Applying OR to problem situations within community organisations: a case in a Danish non-profit, member-driven food cooperative

Elena Tavella , Thanos Papadopoulos

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Highlights

- Illustrates how Community OR is used in Alternative Food Networks (AFNs)
- Shows the use of Viable System Model in AFNs
- Demonstrates how Community OR enhances coordination within AFNs
- Demonstrates how Community OR enhances cohesion within AFNs

Applying OR to problem situations within community organisations: a case in a Danish non-profit, member-driven food cooperative

Author names and Affiliations:

- **Dr Elena Tavella -Corresponding author:**
  Department of Food and Resource Economics, University of Copenhagen, Rolighedsvej 25, 1958 Frederiksberg C, Denmark. Email: eta@ifro.ku.dk
  Phone: +4535333709

- **Prof Thanos Papadopoulos**
  Kent Business School, University of Kent, Sail and Colour Loft, The Historic Dockyard, Chatham, Kent ME4 4TE, United Kingdom
  Email: A.Papadopoulos@kent.ac.uk

Abstract

This paper focuses on how the use of Community OR (COR), specifically Systems Thinking (ST) and the Viable System Model (VSM) can help in addressing complex and uncertain problem situations within community organisations, in particular Alternative Food Networks (AFNs). Literature has highlighted the importance and benefits of AFNs, but also the complexity and uncertainty underpinning the majority of AFN related problem situations that limit decision making and strategic planning and threaten the long-term sustainability of AFNs. To address this issue, we discuss the use of ST via a VSM intervention within a member-driven food cooperative in Copenhagen, Denmark, and the changes in decision making and the organisational structure of the cooperative. We illustrate the application of the VSM and in particular the methodology for organisational self-transformation within 'localist green communitarianism' and 'nonprofit management' to tackle issues, enhance democratic and participative decision making, and changes in the organisational structure that foster coordination and cohesion. The implications for COR and Soft OR, limitations and future research directions are also provided.

Keywords: Problem structuring, Community OR, Alternative Food Networks, decision making, Viable System Model

1. Introduction

In recent years, food producers, researchers, policy makers and consumers have recognised the need for protecting and enhancing environmental and human health (Espinosa et al., 2008; USDA, 2012; EC, 2013; Howard-Grenville et al., 2014). Nevertheless, the globalisation, industrialisation and intensification of food production and distribution have caused environmental degradation, resource depletion, health scares and consumer anxiety concerning food safety (Ilbery and Kneafsey, 2000; Murdoch et al., 2000; King, 2008). To address and alleviate these issues, researchers have emphasised the potential of Alternative Food Networks (AFNs), which are community organisations that comprise for instance farmers' markets, box schemes, food cooperatives and community-supported agriculture (Ilbery and Kneafsey, 2000; Marsden et al., 2000; Hinrichs, 2003; Sage, 2003; King, 2008; Milestad et al., 2010; Tregear, 2011).

Alternative Food Networks suggest a counter movement to globalised, industrialised, and resource intensive food systems, and play a central role in creating environmentally and economically sustainable communities, as well as healthy societies. Specifically, AFNs promote face-to-face contact between producers and consumers, ecology, food quality, and sustainability (Marsden et al., 2000; Ilbery and Maye, 2006). Food production and distribution occur mainly through small-scale enterprises (e.g. farms

and shops) and local initiatives (e.g. community events and markets) that supply ecological food, provide recreation opportunities, and enhance local, sustainable development by retaining returns within and employing members of local communities (Marsden et al., 2000; Sage, 2003).

Despite the proclaimed social, economic and ecological benefits of AFNs (Tregear, 2011), actors face complex and uncertain problem situations created by the interconnections between human/organisational (e.g. difficulties in collaborating and reaching consensus) and technical issues, such as high operating, distribution and transportation costs (Kottila et al., 2005; Stolze et al., 2007; Kledal and Meldgaard, 2008; Milestad et al., 2010). AFN issues can be classified into: (a) '*community partnership' issues*: they concern the initiation of relationships between actors in the food network (e.g. difficulties in the right choice of network partners and finding skilled partners) (Ilbery et al. 2004; Cuéllar-Padilla and Calle-Collado, 2011; Freidberg and Goldstein, 2011; Blanc and Kledal, 2012; Spilková and Perlín, 2013); (b) '*communication within the community' issues*: they relate to insufficient information sharing and social interaction between actors (Vakoufaris et al., 2007; Kottila and Rönni, 2008; Cuéllar-Padilla and Calle-Collado, 2011); (c) '*community collaboration' issues*: lack of commitment, trust and agreement due to actors' different interests, goals and values (Wiskerke, 2003; Vakoufaris et al., 2007; Kottila and Rönni, 2008; Cuéllar-Padilla and Calle-Collado, 2011; Spilková and Perlín, 2013); and (d) *'production and economics' issues*: high production, distribution and transportation costs (Byrom et al., 2001; Vakoufaris et al., 2007; Freidberg and Goldstein, 2011; Tregear, 2011; Blanc and Kledal, 2012; Damon and Nicola, 2013).

Ad-hoc, direct and personal communication to resolve these issues is not always sufficient. Actors often have divergent and sometimes even conflicting perspectives concerning the problem situation they face, and pursue different interests and goals. Consequently, they may not reach shared decisions and achieve mutual agreement concerning management processes (Kottila et al., 2005; Stolze et al., 2007; Kledal and Meldgaard, 2008). These problem situations may hamper democratic and participative decision making, thereby affecting coordination and cohesion (Stolze et al., 2007; Kledal and Meldgaard, 2008; Milestad et al., 2010). Hence they may threaten the long-term sustainability of AFNs (Feagan and Henderson, 2009; Charles, 2011).

To resolve these issues, literature has suggested the use of participatory, interactive and facilitated approaches during interventions with AFN actors (e.g. Marsden et al., 2000; Kledal and Meldgaard, 2008; Cuéllar-Padilla and Calle-Collado, 2011). Apart from few exceptions (e.g. Cuéllar-Padilla and Calle-Collado, 2011; Tavella and Hjortsø, 2012), there is limited evidence of how participatory, interactive and facilitated approaches help AFN actors address complex and uncertain problem situations during interventions. In particular, there is yet research to be conducted on how these

approaches may support democratic and participative decision making, and changes in the organisational structure that may enable coordination and cohesion within community organisations (Midgley and Ochoa-Arias, 1999; 2004; Blanc and Kledal, 2012; Cleveland et al., 2014). To address these gaps, this paper (i) qualitatively analyses a case vignette concerning an action research (Huxham and Vangen, 2003; Eden and Huxham, 2006) intervention within a member-driven food cooperative in Copenhagen, Denmark; and (ii) discusses the changes in decision making and the organisational structure of the cooperative as a result of the intervention, and how these changes led to the enhancement of coordination and cohesion within the cooperative. The intervention was supported by Community Operational Research (COR) (Parry and Mingers, 1991; Jackson, 2004; Midgley and Ochoa-Arias, 2004), in particular Systems Thinking (ST) (Checkland, 1981; 1990; Jackson, 2002) and the Viable System Model (VSM) (Beer, 1979; 1981; 1985). Our intervention was inspired by the VSM methodology developed by Espinosa and Walker (2011; 2013), which is based on VSM theory and the theory of organisational viability. This methodology is useful to enhance sustainable development of complex organisations through the use of complexity management to address governance problems and design viable organisations.

This paper contributes to the literature on the use of COR within 'localist green communitarianism' (Midgley and Ochoa-Arias, 1999; 2004) and 'nonprofit management' (Johnson and Smilowitz, 2012; Privett, 2012) by providing an example of how ST and the VSM supported actors in addressing their problem situation, and fostering changes in decision making and the organisational structure of the cooperative. Thus this paper responds to the call by Midgley and Ochoa-Arias (1999; 2004) to directly work with local, green community and voluntary organisations with the aim of enhancing their coordination (e.g. through planning, formulating visions for a desired future and financial management) and cohesion.

The rest of the paper is organised as follows. In the next section we introduce COR and link AFN issues to the basic tenets of ST. Then we introduce the VSM and the VSM intervention approach developed by Espinosa and Walker (2011; 2013). After discussing the methodology we present our intervention and findings. The paper concludes with a discussion of our contributions to the COR literature and the implications for COR and Soft OR practice, limitations, and suggestions for future research.

2. Community Operational Research and alternative food networks

Community Operational Research (COR) was established to help community organisations resolve their complex and uncertain problem situations. Such organisations are organised in a participatory way, represent people's interests, are socially committed, and aim at improving society. Furthermore,

they are typically non-profit, non-hierarchical, and run by full-time or part-time volunteers with some paid workers. Time and money are lacking, thus members cannot afford to pay consultants to help them address their problem situations (Parry and Mingers, 1991; Jackson, 2004; Midgley and Ochoa-Arias, 2004). The main characteristic of these communities is 'communitarianism', defined by Midgley and Ochoa-Arias (1999, p. 267) as the "belief in the normative primacy of the community over the individual (although some de-emphasise the individual more than others), a focus on social virtues or duties rather than individual rights (although not always to the exclusion of rights), and, for most, an emphasis on the power of participative decision-making to regenerate community cohesion".

There are various forms of communitarianism (described in Midgley and Ochoa-Arias, 1999; 2004), in this paper we focus on 'localist green communitarianism'. This form supports the coordination (e.g. through planning, formulating visions for a desired future and financial management) and cohesion of local communities. Communities are held together by implicit, socially shared meanings, and driven by a commonly accepted notion of the social good. Communities are characterized by participation in the generation of shared values upon which democratic and participative decision making can be based, thereby enhancing cohesion (Midgley & Ochoa Arias, 2004). In our case AFNs aim at enhancing local sustainable development and environmental protection through their activities.

The support of COR is achieved via the use of participatory, interactive and facilitated approaches to enhance model-supported group conversations in a workshop format. These approaches draw on ST (Jackson, 2004), which is concerned with "rational intervention in human affairs" (Checkland, 1985, p. 757). According to Argyris (1970, p. 15) "to intervene is to enter into an on-going system of relationship, to come between or among persons, groups or objects" by, for instance, entering an unknown situation as an external agent and leaving at the end of the project; collaborating with the same organisation in multiple projects; and/or using methodologies and methods in the own workplace (Mingers and Brocklesby, 1997). The aim of intervening is to generate valid information and help the system of concern alleviate and make progress with the problem situations it faces (Checkland, 1985; Jackson, 2002).

