

AgroEcological Transitions

Changes and Breakthroughs in the Making

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Reflexivity, reflection and learning in the context of system innovation: Prying loose entangled concepts

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Abstract

System innovations towards sustainability invariably involve learning. In experiments, participants learn about how innovations can change their institutional and biophysical environments. To enrich such approaches in-depth insight in the relation between reflexivity, learning and reflection is needed. However, reflexivity is seldom clarified conceptually and as a consequence its relations with learning and reflection have hardly been studied so far. In this chapter, we first conceptually disentangle the concepts of reflexivity, reflection and learning and then present an exploratory case study on their relations. The case study shows that as expected in literature, learning indeed may increase reflexivity. However, the relation we found was rather loose—in many cases changes in reflexivity preceded learning, instead of resulting from learning. Furthermore, much learning was unrelated to reflexivity. These findings show the importance of conceptually distinguishing learning, reflection and reflexivity and of studying their relations and interactions in future empirical research. We shortly discuss the implications for the facilitation of learning and system innovation.

Keywords: Reflexivity, learning, reflection, system-innovation

1 Introduction

System innovations towards sustainability invariably involve learning. In local experiments, participants learn about how they can change their institutional and physical environments. Local learning experiences with social and technical novelties and innovations, are translated into more generic rules and hence foster sustainability transitions in the making (Smith & Raven 2012). Such learning takes place in a situation of actors collaborating within and across social networks, in an ever-changing environment. The associated learning processes are fraught with uncertainties, value differences and different time horizons.

In recent years, researchers have started to develop learning concepts that are relevant to complex problems or, more specifically, system innovation, in terms of the importance of its systemic context and its inherently reflexive nature. The concept of system learning for instance has recently been developed further as a process by which actors learn to redefine external barriers in the dominant system into opportunities and are thus inspired to design activities that would contribute to system change (Van Mierlo et al. 2013). Reflexivity is seen as a major asset of such learning processes. These new orientations have given rise to methodologies that support learning for system innovations, such as Reflexive Monitoring in Action (RMA). Learning is thought to require reflection on the assumptions underlying proposed actions, on perceived boundaries between project and context (or in transition terms: between niche and regime / system), and on the actions of external actors which may be perceived and handled as barriers or windows of opportunity. A conducive learning process, in turn, may stimulate the reflexivity of a system innovation project which is regarded as an emergent systemic property. This perspective on reflexivity acknowledges specifically the institutional character that is typical for change processes towards sustainability. Reflection, learning and reflexivity hence are assumed to be separate but positively related concepts.

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For approaches aiming at system innovation, in-depth insight in the relation of reflexivity with learning and reflection is needed. All three concepts themselves are loaded with positive connotations and the concept of reflexivity is seldom clarified (Popa et al., in press). As a consequence, its relation with the other concepts has hardly been studied so far. This led us to pose the following research question: Is it possible at all to recognize reflexivity in a system innovation initiative separately from learning, and if so how? A second question is: To what extent can changes with regard to reflexivity be attributed to learning outcomes?

In this chapter, we aim to explore the presumed relations between the concepts of reflexivity and learning more critically in the case of a system innovation initiative in the Dutch greenhouse sector. We first broadly describe the ideas about reflexivity, with specific attention to the context of sustainability transitions and infer that it is conflated with the notion of reflection. Next, we develop a conceptual framework to study the relation between reflexivity and learning in a system innovation initiative more systematically. We illustrate the value of this model with a case study in the greenhouse sector in the Netherlands, by presenting the findings in terms of changes in reflexivity and the associated outcomes of learning. In the end, we conclude that at times learning indeed contributed to reflexivity. However, reflexivity seems to be the outcome of multiple processes rather than learning among initiators of a system innovation project alone. As expected, it indeed may be regarded as a positive emergent systemic property of a system innovation initiative.

