Title: Leverage points in farmer, advisor and researcher interactions

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Short abstract

The aim of this study is to investigate how agricultural firms can use innovation support services to develop new knowledge and innovation, for their sustainable business development and growth. The methods comprise a qualitative case study with a comparative process ethnography approach, employing two cases of long-term collaborations between multiple actors in Sweden. The findings suggest that the processes of social learning, the forming of collective agency, enhancing of resource access and the operationalizing of results, were leverage points creating the ability to maintain and develop the collaboration over time. The practical implications include how agricultural firms can gain innovative strength and find leverage by forming collective agency with key individuals in order to access complementary competences and resources of others. The theoretical implications include the value of collective agency for multi-actor collaborations, and that a composition of smaller leverage points were found to enable larger change.

Extended abstract

1. Purpose

The aim of this study is to investigate how agricultural firms can use the innovation support system to develop new knowledge and innovation and create sustainable business development and growth. The results relate to the development of approaches and tools used for collaborative, participative and transdisciplinary learning, found in topic 3 of the ESEE 2023 conference.

Investigations into the functions of innovation support services (ISS) have revealed a number of functions being carried out by advisory organisations and other actors, these include problem identification, network brokering, and the provision of resources (Faure et al. 2019; Proietti and Cristiano 2022). The role of ISS is to support farmers and other stakeholders with by providing adequate responses to their need for new knowledge and innovation (Kilelu et al. 2014). Such functions within the AKIS can become leverage points for development and change (Leeuwis and van den Ban 2004). Leverage points are places within a complex system in which a small shift in one function can produce changes across the whole system (Meadows 1999). As a conceptual framework, the leverage point perspective can be applied as guidance to identify where local actors, engaged in social learning, can jointly and successfully intervene in a system (Lam et al. 2020). In agricultural knowledge and innovation systems (AKIS), there is always the potential to re-design interactions by changing the structure of information flows between stakeholders and increasing their power to change or self-organise (EU SCAR 2012). In this way, new forms of stakeholder interactions, implemented as small steps, can form the basis of significant change. According to Senge (2006), the bottom line of systems thinking is finding leverage, the key element from which small actions can be taken and can lead to substantial improvements.

An important driver of innovation identified in previous literature is knowing what you want to achieve, or the art of demand articulation (e.g., Klerkx and Leeuwis 2008; Kilelu et al. 2014). This step requires an analysis of what is already known and a will to push forward in a specific matter. Pelenc et al. (2015:227), denote this as *agency*, defining it as “the ability of a person to pursue goals and act

in order to reach them". Similarly, Giddens (1984:14) defines agency as an individual's ability to "make a difference" with regard to the current state of affairs. Individual agency can go beyond narrow self-interest to encompass altruistic motives in a wider sense and can contribute to the creation of collective agency (Pelec et al. 2015). Collective agency emerges through a social learning process, where individual agency is shared with others; it cannot be imposed on anyone unwillingly (Pahl-Wostl 2006). Such a set of more or less shared ideas facilitates communication in the group and can lead to the adoption of joint goals for action. In this way, collective agency is a social structure, which guides the members' communication and decision-making. Such social structures can contain social rules and mobilise resources (Giddens 1984). The concept of collective agency has been used to denote, for example, social innovation promoting alternative food systems (Fernandez-Wulff 2019), and in multi-actor approaches to environmental conflict (Pahl-Wostl 2006; Pelenc et al. 2015). Faure et al. (2019) found the expression of agency, as demand articulation, to be present in all stages of the innovation process. Demand articulation has also been found to be a dynamic process, unfolding with the learning processes of the involved actors (Kilelu et al. 2014).

2. Design/Methodology/Approach

A qualitative case study approach was used as it allows for the capture of the evolving and dynamic nature of social events over time. Following Leeuwis and van den Ban (2004:373), a comparative process ethnography approach was used, in this case meaning "the close following (or ex-post reconstruction) of events and interactions in and around a particular innovation trajectory, as well as the gathering of the participants' reflections and rationalisations in connection with these". Retrospective studies enable a recognition of overall patterns in innovation processes, and aid the understanding of cause and effect (Leonard-Barton 1990).

Through searches in the databases of four applied research funders, two cases of long-term collaboration, exceeding 10 years and involving multiple stakeholders, were identified. The first case started in the early 2000's with the aim of dealing with the problem of weed control in organic farming. A working group was formed, consisting of two researchers, four farmers, an advisor, an advisory support expert, and a group facilitator. The set-up was to have a participatory approach with field trials carried out by the farmers at their farms. Between 2006-2014, the collaboration developed into a series of project proposals, resulting in ten projects being performed, three being related to the main project idea of weed control, and seven being spin-off ideas which sprung from the main project. An additional six projects addressed follow-up questions.

The second case included a producer organisation with warehouse facilities for the storing of fresh produce. In order to deliver better quality all year round to customers and consumers, they needed to understand how post-harvest treatment and storage of the fresh produce should be carried out. A dialogue was started between the producer organisation and university researchers, resulting in a research project. From 1999 to 2018, the collaboration developed into a series of emerging ideas and project proposals.

The data collection included written sources and semi-structured interviews with the involved individuals, the latter are presented in table 1.

Case	Type of organisation	Representative
Case 1. Weed control in organic farming	Farms	Farmer 1
		Employee of Farmer 1
		Farmer 2

	Advisory services	Advisor 1
		Advisor 2, facilitator expert
	National agricultural authority	Advisory support expert
	University	Researcher 1
		Researcher 2
Case 2. Storing of fresh produce	Producers' cooperative	Former CEO
		Former advisor, current CEO
	University	Researcher 3
		Researcher 4
Related to both cases	Farmers' organisation	CEO
		Expert

Table 1. The respondents (n=14) and their roles in the respective cases.