Table 1 illustrates the characteristics of problem situations in AFNs from a ST perspective and maps these situations to the issue types identified in the introduction. The use of ST can assist AFNs in addressing *complexity and uncertainty* (regarding e.g. consumer demand and timely delivery of organic food products) that cause actors' –such as members of the cooperatives, food producers and distributors– possible incomplete understanding of the problem situation, which issues constitute the problem situation, and how to deal with it (Rosenhead and Mingers, 2001). AFNs, being human systems, comprise both tangible (e.g. people) and *intangible* elements or entities, including for instance

information, values, ideas actors possess and goals they would like to attain (Buckle Henning and Chen, 2012). Goals may or may not be known to the person that possesses them; some are endorsed by a system and some are not; and some may co-exist harmoniously, others may not (Checkland, 1999).

Complexity and uncertainty arise within real-world problem situations that comprise a multitude of *interconnected elements and issues* (e.g. actors; product, monetary and information flows; various cost types and communication) and the relationships between them. The interconnections between elements and issues are reinforced by *multiple actors with divergent or even conflicting perspectives* regarding the problematic situation, and *pursuing different interests and goals* (Jackson and Keys, 1984). These relationships give rise to *emergent properties* that only exist in relation to the complete whole composed of its assembled parts ('the whole is more than the sum of its parts') and are defined as observable consequences (e.g. lack in information sharing) that constitute the unique identity of particular problem situations (Checkland, 2012). Emergent properties are crucial features that need to be considered and grasped in order to understand, structure, and tackle complex and uncertain problem situations. Grasping emergent properties requires agents to adopt a "holistic way of thinking", that is, one that draws connections between elements and issues, and considers the different perspectives of multiple actors. Practically, actors engage in participatory, interactive and facilitated conversations in order to get insight into and resolve the problem situations they face by visualising elements, issues, and their relationships in graphical representations and/or models. Representations and models are useful to identify crucial elements and issues constituting a certain problem situation; depict relationships and emergent properties; and engage in reflections and analysis concerning the problem situation. Reflection and analysis enable actors to better understand the problem situation, structure and make sense of it, and determine options for resolution and progress usually resulting in the formulation of an action plan (Checkland, 1981, 2012; Jackson, 2002; 2003; Pidd, 2003). In order to understand the relationship between COR and ST, we acknowledge them as two different communities that work better keeping their separate identities and through their interactions enriching each other (Midgley & Ochoa Arias, 2004).

Table 1: The characteristics of AFN problem situations from a ST perspective

Systems Thinking	Problem Situations in AFNs	AFN issue 'type'
Inter-connectedness of elements and issues	Connections between, e.g. food producers and distributors; environmental, agricultural and managerial elements; product, monetary and information flows Connections between technical (e.g. high distribution costs) and human/organisational issues (e.g. a lack in communication amongst actors)	(a), (b), (c)
Emergent properties	The relationships between actors constitute, e.g. the emergent property of information and product flows or of a lack in information sharing	(a), (b), (c)

Uncertainty	Uncertainty regarding, e.g. consumers' demand for and timely delivery of, e.g. organic food products	(a), (b), (c), (d)
Intangibles	The importance of, e.g. beliefs and values in decision making and strategic planning	(a), (b), (c)
Multiple actors with divergent perceptions of the problem situation they face	A lack in collaboration is, e.g. seen as a result of a lack in information availability, and/or a lack in information sharing amongst actors	(a), (b), (c)
Multiple actors with different goals and interests, beliefs and values	Actors, e.g. emphasise environmental, human health or financial matters; individual or community aspects	(a), (b), (c)

Within this paper we explore how ST and in particular how the VSM can support democratic and participative decision making (Espinosa et al., 2004) and changes in the organisational structure that may enhance AFN coordination and cohesion (inspired by Beer, 1979; 1981; 1985; Espinosa and Walker, 2013). Drawing on COR and VSM considerations of coordination and cohesions and our intervention, we consider coordination and cohesion to be inter-dependent. Coordination involves organisational planning, formulating visions and financial management (Midgley & Ochoa Arias,1999; 2004), as well as the management of material, information and financial flows (Stadtler, 2005) within an organisation and between the organisation and its environment. Beer (1979) has suggested that the components of a viable organisation constantly interact with each other, and the organisation constantly interacts with its environment. These interactions need to consider the law of requisite variety, which entails that handling environmental variety by internally generating an equal degree of *requisite* variety supports organisations in achieving coordination. When internal and environmental varieties interact in constant balance, cohesion – the maintenance of autonomy and identity of the organisation as a whole – is enhanced (Espinosa et al., 2007; 2008).

2.1 The Viable System Model

Some participatory, interactive and facilitated approaches used in COR are systemic (Jackson, 2002; Midgley et al., 2013). They help stakeholders "enhance mutual understanding", as well as undertake "bigger picture analyses, which may cast new light on the issue and potential solutions". Systemic approaches are particularly useful "to broaden the perspectives of participants in order to facilitate the emergence of new framings, strategies and actions" (Midgley et al., 2013, p. 143-144).

Stafford Beer (1979; 1981; 1985) developed the VSM as the theory of viability in complex organisations, or the theory for managing organisational complexity. "The VSM offers a meta-language to describe recurrent patterns of interaction, and the way different roles and groups deal with complexity in an organisational context" (Espinosa et al., 2015, p. 204). Thus, the VSM enshrines the

determinants of viability and its use provides support in establishing viable and sustainable organisations.

The VSM meta-language is useful to (i) diagnose weaknesses and problems within an organisation and (ii) (re)design the structure of an organisation to make it viable, and suggest improvements that will enhance organisational performance and the ability to manage complexity, thereby enhancing the long-term sustainability of the organisation. A viable organisation is capable of constantly dealing with and adapting to a changing environment, at the same time maintaining autonomy and identity. To maintain a separate existence but co-evolve with its environment an organisation and its components need to be autonomous. At the same time, different components need to continuously interact with each other, and with its neighbouring organisations (and other systems) in a dynamic balance. This interaction originates in the *recursive* nature of viable organisational systems (and other systems) (Beer, 1979; Espinosa et al., 2008; Espinosa and Walker, 2011). According to Beer (1979) all viable organisations are based on the same structural laws that determine *recursiveness,* which implies that all viable systems contain, and are contained in – *replicable* (the same type) of autonomous, adaptable, self-regulatory and self-organising systems. Therefore, the performance, variability and sustainability of an organisation depend on the performance, variability and sustainability of its components. The recursive nature of the VSM allows recursive –meaning replicable– mapping of complex organisations, which involves the exploration of interactions between viable systems and their environment at different recursive levels. Recursive mapping enables actors to identify different viable systems and address specific issues at different levels of recursion through the same language and tools (Beer, 1979; 1981; Espinosa et al., 2007; 2008; Espinosa and Walker, 2011).

A viable organisation (or system) consists of five dynamic systems that recursively operate across the organisation and carry out specific functions. Those systems are linked with each other and constantly monitor and balance information flowing between each other (vertical links in the VSM) and the environment (horizontal links in the VSM) (Figure 1) (Beer, 1979; 1981; Espinosa et al., 2008). The systems include (Beer, 1979; 1981; Schwaninger, 2001; Espinosa and Walker, 2011; Espinosa et al., 2015):

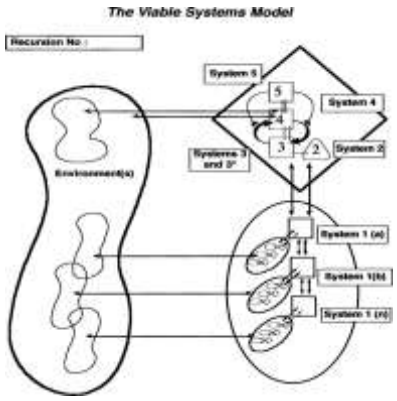
- System 1 (S1): autonomous (to make local decisions on most issues) Operational Units (primary activities), each representing a VSM at the lower level of recursion; responsible for carrying out the operations necessary to implement the organisational purpose. Each Operational Unit interacts with its own environment (e.g. through exchange of goods), which is embedded in a larger environment;
- System 2 (S2): mechanisms that deal with critical issues between the Operational Units; responsible for damping oscillations and ensuring coordination of activities through communication;

- System 3 (S3): optimises interactions and fosters synergy between the Operational Units by, for example, allocating financial and human resources that are necessary for running operations in exchange of accountability from S1;
- System 3* (S3*): a particular case of S3 responsible for investigating and validating complementary information flowing between Systems 1-3 and about the happenings at the operational level (e.g. auditing or monitoring activities);
- System 4 (S4): responsible for long-term planning by scanning the environment and looking for opportunities and threats;
- System 5 (S5): overall context responsible for closure, identity, policy and ethos; monitors the relationships between S3 and S4

The VSM has been applied, *inter alia*, within environmental management (Espinosa and Walker, 2006), to re-organise and solve complex problem situations within cooperatives (Walker, 1991), eco-villages (Espinosa and Walker, 2013) and local food networks (Tavella and Papadopoulos, 2014), and to strategy implementation (Espinosa et al., 2015).

In what follows we discuss the VSM principles for sustainability and outline the VSM intervention process. Both are used to further support our discussion of the VSM as an approach for alleviating partnership, communication and collaboration issues, enhancing democratic and participative decision making, and changing organisational structures that may promote coordination and cohesion of AFNs.

Figure 1: The Viable System Model (Espinosa et al., 2008)



2.2 The VSM principles of viability for developing sustainable organisations and communities

The five VSM systems constantly monitor and balance information flowing between each other and the environment. The balance between internal and external information flows determines cohesion at all levels within a viable system. Management (the metasystem including S2-5) ensures cohesion, which protects the identity of the Operational Units, enables necessary resources to be distributed amongst the Units, and tames environmental change. At the same time, cohesion limits the autonomy of the Operational Units, meaning that if the actions of an Operational Unit threaten the survival of the

organisation, by exceeding its intentions, management penalises its autonomy. In other words, management only intervenes when organisational cohesion is threatened. Cohesion and autonomy are the basis for viability, and they must be balanced (Beer, 1979; Espinosa et al., 2006). The balance between cohesion and autonomy renders the VSM and the principles of viability (Table 2) particularly relevant for sustainable development through participative and democratic decision making and the design of self-governance mechanisms (Espinosa et al., 2008; Espinosa and Walker, 2011).