1.1 Reflexivity

In the most general sense, reflexivity entails “some sort of recursive turning back” (Lynch 2000:34). A very broad distinction can be drawn between reflexivity as a human condition and reflexivity as a human capacity, something one may or may not be (i.e., *being reflexive*). In the former meaning of the word, it concerns how every person, or humanity as a whole, acts in a (socio-physical) context that changes over the course of human action, and subsequently comes to change persons, or humanity. In this sense, people always are reflexive, whether desired not, comparable to Heidegger’s notion that people are always “thrown into the world”—they cannot be without being there. In the latter meaning, reflexivity can be seen as a virtue—the more one is aware of one’s ties to the environment and how it changes, the better one’s goals, interests and actions can be attuned to (changes in) this environment. In this sense, being reflexive can be seen as an intentional act of reflection.

Beck and colleagues related the concept of reflexivity, as a condition, to persistent societal problems (Beck et al. 2003). In their perspective, reflexivity mainly concerns how modern society has come to (unintentionally) impact itself negatively through modernisation processes. While simple modern society “started out from” simple distinctions between society and nature, between insiders and outsiders, and between knowledge and other beliefs, in the process of modernisation people became more and more interconnected, blurring lines between nature and society, ever changing who’s in and who’s out, and rendering one set of beliefs just as true as any other set. This then is *reflexivity*¹: the process of modernisation has undercut its own basic tenets, that is, the simple distinctions between for instance society and nature, insiders and outsiders, and knowledge and beliefs. For example, the accelerated burning of fossil fuels has led to possibly irreversible climate change, which in turn forces to rethink many aspects of society, primarily the way energy is produced, food is grown, dwellings are built—all these developments were never intended when people started to produce energy with fossil fuels and as such they are all examples of how the environment is turning back on society. Beck et al. (2003; cf. Smith & Raven 2012) write that such reflexive change involves co-occurring changes in economy (markets, dominant user/consumer practices), politics (rules and regulations, policy networks, power), technology (infrastructure, technical standards), culture (value orientations, symbols), and science (knowledge in perspective, questioning the value of science). In other words, reflexivity then is the nature of any modern society. This is what Voss et al. (2006) call first-order reflexivity.

¹ For reasons of clarity, the main concepts used in this chapter are printed in italics.

Being reflexive refers to having an awareness of the reflexivity of one's situation in reflexive society. This entails knowledge of how society is changing, how those changes may impact oneself, and how one contributes to changing society, as well as attuning one's goals and interests to those changes. In that sense, it goes beyond "merely" reflecting on society, because it also involves drawing consequences from those reflections for oneself. A "reflection-on-reflection", so to speak (Beck et al. 2003:16). Being reflexive thus allows people to act more in accordance with their societal environment and in this way to increase their chances of "success" (in quotes, because what counts as success will remain open for debate among the reflexive), and for society to become more sustainable. In this sense, reflexivity is a human (group and/or individual) capacity, that may be present to a varying extent, and which can be supported, for instance, to foster sustainable development. This is what Voss et al. (2006) call second-order reflexivity. It is inherent in approaches such as reflexive governance (Voss et al. 2006).

Reflexivity is an ambiguous concept with various meanings (Lynch 2000). With each meaning of the term, what is turning back, and on what, varies. For instance, the object of reflexivity for Beck is modern society. Or, consider the example of *reflexive governance*:

"... refers to the problem of shaping societal developments in the light of the reflexivity of steering strategies – the phenomenon that thinking and acting with respect to an object of steering also affects the subject and its ability to steer. One calls into question the foundations of governance itself, the concepts, practices etc. by which societal development is governed and that one envisions alternatives and reinvents and shapes those foundations. E.g. modern ways of problem solving (rational, specialised) may change when trying to deal with problems that are the outcome of these problem solving practices. Externalities should no longer be seen as externalities. ..." (Voss et al. 2006:4).

Reflexive research, another example, is advocated as an adaptive change process from interdisciplinary research to transdisciplinary research, involving a structural change of the division of labour between scientists, experts and others (Popa et al., in press). In *reflexive monitoring*, a third example, dominant ways to conduct evaluation studies (goal oriented or purely learning oriented) are being transformed in an experimental and learning approach while supporting innovation initiatives to contribute to the change of a specific socio-technological system (Van Mierlo et al. 2010a). Although such meanings seem dissimilar, the different meanings tend to include the other. For instance, the first of five key elements of *reflexive governance* is defined as transdisciplinary knowledge production (Voss et al. 2006) which covers reflexive research.