The documents and interviews complemented each other and offered a means of comparing and triangulating data. Using a grounded theory approach, we searched for patterns in the material (Charmaz 2006). With the aim of unpacking the development of the case studies over time, the project funding of the two cases was mapped along timeline illustrations.

3. Findings

A wide variety of actions and processes were present in the two multi-actor cases. Some of these appeared to be particularly important for creating and developing the collaboration process, and reach the desired outcomes. As will be further detailed below, we found the most prominent of these to be the forming of collective agency, social learning, enhancing resource access and the operationalization of results.

The forming of collective agency

The start of the two cases reflects a similar pattern: someone recognising a problem and deciding to act on it, i.e., having the agency to deal with a perceived problem or opportunity (Giddens 1984). Thinking that their problems could best be dealt with in cooperation with others, they made contact with researchers they knew themselves or through others. By inviting others to join forces in dealing with the problem, their individual agency was transformed into a collective agency; a social structure guiding the communication and decision-making of the involved individuals (Pelenc et al. 2015). This happened through a social learning process and led to the forming of concrete ideas around project set-up and funding proposals. While the concept of collective agency in Fernandez-Wulff (2019) and Pelenc et al. (2015) refers to larger groups of people in public contexts, in this paper, the notion of collective agency is used in the context of a small group of individuals sharing specific agency within agricultural innovation.

While in both the cases, researchers were invited to share the original agency, over time the sharing of the agency went both ways. For example, in case 1, there was a need for a joint understanding of the field trials and to settle a trial plan agreed upon by all parties. The researchers expressed how they would argue for their needs in the field trials, building interest and understanding from the farmers. Hence, the farmers would share that part of the researcher's agency in a collective agency based around the trial plans performed at their farms.

Social learning

The collaboration in the two cases developed into a series of emerging ideas related to the original question, for example, seedbed preparation and fertilizer placement. Reflecting on how the new ideas were born, the respondents would refer to their dialogue with others, in which new ways of seeing things were elaborated. It often started with someone voicing an idea, allowing others to comment and contribute with their views, adding new perspectives and knowledge to the original idea, with new angles on the issue becoming visible (cf. Isaacs 1999). This relates to the findings of Millar and Curtis (1997) and Šūmane et al. (2018), who found that most learning occurs when expert and local knowledge meet. In this way, dialogues and joint learning created new ideas and motivation for further work.

In the interview excerpts concerning emerging ideas, references were made to relationships with others, suggesting this was an important element in the creation of new ideas. A researcher commented appreciatively on the sense of the "joy of discovery" when working with farmers and advisors, and a representative of a producer organisation pointed to "the long-term, close relationships and easy contact paths", reflecting a sincere appreciation of the relationships they had. This indicates that the quality of their relationships with other actors was a key element in the generation of new ideas, allowing for 'thinking together' (Isaacs 1999, p 6).

Enhancing resource access and operationalizing of results

Both cases were successful in finding further funding to continue the project and to deal with any emerging ideas in several spin-off projects. Project funding enabled field trials and lab experiments to be performed, which provided input for experiential learning in the groups. The feedback from the monitoring and evaluation of the trials contributed to a higher quality of social learning in the groups (Guijt and Proost 2002) and enabled new thoughts and ideas to emerge in dialogue. The ability to test emerging ideas deepened the learning dialogue between the parties around the issues.

One of the farmers reflected on the value of being involved in the field trials; the monetary compensation for the work was positive, but the real value lay in the use which the results could be put to. A representative for a producer organisation reflected on how the research findings were operationalized into a practical booklet for the organisation and its growers. In this way, the new learnings were operationalized into practical change.

4. Practical Implications

The cases illustrate how individual agency was shared with others through social learning, creating collective agency, a social structure that formed the basis for the further collaboration. From this, project set-up and applications could be formed, creating resources for experiential learning and monitoring and, in turn, enabling further learning, the creation of new ideas, and the operationalizing of results. This is to say that agricultural firms can gain innovative strength and find leverage through innovation support services by forming collective agency with key individuals in order to access the competence and resources of others. It also indicates how the development and maintenance of networks is a worthwhile pursuit for agricultural firms, even when time and resources may be scarce. For policymakers, the results suggest that funding is needed for services supporting the identified leverage points, e.g., providing network facilitation, guidance for social learning processes, and to enhance resources access and operationalization through project funding. This is related to several of the identified functions of ISS (Faure et al. 2019; Proietti and Cristiano 2022).

5. Theoretical Implications

The results of this study indicate that social learning, the forming of collective agency, the enhancement of resource access and the operationalizing of results enabled further learning and the creation of new ideas. These processes created the ability to maintain and develop the collaboration over time. The results suggest that a composition of leverage points (Meadows 1999) can provide deep potential impacts. It was the smaller but qualitatively important differences in how things were done that were found to alter behaviour and trajectories, in turn enabling larger change (Senge 2006).

This paper uses the notion of collective agency in a small group of individuals related to a specific agricultural innovation. While researchers were invited to share the original agency, over time, the sharing of agency became a reciprocal development. The results from the monitoring of trials also influenced and altered the collective agency, as the new findings were integrated and brought new goals and actions. This illustrates how the collective agency evolved together with the joint learning in the groups. This links with findings of how continuous learning contributes to a dynamic process of demand articulation (Kilelu et al. 2014), present in all stages of the innovation process (Faure et al. 2019).

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