Table 2: The VSM principles for sustainability by Espinosa et al. (2008)

Autonomy and cohesion	The VSM promotes local autonomy of the elements of an organisation that coupled with each other interact in a whole in order to support organisational functionality and effectiveness. Autonomy and cohesion are important in the context of sustainability because "the cohesion of structurally coupled autonomous organisations", which occurs through conscious interaction and purposeful conversations, creates sustainability (p. 642-643).
The role of higher management	Within the VSM management does not interfere through decree, but provides a "meta" support to ensure cohesion and synergy amongst the organisational operations (by e.g. allocating financial and human resources, and ensuring that the operational units operate within a defined policy). Management reacts to the needs of the operations and only deploys authority if an operational unit does not act within the policy framework.
Structural coupling with the environment	Implementing a VSM within an organisation also means monitoring the relationships with the external environment with the aim at strengthening the ability of the organisation to constantly adapt to outside change in correlation to internal change, thus enhancing its viability.
Variables and metrics for sustainability	Monitoring the relationships between organisation and environment includes the identification and measurement of the essential variables – quantitative (e.g. economic aspects) and qualitative (e.g. actors' wellbeing) that can be used to monitor the interaction between the organisation and its social and legal embodiment or culture. The measurement of these variables considers both the financial and the social viability of an organisation and aims at monitoring self-regulation of embedded viable systems.
Participation and re-engagement	The VSM is based on actors' participation at all organisational levels, empowering and engaging autonomous individuals, and attributing decision making power to the actors who carry out specific activities.

2.3 The VSM intervention

The VSM was in the 80ties and early 90ties recognised as a functionalist-hard ST approach (Jackson and Keys, 1984; Jackson, 1993), however at the same time, throughout the years and up to now, the VSM has continuously been developed from constructivism and second order cybernetic perspectives (Espejo, 1990; Harnden, 1990; Jackson, 2003; Espinosa et al., 2008). The intervention reported and

analysed within this paper was inspired by the VSM methodology for organisational self-transformation recently developed as a soft OR approach by Espinosa and Walker (2011; 2013; Espinosa et al., 2015). Similar to other soft OR scholars (e.g. Rosenhead and Mingers, 2001; Franco and Montibeller, 2010), Espinosa and Walker (2011; 2013) use and build the VSM on flipcharts within participatory, interactive and facilitated group conversations in a workshop-format.

A VSM intervention aims at improving the long-term viability and sustainability of a system of concern, for instance, an organisation or community, by enabling it to constantly deal with complex situations and adapt to environmental change. The facilitator enhances a conversation between workshop participants to identify and understand critical issues, and suggest structural, technological and self-regulatory change within the system. For this purpose, the VSM is used as a diagnostic and/or design tool in a participative learning process, during which the participants critically observe their current organisation and performance. The participants rethink their organisation by using VSM distinctions (VSM diagnosis), jointly reflecting, discussing and building a model of the organisation as a viable system. Agreement on how to act and implement the VSM in practice results from active participation in the diagnosis and design process (Espinosa and Walker, 2011). Furthermore, this type of VSM intervention aims – by using the VSM as a meta-language, a hermeneutical tool – at initiating and guiding a process of self-organisation and self-transformation within groups (e.g. communities and organisations). The facilitator provides learning tools, manages diagnostic and initial design conversations, and formulates suggestions for improvement in order to support stakeholders in steering their *own* and *independent* process of organisation and transformation (Espinosa and Walker, 2011; 2013). Specifically, Espinosa and Walker (2013) have carried out workshops within an Irish eco-community in order "to support the members' learning about the VSM (basic training) aimed at improving their knowledge and skills in deciding about improvements to their own organisation" (p. 120). Thus the methodology helps actors generate organisational arrangements that are required for enhancing their possibilities for long-term organisational viability and sustainability (Espinosa et al., 2015).

3. Methodology

We present a case vignette (Finch, 1987; Hughes, 1998; Taylor, 2006) that outlines how VSM principles can be applied in problem situations related to AFNs. Case vignettes have been used in the fields of soft OR and problem structuring (e.g. Franco, 2013; Velez-Castiblanco et al., 2016) to illustrate the role of models during problem solving collaborations. The selection of the vignette was on the basis of providing appropriate illustrations of the role of the VSM in alleviating problem situations, supporting

democratic and participative decision making, and changes in the organisational structure that may create conditions that favour the enhancement of coordination and cohesion within AFNs.

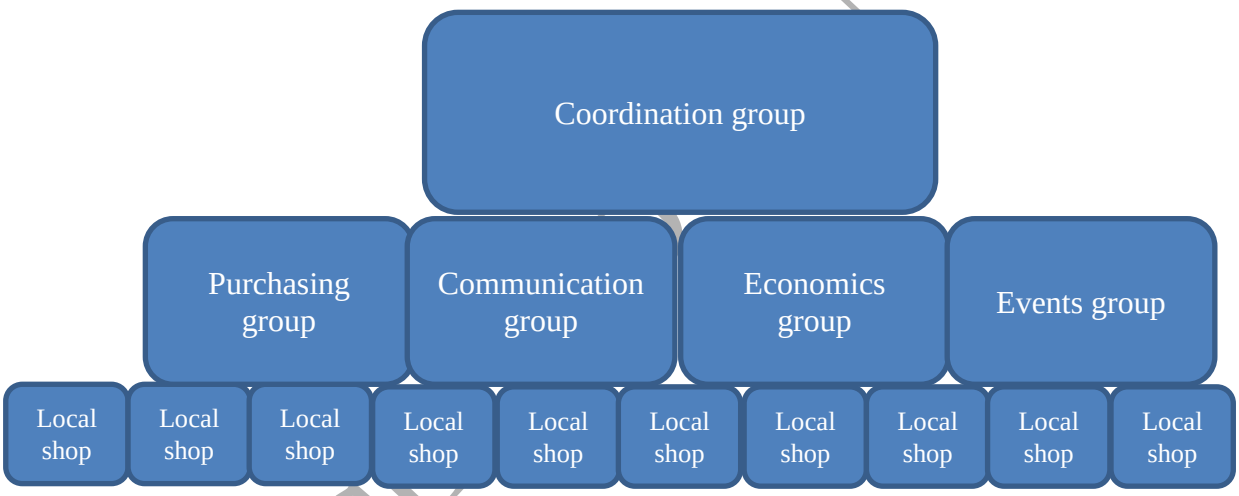
The first author facilitated a one-day VSM workshop within a non-profit, member-driven and volunteering based food cooperative in Copenhagen, Denmark, called KBHFF, as part of a larger action research (Huxham and Vangen, 2003; Eden and Huxham, 2006) intervention (carried out between June 2012 and February 2013). Tavella and Papadopoulos (2015) draw on data collected within the same food cooperative, however this paper is different in terms of aim, analytical approach, findings, and contributions. The previous paper explored how facilitators use 'scripts' to manage workshops and achieve workshop outcomes, and presented a framework that linked script-supported behaviors to different types of outcomes. The current paper comprises additional data to include the development of the cooperative months after the VSM workshop and to identify its influence on changes related to the organisational structure. The workshop and post-workshop stage, hence, constitute the main units of analysis. Data were collected through (i) audio recordings of the workshop; (ii) informal conversations with the workshop participants conducted after the workshop and as changes in the organisational structure were formulated (where written notes were kept); and (iii) online documentation and videos describing the new organisational structure, as well as the project plan of the changes. The accumulated data was transcribed, coded, and analysed following the tenets of inductive research (Eisenhardt, 1989; Strauss and Corbin, 1998). To analyse (i), we split the workshop transcription in excerpts depending on their focus on AFN issue types ((a), (b), and (c) as described in the introduction). We coded each excerpt by turn of speech referring to the VSM principles (including sustainability principles as described in Table 2). To analyse (ii) and (iii), we coded notes and documentation into themes that referred to the AFN issues and how they were addressed with the use of VSM principles, and kept notes referring to the changes in the organisational structure when watching the videos. We continuously moved back and forth between data, AFN issue types, and VSM principles to further confirm whether the VSM principles and AFN issue types could be 'tracked' within the empirical data, thus building our analysis.

4. Case vignette: the use of the VSM in KBHFF

KBHFF aims at creating an alternative food community by weekly supplying local, organic vegetables and fruit to its members at affordable prices, disseminating knowledge on ecology and sustainable food production, distribution and consumption, and participating and actively collaborating in maintaining and developing an inclusive and transparent community organisation. In exchange the members are required to work three hours a month within the cooperative, for instance, ordering and packaging

vegetables and fruit, organising meetings and events, and updating the website. The cooperative comprises: 10 local shops, in which every Wednesday members collect the vegetable and fruit bags they have ordered beforehand; four operational groups, that is, the purchasing, the communication, the economics and the events group; and 8 support groups, that is, the facilitation, the handcraft, the graphics, the hygiene, the development, the web, the textile bags, and the fish demand group (the support groups are not part of the KBHFF structure as such, but activated when needed). Members who are active within the shops, the operational and/or support groups may also join the coordination group, which ensures that KBHFF moves in the right direction. Therefore, KBHFF follows a particular organisational structure (see Fig. 2), in which members organise their activities either by themselves, or they collaboratively self-organise in sub-groups.

Figure 2: The organisational structure of KBHFF before the VSM intervention (own illustration based on KBHFF original documents representing the organisational structure) (black and white in print)



Notes: KBHFF has designed an organisational structure that seeks to enable members to get an overview of the opportunities for volunteering three hours a month within the organisation by representing its structure in three levels (the illustration of three levels aims at providing clarity and overview of the structure to members). These levels comprise different KBHFF "departments" in which members can decide to work. Members allocated to different local shops (the third level) can opt to volunteer in the shop (e.g. selling fruit and vegetables), in one (or more) operational groups (the second level) and/or the coordination group (the first level). The coordination group ensures that KBHFF moves in the right direction and it is composed of members that are active within the four operational groups. The different operational groups are in charge of e.g. purchasing fruit and vegetables to be sold in the local shops; enhancing communication amongst the local shops and with external stakeholders; calculating budgets; and organising events for KBHFF members.

