical process in due time.

The method consists of a series of dialogical meetings. The focal organization, operating on the market surface invites the supply chains into anticipatory network dialogues. The initial meetings take place between researcher network and one sequential level of supply chain network at a time, possibly allowing inclusion of mediated dialog with subsequent supply chain levels. After these meetings, the full supply chain network and researcher network participate in dialogical meetings constructing anticipated changes on the supply chain level. This research design, based on previous research practice and new therapeutic theory, is part of on-going implementation of research in sustainability skills of food supply chain actors.

Discussion and concluding remarks

This paper sets to outline the necessary conditions for systemic and creative co-development of sustainable food systems from the scratch. The outline starts from the functional unit of the system, identified as the economic relations between the food chain actors, branching off into networks. These relations are seen to entail additionally the social dimension as well as the environmental one. The conditions for advancement have been identified as anticipatory network dialogues, allowing sharing of knowledge and creating new modes of activities, increasing transparency of socio-economic relations and learning about contextual environmental impacts. The communicative challenge pertains to rendering these features intelligible for actors within the system by offering them modelled virtual knowledge about the reality for corrective and creative actions. The incremental and stabilized demand, allowing iterative 'loop' developments through economic, social and environmental relations is hypothesised to end up in over-all sustainability kernel within larger food systems.

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