Despite its current success, the members of KBHFF are uncertain about its future. The members do not share a common strategic focus and long-term planning, causing uncertainty concerning the future

survival and development of KBHFF. Moreover, the fast expansion of KBHFF (i.e. development of shops and member uptake and leave) hampers organisational transparency, limits the access to internal information and communication between members, and causes ambiguity regarding their responsibilities. In theory decision making (prior to intervention) is participatory and consensual. However, in practice, communication is still lacking amongst the operational groups and between the operational groups and the local shops, hampering and slowing down decision making at different organisational levels. Some of these issues were known by the first author through access to a non-confidential project work written by students at the University of Copenhagen, and were further brought to the foreground through her informal discussions with KBHFF members before the intervention (see the timeline in Appendix 1). Hence, because of her interest in problem solving in community organisations, she asked KBHFF for the opportunity to collaboratively carry out an action research intervention. KBHFF agreed. Some members of the facilitation group – responsible for facilitating meetings and workshops within KBHFF – were aware of systemic approaches, and thought that those could help them tackle their issues.

4.1 The VSM workshop

Following formal conversations (two meetings) between the first author (the facilitator) and the representatives of the communication (responsible for coordinating internal and external communication) and facilitation groups, and a meeting with the majority of the different operational and support groups' representatives, KBHFF agreed on organising a one-day VSM workshop (from ca. 9.30 am to 5 pm). The facilitator met three times with members of the facilitation group who helped set up the workshop (e.g. finding a venue, arranging refreshments, sending out invitations to participants, and scheduling workshop activities).

Inspired by Espinosa and Walker (2011; 2013) the VSM workshop was based on the methodology for organisational self-transformation and had two aims: firstly, to carry out a VSM diagnosis in order to support the members in re-thinking the organisation of KBHFF, and identifying critical issues and opportunities to tackle them. The facilitator and the facilitation group believed that the VSM principles for sustainability, as well as the VSM mechanisms to monitor the external environment could help KBHFF enhance its strategic focus and long-term planning. Secondly, to support participants' learning about the VSM in order to improve their knowledge and skills in suggesting and deciding about improvements to KBHFF, self-organise, and initiate processes of self-transformation.

The workshop involved 8 participants representing the different local shops, as well as the main operational groups – the communication, events, and economy groups, and the coordination group. The workshop was conducted in Danish to allow for wider participation of KBHFF members in the workshop. The workshop comprised the following steps:

(i) the facilitator introduced the VSM (with a power-point presentation) outlining VSM principles (e.g. referring to the definitions of the 5 systems and the VSM principles for sustainability) and practical examples, and presenting the agenda for the day

(ii) the group, after reading and discussing the identity statement of KBHFF, reformulated, sharpened and shortened it. Rewriting the identity statement helped clarify and agree on the identity of KBHFF, which would guide the following workshop activities and inform the VSM

(iii) the participants identified the System 1s of KBHFF that is necessary for implementing the identity statement, including (i) purchasing (vegetables and fruit); (ii) selling vegetables and fruit; (iii) dissemination (of e.g. knowledge about food and organic farming); and (iv) creating opportunities for being together (e.g. socializing and having a good time) (Fig. 4a). The facilitator also asked the participants System 1s questions (inspired by Espinosa and Walker, 2011; 2013)

(iv) the participants drew and presented cartoons (based upon Checkland (1981)'s rich pictures) (Fig. 3a and 3b) representing problem situations affecting the performance of KBHFF. Specific and clearly defined problems were then in agreement with the group written down by the facilitator on a flipchart (in a list format; Appendix 2). Note that Espinosa and Walker (2013) suggest drawing cartoons before identifying the identity of the system in focus and System 1s. In our case we changed the sequence of these activities, after consultation with the facilitation group, in order to match the anticipated preferences and working style of the participants

(v) the group built the meta-systemic diagram (comprising Systems 2-5 and their functions) (Fig. 4b) by posing, reflecting on and answering meta-questions involving criteria for dealing with complexity at each level (inspired by Espinosa and Walker, 2011; 2013)

(vi) the group summed up the VSM, re-examined the agreed-upon actions, discussed and agreed on next steps towards the implementation of the VSM in the form of an action plan

At the end of the workshop the group achieved the following outcomes: a rewritten identity statement, two cartoons representing the problem situation (Fig. 3a and 3b represent one cartoon), a list with critical issues (Appendix 2), a VSM (Fig. 4a) and meta-systemic diagram (Fig. 4b) on flipcharts, and an action plan with priority activities, responsibilities and first deadlines.

Figure 3a: A cartoon showing the problem situation within KBHFF (black and white in print, online in color)

Figure 3b: Detail of the cartoon in Figure 3a (black and white in print, online in color)

Figure 4a: The VSM at the end of the workshop (black and white in print, online in color)

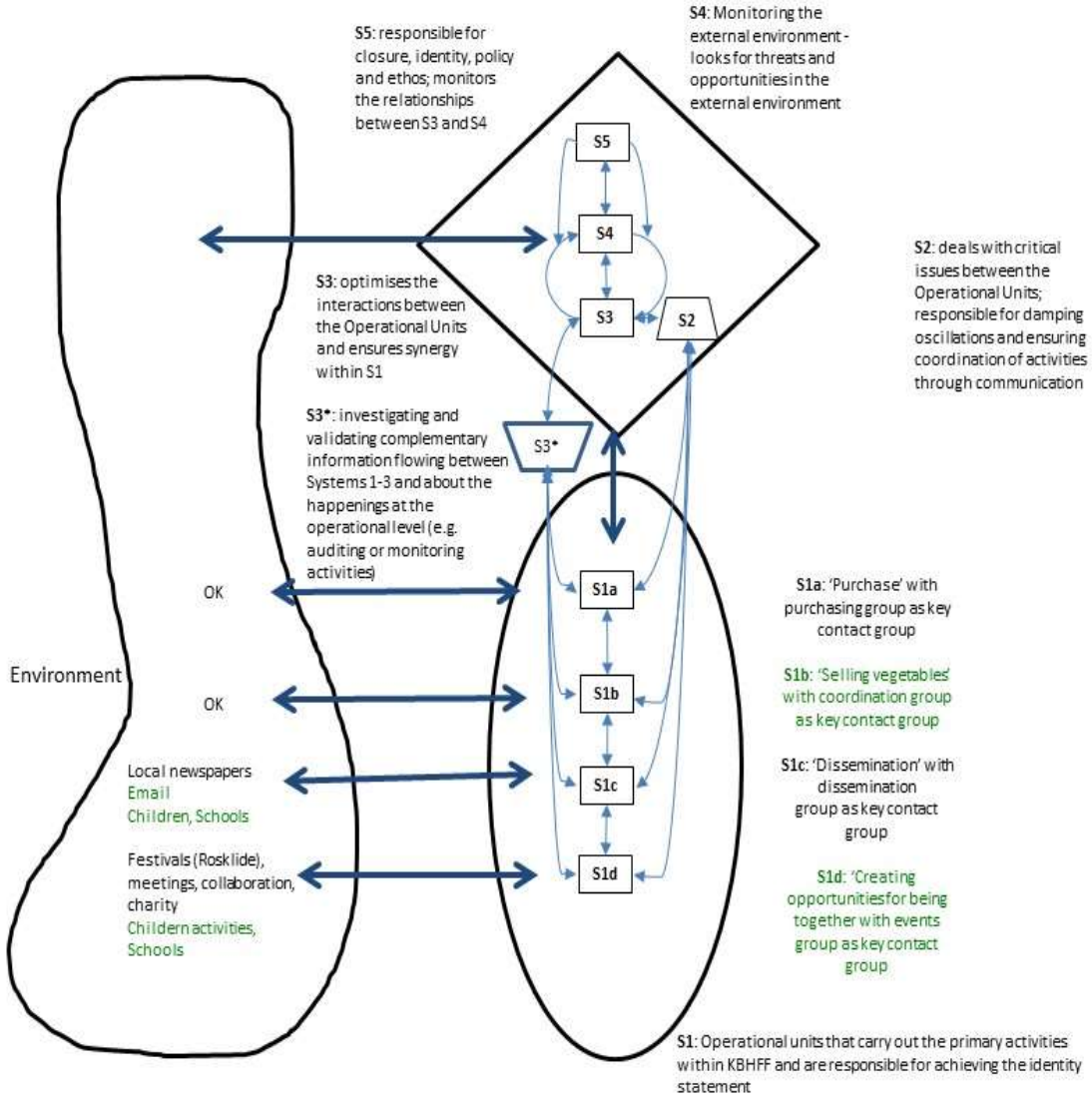
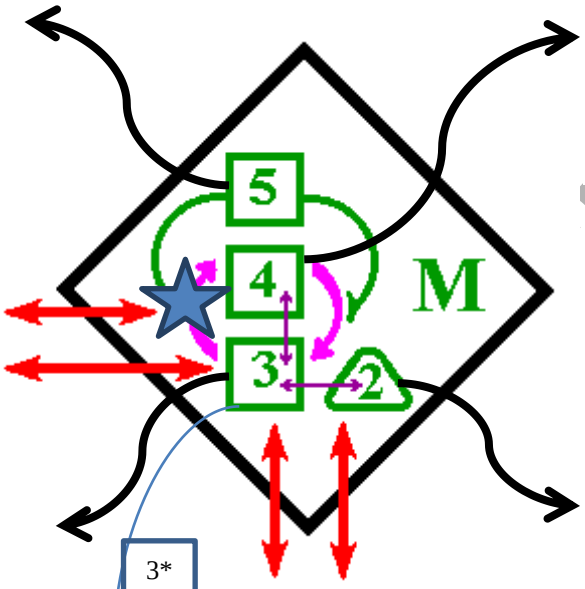


Figure 4b: The meta-systemic diagram at the end of the workshop (black and white in print, online in color)



System 5
General assembly
Coordination group
Debate meetings

System 4
Vision days
Producers meetings
Coordination group
Work camps together with other communities in Scandinavia
Common currency group
Purchasing group: development of new product groups; improved collaboration with the logistics group

System 2
Feedback scheme
Representatives of the shops group in the purchasing group
Purchasing group communicates to the meeting of the shops group (through meetings or minutes)
Fix points on the agenda of the shops group (e.g. news from the purchasing group)
Meetings within the central groups (logistics, economy, purchasing and communication) at the same time and place (4-6 times per year, coordinate the existing meetings)
Clear distribution of roles between the communication group, events group and dissemination corps
Better use of the collaboration platform and coordination with WIKI
Joint meals
Facilitation group
Use internal resources to develop an internal communication strategy and disseminate it
Introduction meetings for new members: mandatory, working groups across KBHFF
Member evaluation concerning interests and motivation when members sign up in order to better connect them with each other and the working groups
Common meetings of working groups in the local departments
Weekly feedback from the economy group to the local departments

System 3
Coordination group
Experience exchange workshop
Shops group
Info mail
Guard plans: teams and team-link
Meetings of local departments
Events group: as resource group for different local activities
Member system for reminders, sanctions concerning passive members

System 3*
Board
Contact persons

Interaction between systems 3 and 4:
Development meetings, vision days
Disseminate decision diagram
Idea generation board (Amager) with contact information and recruiting function
News from the web on the announcement board in the shop

4.2 Analysis of interaction excerpts from the workshop

In this sub-section we analyse excerpts from the interaction that took place during the workshop in order to identify how, during the workshop, the VSM helped participants structure and address KBHFF issues. To organise our analysis, we classify the KBHFF issues following the three issue types identified in the AFN literature (see introduction): (a) "community partnership", (b) "communication within the community", and (c) "community collaboration". For each one of the types, we illustrate the contribution of the VSM workshop by providing excerpts from the transcript. The selected excerpts are of particular value because they provide a good illustration of the role of the VSM approach in addressing issues during the workshop. Each excerpt reports how the participants used the VSM models on the flipcharts and VSM principles to identify measures to alleviate the issues of concern, culminating in the achievement of workshop outcomes in the form of a contribution to model content and/or action plan. In addition, we point out how the workshop conversation is linked to aspects of coordination and cohesion from a COR and VSM perspective.

(a) Community Partnership

A critical issue identified while drawing cartoons representing the problem situation within KBHFF concerns the weak relationships between new and the existing members (the actors of KBHFF), which affects partnership in carrying out operational and management activities within the operational and support groups. In the following excerpt Participants (P) 1, 2 and 3 state the issue of how to get new members to sign up for KBHFF (turns 1 and 2), how to support them in identifying which operational and/or support group(s) they may join (turn 3), and how to motivate existing members to jointly carry out operational and management activities within KBHFF. The partnership issue is taken further by P1, who points out that the main cause lies in the weak relationships between new and existing members, and the unawareness of the latter regarding KBHFF frameworks (turn 4).

1	P1	Yeah, further on there is the question, how we take up new members *((issue identified by drawing cartoons))*
2	P2	Yes, the uptake of new members and motivating the old ones
3	P3	Make them *((new members))* find their place
		[…]
4	P1	Well, the problem is, that you *((new member))* join a new organisation, where you don't know how you should behave, and you cannot ask what you should do, because there is not any of the others *((existing members))* who know that

In order to address this issue P1 and P2 suggest, drawing on the VSM principles of participation and re-engagement at all organisational levels, that introductory meetings to new members should be mandatory and attended by each member after signing up for KBHFF (turns 5 and 6) (according to Beer, interaction between organisational components that considers the law of requisite variety, in this case KBHFF members, fosters coordination). Following this suggestion and P1's contribution (turn 7), 'mandatory introductory meetings for new members' and 'working groups taking care of new members across KBHFF' are added to System 2 (responsible for resolving issues between Operational Units and ensuring coordination of activities through communication) of the meta-systemic diagram (on a flipchart, Fig. 4b) by the facilitator (contribution to model content). Those additions informed the suggestion of introducing a contact person and coordinator for new members in the shops group as part of the new organisational structure of KBHFF. The contact person and coordinator is responsible for managing information flows between actual members, those who are interested in becoming KBHFF members and the different components of KBHFF (according to Beer interaction – which considers the law of requisite variety – within an organisation and between the organisation and its environment, in this case potential KBHFF members, enhances coordination, and balance between internal and external information flows fosters cohesion).

5	P1	[…] all *((new))* members should meet up for a member meeting the first time *((when they sign up for KBHFF))*, so that it is somehow ensured, that they get an introduction to what this here *((KBHFF))* is all about […] *((referring to the VSM principle of participation and re-engagement at all levels))*
6	P2	[…] in some departments there are introductory meetings for new members and in the long-run they could become mandatory […] *((referring to the VSM principle of participation and re-engagement at all levels))*
7	P1	It could be nice to get some people *((existing members))* who would like to deal with member introduction across KBHFF […] *((referring to the VSM principle of participation and re-engagement at all levels))*

Notes: P – Participant. The use of an ellipsis in brackets (i.e. [...]) following a statement indicates that utterances by one or more participants have been edited out.

(b) Communication within the community

A major issue (identified while drawing cartoons on flipcharts) discussed during the workshop concerns the lacking communication between the operational groups (economics, purchasing, events and communication groups). In the following excerpt the participants mention, by referring to the VSM on the flipchart, poor communication between KBHFF members and the purchasing group (turn 1),

between the shops and purchasing groups (turns 3 and 4), and the purchasing and coordination groups (turn 5), as well as the issue of communicating adequately between groups (turn 2).

1	P4	[…] there is no connection to the purchasing group […] it is a problem that we *((KBHFF members))* cannot communicate with them *((the purchasing group)) ((issue identified by drawing cartoons on the flipcharts; the mentioned groups are represented in the VSM on the flipchart towards which the participants orient; Fig. 4a))* […]
2	P1	[…] all in all to communicate adequately but without communicating too much, I think, is a big problem […] […]
3	P3	[…] there is a problem with feedback communication, we see the problem is feedback communication from the shops group to the purchasing group *((referring to the VSM on the flipchart, Fig. 4a and VSM principle of participation and re-engagement at all levels))* […] […]
4	F	Is it the missing communication between the shops group and the purchasing group? *((referring to the VSM on the flipchart; Fig. 4a))*
5	P1	Yes, and the purchasing group and the coordination group *((referring to the VSM on the flipchart; Fig. 4a))*

In order to address the communication issue P1 supported by P2 suggests (turns 6 to 8), drawing on the VSM principle of participation and re-engagement at all organisational levels, to organise parallel meetings (at the same time and place) within the four key groups of KBHFF, followed by a joined dinner and meeting (according to Beer, interaction between organisational components that considers the law of requisite variety, in this case the key groups in KBHFF, fosters coordination). This suggestion is then added to System 2 (as meetings within the central groups in Fig. 4b) of the meta-systemic diagram (on a flipchart) by the facilitator, meetings are planned to take place 4 to 6 times per year, and the first time is scheduled about one month after the workshop (contribution to model content and action plan). The issue of lacking communication between the operational groups was taken further in the discussions concerning the formulation of the new organisational structure of KBHFF, thereby leading to the addition of a distribution group, emphasis of the autonomy of the operational groups (according to Beer maintenance of a balanced organisational autonomy enhances cohesion), and the regular organisation of coordination meetings amongst the operational groups.

6	P1	[…] the 4 central groups […] if they could agree to meet […] at the same time, so that there were 4 parallel meetings, and had a one hour session afterwards or something like this, where we could mingle and talk […] I think, it would be really good if we could meet […] *((referring to the VSM principle of participation and re-engagement at all levels))*
7	P2	This is interesting. So if you think that there is one meeting of the communication group, meeting of the purchasing group, meeting of the logistics group, all together from 5 to 6:30 pm, and then there is dinner and then afterwards there is a meeting of the coordination group *((referring to the VSM principle of participation and re-engagement at all levels))*
8	P1	[…] several meetings at the same place at the same time more often *((referring to the VSM principle of participation and re-engagement at all levels))*

Notes: P – Participant; F - Facilitator. The use of an ellipsis in brackets (i.e. [...]) following a statement indicates that utterances by one or more participants have been edited out.

(c) Community collaboration

When modelling System 3 (which optimises interactions and fosters synergy between the Operational Units) of the VSM, the participants raise the issue of 'passive members', who are KBHFF members but do not actively work the required three hours per month, thus affecting the collaboration amongst members. In the excerpt below the participants discuss opportunities to deal with passive members. P4 suggests introducing a 'team structure' in all KBHFF shops, which requires members to join teams responsible for carrying out specific operational and management activities (turn 1) (according to Midgley & Ochoa Arias (1999; 2004) planning enhances coordination). 'Joining teams' is seen by the participants as a means to identify which members want to actively collaborate (turn 2), who KBHFF wants to involve as an active member (turn 3), and generally who is KBHFF member (turn 4), thus enhancing participation, engagement and empowerment at all organisational levels. Subsequently, 'teams' is added to System 3 on the meta-systemic diagram (on a flipchart as guard plans: teams and team-link in Fig. 4b) by the facilitator as a mechanism to enhance collaboration, optimise interactions and foster synergy within KBHFF (contribution to model content) (according to Beer, internal interactions that consider the law of requisite variety foster coordination). The idea to introduce and coordinate a team structure informed the suggestion of introducing a contact person and coordinator in the shops group as part of the new organisational structure of KBHFF (according to Beer interaction – which considers the law of requisite variety – within an organisation and between the organisation and its environment, in this case potential KBHFF members, enhances coordination, and balance between internal and external information flows fosters cohesion).

1	P4	[…] there is a matching of expectations to say, ok, as they have done in Østerbro *((a local shop of KBHFF))* and say now we change to the team structure and so people *((members))* should join a team […] […]
2	P1	Exactly […] yes, so the problem is solved. So we find out who really wants to be member and who doesn't *((referring to the VSM principle of participation, re-engagement and autonomy at all levels))*
3	P3	Yes, and it is namely just more generally seen about who we would like to have as members *((referring to the VSM principle of participation, re-engagement and autonomy at all levels))*
4	P1	Yes, or as a minimum we discover who *((members))* we have *((referring to the VSM principle of participation, re-engagement and autonomy at all levels))*

Notes: P – Participant. The use of an ellipsis in brackets (i.e. [...]) following a statement indicates that utterances by one or more participants have been edited out.

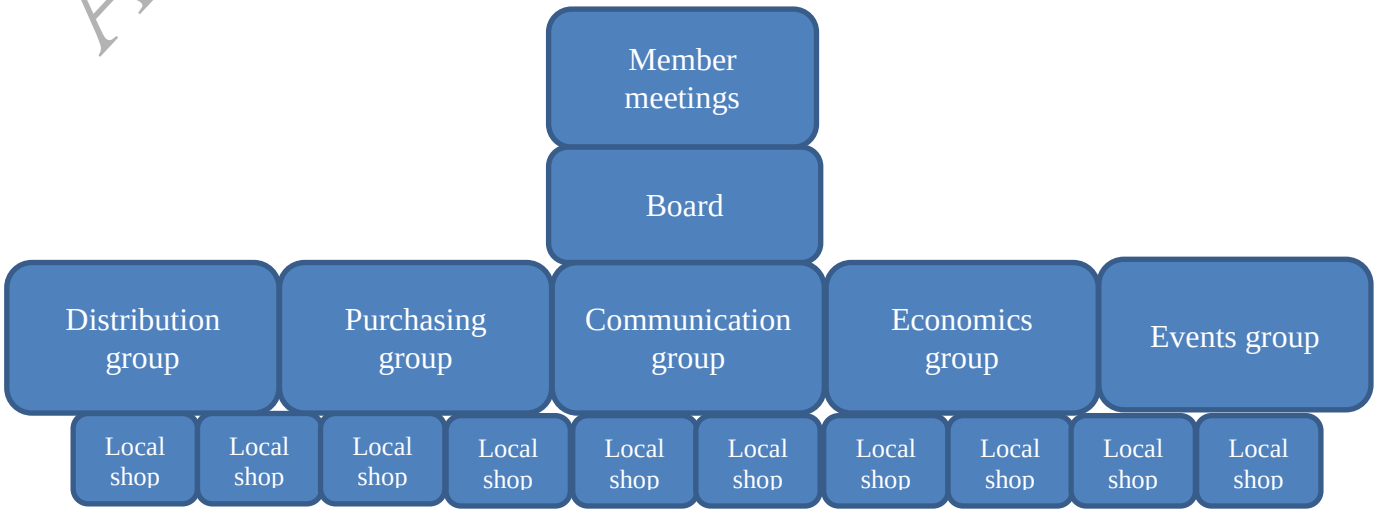
4.3 The post-workshop stage

Following the workshop the facilitator produced a short report highlighting the achieved workshop outcomes. The report was accessible to KBHFF members. The informal communications between the facilitator and workshop participants revealed the positive impact (that is, better understanding of VSM components and their benefits for sustainable organisational development; better understanding of the problem situation and opportunities for addressing it in VSM terms; excitement about agreement on the action plan and commitment to the next meetings) the VSM workshop had on KBHFF, since members had agreed to formulate an action plan. An email from the representative of the facilitation group illustrates excitement (translation from Danish): "*Thanks a lot for your help in introducing us to the VSM and for helping us on the way towards the new organisational structure☺*" and another KBHFF member who participated in the VSM workshop wrote "…*and cool about the application and the VSM group, there are some exciting things happening with KBHFF☺*'

About one month after the workshop another meeting was organised including those members who did not attend the VSM workshop and further conversations regarding the implementation of the action plan were initiated. A VSM group, comprising two workshop participants, three other members of KBHFF (not present in the workshop), and the facilitator, was established. This group was tasked with steering the action plan and help whenever issues came to the surface. The VSM group initiated a discussion on further opportunities for identifying, describing, and re-organising the functions of the operational and support groups of KBHFF in order to avoid overlapping within different groups. Hence, the members of KBHFF would gain a more in-depth understanding of the responsibilities of the different groups, and this would have an effect on prospective members, that is, they would be able to orient themselves better in joining a particular and suitable group (according to Beer interaction –

which considers the law of requisite variety – within an organisation and between the organisation and its environment, in this case potential KBHFF members, enhances coordination, and balance between internal and external information flows fosters cohesion). As a result of this discussion, the structure group was established in October 2013 as a temporary group tasked to analyse the organisational structure from the perspective of the VSM built during the workshop, and suggest opportunities for improvement (according to Midgley & Ochoa Arias (1999; 2004) planning and formulating visions for a desired future enhance coordination). The structure group identified the following organisational issues: the coordination group was solely responsible for the decisions of the shops and operational groups, but the coordination led to work overload and was highly inefficient. This was mainly because the coordination group had not evolved at the same pace as the rest of KBHFF. The operational groups were coordinated by the members of the coordination group that were not aware of which decisions the operational groups could make on their own. Slow decision making within operational groups occurred, due to slow communication between the operational groups and the coordination group. Thus, it became clear that centralised decision making was not appropriate because most decisions made by the coordination group concerned each groups' operational and day-to-day activities. To resolve these issues, the structure group proposed the following changes in the organisational structure of KBHFF (according to Midgley & Ochoa Arias (1999; 2004) planning and formulating visions for a desired future enhance coordination): unloading responsibilities of the coordination group onto other groups, establishing clear means for internal communication between groups (according to Beer, internal interaction that considers the law of requisite variety fosters coordination), and clearly distributing roles and decision making power between the operational groups (according to Midgley & Ochoa Arias (1999) participative decision making enhances cohesion). These suggestions were presented and discussed within the structure group, as well as with other members at joint meetings. At the meeting of the general assembly in April 2014 KBHFF members approved and agreed on a new organisational structure (see Fig. 5).

Figure 5: The new organisational structure of KBHFF (own illustration based on KBHFF original documents representing the organisational structure) (black and white in print)



Notes: KBHFF has designed an organisational structure that seeks to enable members to get an overview of the opportunities for volunteering three hours a month within the organisation by representing its structure in different levels (the illustration of levels aims at providing clarity and overview of the structure to members). These levels comprise different KBHFF "departments" in which members can decide to work. Members allocated to different local shops can opt to volunteer in the shop (e.g. selling fruit and vegetables), in one (or more) operational groups, and/or the Board. All groups (and their meetings) are accessible to all members, who regularly can meet in the 'member meetings'.

The first level has overriding responsibility and takes major decisions. It consists of member meetings – the overall instance of KBHFF, and the Board, which is elected at the yearly general assembly.

The second level includes the 5 operational groups of KBHFF, which are responsible for different operational tasks.

The third level comprises the local shops that distribute fruit and vegetables each week.

4.4 The new organisational structure of KBHFF

As a result of the VSM workshop and discussions on implementing the action plan, continuous improvements in the organisational structure of KBHFF were suggested that allow for enhancement of coordination and cohesion (see Fig. 2 for the organisational structure before the intervention and Fig. 5 for the organisational structure after the intervention). The organisational structure of KBHFF includes the following new components:

(i) a distribution group: added to the main operational groups – the purchasing, communication, economics and events groups – each being responsible for different operational activities. These groups are also in charge of coordinating activities between the different components of the organisational structure;

(ii) the autonomy of the operational groups and local shops: the operational groups are autonomous in deciding on and carrying out their operational activities. However, operational groups are required to comply with the basic principles of KBHFF (that are: sale of seasonal, organically and locally produced fruit and vegetables; support fair and direct trade; environmentally friendly distribution; disseminate knowledge about food and organic farming; an economically sustainable and independent organisation; a transparent and trustworthy organisation; an accessible organisation for members; and a locally collaborating community runs the organisation) and the economic framework, which they get assigned at the yearly general assembly. Coordination between groups is mandatory only if a group intends to implement initiatives that affect the operation range of the other groups (according to Beer balance between autonomy and management enhances cohesion);

(iii) the coordination meetings amongst the operational groups: every other month, after having held individual meetings, the five groups gather in a joint coordination meeting. The coordination meeting does not represent an independent or separate group as such, but an opportunity for members of different operational groups to discuss their work, get to know each other better and coordinate operational decisions that concern more than one group (according to Beer internal interaction that considers the law of requisite variety fosters coordination). Similar to the operational groups the local shops are also autonomous in deciding how to organise their activities and meetings (according to Beer a balanced autonomy enhances cohesion);

(iv) the contact persons and introduction coordinators in each shop: the contact persons facilitate communication between members who visit the shops, for instance, if those have new ideas or suggestions concerning the development of KBHFF, want to know more about its activities or face any issue related to the groups and the other components of KBHFF. The introduction coordinator introduces new members to KBHFF (according to Beer internal interaction that considers the law of requisite variety fosters coordination, and balance between internal and external information flows enhances cohesion);

(v) the Board: has overriding responsibility for economic and legal viability, strategic development and long-term planning (according to Midgley & Ochoa Arias (1999; 2004) financial management, planning and formulating a shared vision enhance coordination). It is elected at the yearly member meetings (the final instance of KBHFF in which everybody can participate) and holds open meetings every third month (according to Midgley & Ochoa Arias (1999) participation enhances cohesion);

(vi) all meetings across KBHFF are accessible to all members, thus giving everybody the opportunity to contribute to decision making (according to Midgley & Ochoa Arias (1999) participative decision making enhances cohesion).

Currently, KBHFF is implementing and continuously improving the new organisational structure within the operational groups and local shops. The implementation and improvements include for instance: facilitating the first coordination meetings amongst the operational groups; establishing the new distribution group; updating the website of KBHFF and other online platforms used by members for communication purposes with latest information about the structure; arranging workshops in the shops groups in order to help disseminate the structure and identify local contact persons; building a joint online calendar with meetings and events; and implementing introductory meetings for new members in which they learn how to navigate within the new structure. An email conversation between the first author and the representative of the facilitation group revealed several challenges related to the implementation of the new organisational structure: urgent tasks concerning finance, logistics and hygiene are to be addressed; KBHFF is based on volunteers who are employed elsewhere and hence cannot be fully dedicated to the implementation of the new structure; the implementation process seems to be low on the Board meetings' agenda, which prioritises the aforementioned urgent tasks; KBHFF has high member turnover, and subsequently members in charge of specific implementation tasks leave KBHFF. In autumn 2014 KBHFF identified the need for employing part-time staff members at the level of project-manager/coordinator to help coordinate the operational groups, and ensure continuity and implementation of operations and the new organisational structure.

The representative of the facilitation group wrote in an email (translation from Danish): *"It should be said that reality does not correspond with the plan yet. There are so many members and so much change of members in KBHFF, that it has been difficult to implement the idea of a contact person in the different shops and groups…this kind of implementation requires coordination and communication for which it is difficult to find time as volunteer. Currently, I see one of the big challenges in KBHFF how we can employ some people part-time to be responsible and how to coordinate the different central operational groups. And that can be part of ensuring continuity and the implementation of those working processes".*

Since January 2015 KBHFF has employed an accountant and a member coordinator who are in charge of improving the operations and internal organisation. The implementation of the new organisational structure is still in progress.

5. Discussion

5.1 Theoretical contribution

This paper contributes to the literature that applies the VSM to cooperatives and community organisations following a COR perspective (Walker, 1991; Espinosa and Walker, 2011; 2013). It illustrates how the VSM through the methodology for organisational self-transformation (Espinosa and Walker, 2011; 2013) and the principles of requisite variety, recursion and viability (Beer, 1979; 1981; Espinosa et al., 2008) is applied to AFNs to tackle issues related to 'community partnership', 'communication within the community', and 'community collaboration', enable democratic and participative decision making and changes in the organisational structure that can create conditions that favour the enhancement of coordination and cohesion (Table 3). The excerpts above and the post-workshop stage indicate that KBHFF members made suggestions and took action to foster organisational coordination and cohesion. Implementing introduction meetings for new members, introducing contact persons and coordinators in the shops groups (for actual and potential members), organising coordination meetings amongst the operational groups, emphasising the autonomy of the operational groups, planning shifts in a team structure, identifying and suggesting changes in the organisational structure (during the post-workshop stage), and emphasising the role of the Board (planning and management) were means to fostering coordination and cohesion. Coordination and cohesion were, thus, enhanced through internal and external interaction, balance of information flows, autonomy, planning, formulating shared visions, financial management, and participatory decision making (Beer, 1979; 1981; Midgley and Ochoa Arias, 1999; 2004). 'Democratic decision making' is enabled by the VSM and according to Espinosa et al. (2004) includes the following: allowing a balanced participation from internal and external stakeholder views; enabling members to have access to important information and knowledge required for effective decision making; enabling all members have an open mandate to talk and express their opinions in decision making; allowing each organisational level to decide on issues that could only be managed at that level; enabling members to design the agenda by collaboratively addressing their main issues; and providing the mandate to act and decide according to agreements. These aspects are enhanced through the establishment of the new organisational structure for KBHFF.

This paper shows how the VSM can support the COR values of 'localist green communitarianism' and the accepted notion of the social good through participation (Midgley and Ochoa Arias, 2004). In particular the paper highlights the benefits of using the VSM (Table 4) when dealing with AFN issues. It extends previous works (e.g. Espinosa and Walker, 2011; 2013) in that it links the 'what' and the 'how' (illustration) with the 'why', linking thereby theoretical definitions of the VSM to benefits and illustrations from the KBHFF vignette. The VSM (i) identifies critical issues that affect organisational viability and performance ('diagnosis'), for instance in the case of KBHFF, lacking communication amongst the operational groups, poor insight into economic conditions, and difficulties in introducing and activating new members within the organisational activities; (ii) provides structural, technological and self-regulatory change, in our case, the suggestion of and continuous improvements to the new organisational structure, which was formulated independently from external facilitation within the post-workshop stage; and (iii) assists in re-designing and constructing a more viable and sustainable organisational structure ('design') by introducing mechanisms to enhance organisational autonomy (in the case of KBHFF the local shops, e.g., can autonomously make local decisions), coordination (e.g. participation at all levels ensures continuous and balanced interaction, and the local shops are allowed to coordinate interactions with their environment) and cohesion (e.g. the management ensures that KBHFF moves in the right direction and the necessary resources for carrying out operations).

Our study adds to the literature on organisational self-transformation through the VSM methodology and its potential to foster learning environments in which stakeholders improve their knowledge and skills in suggesting and deciding about improvements to their organisation (Espinosa and Walker, 2013). Similar to the Irish eco-community studied by Espinosa and Walker (2013) KBHFF members were able, within the post-workshop stage (see timeline in Appendix 1), to self-organise processes for organisational development and adaptation to the external environment. This process led to the establishment of new groups (e.g. the VSM and structure groups) that designed a new organisational structure, and allowed KBHFF members to take control of their decision making and decide on continuous organisational improvements. In this vein, the KBHFF case provides an additional example to illustrate "the links between sustainability, community development and self-organisation", and that self-organisation and self-transformation encourage cohesion and autonomy, thereby enhancing organisational viability and sustainability (Espinosa and Walker, 2013, p. 128; Espinosa and Walker, 2011). This paper further clarifies the conceptualisation of outcomes in the organisational self-transformation methodology by proposing the types of 'model content' and 'action plan' (Franco and Montibeller, 2010). The 'model content' depicts the problem situation faced by KBHFF and supports participants in analysing and drawing conclusions from it, and the 'action plan' includes priorities for

action and first deadlines, thus helps implement the model (on the flipchart) in practice. Both types (i) contribute to the participants' joint understanding of the problem situation, sense-making, and commitment to action (Table 4), and (ii) are the visible and tangible outcomes of participatory, facilitated and model-supported workshops (Franco and Montibeller, 2010).

Table 3: Mapping AFN issues to VSM principles, workshop outcomes and KBHFF structural changes, and KBHFF outcomes

AFN issue type	VSM principles	Workshop outcomes and changes in KBHFF structure	KBHFF outcomes
'Communication within the community'; Community partnership'; 'Community collaboration'	Handling environmental variety by internally generating an equal degree of requisite variety; Structural coupling with the environment	• The Board focuses on strategic development and long-term planning by balancing internal and external communication and considering aspects of economic and legal viability (balance between internal and external information flows fosters cohesion; planning fosters coordination). • Actors identify collaboration opportunities with other AFNs in Scandinavia. They aim at identifying new products on the market through improving collaboration with the logistics group (balance between internal and external information flows fosters cohesion; interaction between the organisation and its environment fosters coordination).	
'Communication within the community'; 'Community collaboration'	Structural laws that determine recursiveness; viable systems contain, and are contained in autonomous, adaptable, self-regulatory and self-organising systems	• Operational groups and shops are given the freedom to autonomously coordinate their activities, make local decisions and act with their environment within a defined framework (i.e. the principles of KBHFF and the budget assigned) (autonomy fosters cohesion; interaction between the organisation and its environment fosters coordination).	**Democratic and participative decision making** **Cohesion and coordination**
'Communication within the community'; 'Community collaboration'	Autonomy and cohesion	• Operational groups and shops are given the freedom to autonomously coordinate their activities, make local decisions and act with their environment within a defined framework (i.e. the principles of KBHFF and the budget assigned) (autonomy fosters cohesion; interaction between the organisation and its environment fosters coordination). • Decision making power is attributed to specific members who carry out specific activities, such as within the operational groups and shops. All decisions are made at the lowest possible organisational level, where options and consequences can best be evaluated.	

		• Regular coordination meetings amongst the operational groups are introduced, and the coordination group is replaced (which was responsible for coordinating the operational groups and shops), assisting thereby in the decentralisation of KBHFF (internal interaction fosters coordination).	
'Communication within the community'; 'Community collaboration'	Role of higher management	• Board and member meetings take place at specific times (every third month and annually) to ensure that the strategic objectives and identity of KBHFF are met (planning and formulating shared visions foster coordination). The highest level of KBHFF – at which everybody can be involved – does not interfere through decree, but reacts to the needs of the operational groups and shops (e.g. by assigning budgets), and only intervenes and limits their autonomy if the operational groups and shops act outside the defined framework (autonomy and management enhance cohesion). In case of conflict between members and/or specific issues, extraordinary meetings are arranged.	**Democratic and participative decision making** **Cohesion and coordination**
'Communication within the community'; 'Community partnership'; 'Community collaboration'	Participation and re-engagement	• All KBHFF members can attend meetings at all organisational levels and contribute to decision making, thereby fostering a continuous and balanced interaction across KBHFF (internal interaction fosters coordination; participative decision making fosters cohesion). • Contact persons and introduction coordinators facilitate communication between members concerning the organisation and development of KBHFF and introduce new members (internal interaction enhances coordination; balance between internal and external information flows fosters cohesion).	

5.2 Implications for Community OR and Soft OR practice

Our study supports the view of Espinosa and Walker (2013) and Espinosa et al. (2015), which considers the VSM as a participatory and emancipatory methodology for self-transformation, and provides an additional illustration of the use of the VSM as a COR and soft OR approach that could support the strategic development of cooperatives and community organisations; it also extends their studies by offering a 'mapping' of particular AFN issues to VSM principles and outcomes (Table 3). This mapping provides the 'lessons learnt' from using the VSM methodology in practice, that is, dealing with particular AFN issues and achieving particular outcomes through collective and structured debates amongst stakeholders (Espinosa et al., 2015). Hence, Table 3 may be useful to COR and soft OR practitioners who aim at structuring and addressing similar issue types of cooperatives/communities, and AFN issues that are related to partnership, communication, and collaboration. We (i) provide a further understanding of how VSM analyses could be combined with rich picture (Checkland and Scholes, 1990) inspired cartoons (Espinosa and Walker, 2013) in order to better understand the problematic situation at hand, and (ii) add to the conceptualisation of the VSM as a soft OR approach, which structures participants' knowledge, fosters their learning, and produces tangible outcomes (Franco and Montibeller, 2010). Therefore, we contribute to (i) soft OR practice (see Ormerod, 2013; Espinosa and Walker, 2013; Henao and Franco, 2016) by providing a further understanding of the ways in which COR and the VSM can support cooperatives/communities in a systemic way; and (ii) COR practice by responding to the call by Midgley and Ochoa-Arias (1999; 2004) to directly work with local, green community and voluntary organisations aiming at enhancing their coordination (e.g. through planning, formulating visions for a desired future and financial management) and cohesion (e.g. through autonomy and management, participative decision making, and balance between internal and external information flows).

Table 4: The use of the Viable System Model to solve problems and enhance management processes within Alternative Food Networks

What (for details see Walker, 1991 and Espinosa and Walker, 2013)	Why/Benefits (Britton and McCallion, 1989; Espejo and Harnden, 1989; Jackson, 1989; Holmberg, 1989; Checkland and Scholes, 1990; Espinosa et al., 2008)	Illustration (KBHFF workshop)
Draw the elements of the VSM on a flipchart: the environment as an amoeboid shape, the Meta-system as a diamond and the Operation as an ellipse. Add arrows to indicate the interactions (e.g. communication and production flows) between the three elements	The VSM is applicable to organisations that consist of vertically (e.g. a food supply chain comprising farmers – food processors – food distributors) and horizontally (e.g. an association or group of farmers, food producers or distributors) interdependent parts, typically found within AFNs. In practice, the VSM can be used in two ways: for organisational (re)design in order to construct a more viable or new organisational structure; and for diagnosis in order to identify critical issues that affect organisational viability and performance (e.g. management and coordination of AFNs), and to facilitate the operation of goal-seeking and adaptive organisations	See Figures 1, 4a and 4b
Participants (in e.g. groups of 4-5) draw cartoons showing the problem situation affecting the performance of the organisation and write down critical issues on a flipchart	Cartoons are useful for identifying relationships and connections between the elements of the problem situation; expressing value judgements and feelings through symbols. Drawing cartoons enables actors to step back from the problem situation of concern and adopt a holistic view to better understand it and identify critical issues that affect management activities	See Figures 3a and 3b Critical issues – examples: lacking overview of financial situation; lacking overview of frameworks and responsibilities; missing communication among operational groups; weak communication to new members
Formulate an identity statement for the organisation of concern	Formulating a shared identity statement helps actors identify the identity and purpose of their organisation, so to increase their motivation to act for solving problems and enhance management processes	The existing identity statement of KBHFF was re-formulated in agreement with the workshop participants and made available online to all members of KBHFF for feedback
Define the Operational Units (System 1 in the VSM) that carry out the primary activities within the organisation and are responsible for achieving the identity statement	The Operational Units are autonomous (in carrying out operational activities and making internal decisions) and constitute viable systems on their own. The Operational Units are allowed to self-organise and internally make decision, e.g. concerning management activities and the use of resources, thus promoting the performance of the Operational Units (e.g. concerning the production and distribution of food within AFNs)	The KBHFF Operational Units: selling vegetables and fruit (in the shops); dissemination (e.g. of knowledge about organic food and farming); creating opportunities for being together (e.g. members socializing and having a good time during joint activities and meals); and purchasing (organic fruit and vegetables from local farmers). These Operational Units, identified during the workshop within KBHFF imply a re-organisation of the AFN (e.g. the implementation of the Operational Units 'creating opportunities for being together' and 'dissemination' are to be expanded and be prioritised together with 'selling vegetables and fruit' and 'purchasing')

Identify ways to tackle critical issues (System 2 in the VSM). System 2 ensures issue resolution and stability within System 1	Critical issues are dealt with as close as possible to the point where they occur, and the source of control is spread out through the system. There is direct feedback between the Operational Units and System 2, which facilitates coordination between the Operational Units. Coordination is essential, e.g. in order to resolve issues and efficiently manage AFNs	System 2 – examples: actors agree on establishing weekly feedback from the economy to the shops group in order to improve actors' overview of the financial situation; organising regular meetings among the operational groups to shed light on frameworks and roles, and improve communication; using internal resources to formulate and disseminate a communication strategy; organise mandatory introduction meetings for new members and identify their interests and motivations in order to enhance communication to new members
Identify ways of optimising the interactions between the Operational Units (System 3 in the VSM). System 3 ensures synergy within System 1 Identify ways of monitoring the external environment (System 4 in the VSM). System 4 looks for threats and opportunities in the external environment Identify the overall organisational context and identity (System 5 in the VSM). System 5 represents the ultimate authority	System 3 suggests and makes decisions concerning the management of the Operational Units, but issues directives only after consultation with the Operational Units The organisation does not only have the opportunity to adapt to the external environment, but also to proactively change it in ways that are more suitable for the organisation. System 4 supports the organisation in functioning and surviving in its environment Higher management is freed to concentrate on meta-systemic (Systems 2-5) functions and carry out 'boundary management'. It only intervenes as judge when imbalances within the organisation occur The VSM implies decentralisation of control, which promotes organisational efficiency, and considers human concerns, perceptions and goals essential for re-solving issues within and managing AFNs Within a viable organisation all decisions are made at the lowest possible organisational level. Decisions are made where options and consequences can best be evaluated. Actors are well-informed about organisational processes and structures at all levels, which promotes effective decision making, e.g. concerning management activities The VSM can be used to facilitate conversations about human interactions (that are essential within AFNs) and the management of complexity within organisations	System 3 - examples: actors agree on establishing teams to be in charge of setting up guard plans in the shops; expand the events group to include resource provision functions to local activities System 4 – examples: actors agree on carrying out workshops with other AFNs in Scandinavia in order to identify collaboration opportunities; improving collaboration with the logistics group in order to identify new products available on the market System 5: actors agree on maintaining the existing mechanisms –general assembly, coordination group and debate meetings – in order to manage the AFN according to mutually agreed principles

6. Conclusion, limitations, and suggestions for future research

This paper illustrated how COR through ST and the VSM can assist in alleviating ill-structured problem situations, specifically issues related to partnership, communication, and collaboration, and in facilitating coordination and cohesion of AFNs, thereby supporting their long-term sustainability. Driven by our findings that are based on an empirical case vignette from a VSM intervention in Copenhagen, Denmark, we proposed the use of the VSM as a powerful and robust tool to model and diagnose the aforementioned issues and, through participative and democratic decision making and changes in the organisational structure, facilitate the enhancement of coordination and cohesion.

This research has the following limitations. Firstly, the data illustrated is taken from a single VSM intervention, which limits the generalisability of the intervention outcomes. However, we identified that the VSM principles meet the actors' requirements for problem solving, and enhancing coordination and cohesion within AFNs, thus justifying our argument that the VSM is a suitable tool for AFN practice. We recognise that the illustration of more VSM interventions in different AFNs would have strengthened our conclusions. Secondly, since the implementation of the new organisational structure is currently taking place, our results do not allow further analysis of the changes in structure/decision making to the organisational viability.

Notwithstanding these limitations, there is considerable potential for further research. Firstly, we call for further applications of ST approaches including the VSM within AFNs. Scholars could investigate the potential of ST in presence of, for instance, different network configurations, varying power to operational and strategic decision making, and different relationship patterns (i.e. vertical and/or horizontal) between actors. Secondly, it may be fruitful to examine how ST can be used to facilitate the design of AFNs (e.g. the choice of actors and location of facilities), for instance, the use of the VSM to design AFNs based on long-term sustainability principles. Finally, it would be of interest for researchers to study cases of coordination and cohesion as different outcome types (intended versus unintended), and how the process develops from their initial to a final state. We intend to provide food for thought to scholars and practitioners in order to understand the advantages of using COR through ST and in particular the VSM for organisational self-transformation within AFNs.

Appendix 1: The timeline of the pre-workshop, workshop and post-workshop stages and major events (adapted from Tavella and Papadopoulos, 2015)

Date	Activity per stage	Outcomes
June 2012	**Pre-workshop stage:** Conversations about a possible VSM workshop within KBHFF, e-mail communications between the facilitator and the representative of the communication group	Agreement on first meeting
25 June 2012	First meeting: the facilitator and the representative of the communication group explore the idea of carrying out a VSM workshop	Identification of strong interest in and need for a VSM workshop; decision to further explore the idea with the representative of the facilitation group
July-August 2012	The representative of the communication group presents the idea of a VSM workshop to the representative of the facilitation group	Agreement on a meeting between the facilitator and the representative of the facilitation group
30 August 2012	Second meeting: the facilitator and the representative of the facilitation group explore the idea of carrying out a VSM workshop	Agreement on informing the coordination group about a possible VSM workshop
September-October 2012	The representative of the facilitation group discusses the idea of a VSM workshop with the coordination group; e-mail communications between the facilitator and the representative of the facilitation group	Intervention agreement and date for the workshop set First version of the workshop agenda including sequenced activities
27 November 2012	First meeting with the facilitation group to organise the VSM workshop	Adapted version of the workshop agenda
9 January 2013	Second meeting with the facilitation group to organise the VSM workshop	Adapted version of the workshop agenda
4 February 2013	Third meeting with the facilitation group to organise the VSM workshop	Final version of the workshop agenda
23 February 2013	**VSM workshop stage**	Workshop outcomes: re-formulation of identity statement; two cartoons representing the problem situation; identification of critical issues and conflicts of interest; VSM and meta-systemic diagram; and agreement on an action plan with priority activities, responsibilities, and first deadlines
24-28 February 2013	**Post-workshop stage:** informal talks and e-mail communications with workshop participants and facilitation group; writing a report	Workshop report Identification of participants' positive perception of workshop
08 April 2013	First meeting with members who did not attend the VSM workshop and conversations regarding the implementation of the action plan	KBHFF members informed about VSM workshop and outcomes
April-May 2013	E-mail communication with workshop participants and other KBHFF members for discussing the establishment of	VSM group

	the VSM group to be tasked with implementing the action plan	
02 June 2013	First meeting with the VSM group	First idea (written down on a flipchart) of how to re-organise operational and support groups
27 June 2013	Second meeting with the VSM group	Refined idea (written down on a flipchart) of how to re-organise operational and support groups; agreement on discussing potential changes in operational and support groups (e.g. merging and eliminating groups, as well as establishing new groups) with coordination group
26 October 2013	Extraordinary general assembly to discuss the problem situation within KBHFF and identify potential solutions for ensuring the viability of KBHFF	Solutions for improvement suggested and discussed
October 2013	Establishment of structure group	Organisational problems identified and suggestions for new organisational structure formulated
October 2013-April 2014	Discussion amongst different groups concerning the new organisational structure	Final suggestion for new organisational structure
26 April 2014	General assembly	Agreement on implementing new organisational structure
January 2015	Employment of accountant and member coordinator	

Appendix 2: List of critical issues within KBHFF (as identified and formulated during the VSM workshop by drawing and discussing cartoons)

- Lacking connection to the purchasing group: lacking feedback and its recording from the purchasing group
- Dissemination and dissemination material could be organised more and better (internal vs. external dissemination)
- Who has which information?
- Lacking communication between coordination-, shops-, and purchasing groups
- Lacking overview of frameworks and responsibilities
- Lacking dissemination concerning the autonomy within the organisation
- Decoupling between producers (of fruit and vegetables) and members
- Lack of transparency
- Barriers hampering new members moving through the different levels of KBHFF; weak communication to new members
- Lacking economic/financial overview

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