In most perspectives, reflexivity is about fundamental change. However, reflexivity is often described as an activity, a specific kind of reflection, that is, critical reflection or the scrutiny of the assumptions and values underlying current governance approaches, ways of conducting research and evaluations, including the presumed categories of for instance facts versus values (Hendriks & Grin 2007; Keen et al. 2005; also see several contributions in Wals 2007). For instance, in one of the rare empirical studies in which the term is operationalised, reflexivity is described as critical reflection on the assumptions, normative orientations and values underlying mono- and interdisciplinary research practices which requires a social setting of deliberation so as to enable change towards transdisciplinary research (Popa et al., in press).

Many authors use the terms reflection and reflexivity interchangeably. Beck et al. (1994) in contrast, warn not to conflate reflexivity with reflection. They fear the inherent optimism of a conceptualisation of reflection as a conscious activity: the system is expected to open up with more experts, more self-criticism, and more knowledge, while in their view such assumptions themselves are major causes of modern societies' problems.

In our opinion, it is better to regard reflexivity only as a social condition – see our further explanation in the next section – and not conflate it with reflection-on-reflection, or as is often suggested, reflecting at the deeper level of issues, the underlying assumptions and values. It is also very important to distinguish between reflection-on-reflection and reflection in general. Many authors appear to suggest that facilitation of reflection (in general) will stimulate learning and innovation. As a consequence, reflection, while necessary, is interpreted too optimistically. And while facilitating reflection-on-reflection *might* contribute to reflexivity, it

is more realistic to expect this to happen rather unexpectedly and to be dependent on many more conditions.

1.2 Conceptual framework

Many scholars in natural resource management and sustainability transitions relate reflexivity explicitly to a systems perspective, acknowledging the complexity of change processes, the blurring of boundaries between in and out, overlapping network configurations et cetera. In this chapter, we are concerned with the reflexivity of initiatives that aim to contribute to system innovation; the change of existing socio-technological regimes towards a more sustainable direction, including a change of user preferences, market structure, physical infrastructure, symbolic values, et cetera (Geels & Kemp 2007; Smith & Raven 2012).

We define *reflexivity* of a system innovation initiative as an emergent systemic property, that is, its ability to interact with and affect the institutional context in which it operates. It is the result of multiple actions and interactions. In this way and in contrast to most literature on reflexivity, we see it as a possible outcome *of* rather than a condition *for* (or asset to) learning. In the practice of system innovation initiatives, reflexivity can be recognised as the emergence of new (semi-coordinated) practices of participants in the initiative as well as their wider networks, and as new associated rules enabling and constraining these practices. This is in line with, for instance, ideas about reflexive governance involving a change of assumptions, practices, and institutional arrangements (Hendriks & Grin, 2007).

With regard to learning in the context of system innovation, especially social learning scholars mention the importance of reflexivity in learning in complex contexts related to diversity in values, interests and knowledge. They place reflexivity at the core of an interactive learning process engaging multiple actors in issues of sustainability and Natural Resource Management, as a condition for or main asset to *social learning*: “social learning requires reflection and reflexivity throughout the entire process, if only to monitor change and progress throughout” (Wals 2007:500). As said before, the perceived relation between learning and reflexivity, however, tends to remain unclear in the many articles and chapters that elaborate on only one of the two concepts (e.g. Bastrup-Birk & Wildemeersch 2011; Dewulf et al. 2005; Pahl-Wostl 2006).

For Keen et al. (2005) reflexivity (or reflection, Keen et al. use the terms interchangeably) makes up one of the five strands of a social learning process, in addition to system orientation, participation, negotiation and integration. Reflective learning, which involves reflecting on the origins and value of people’s knowledge is supposed to lead to new understandings, which is essential in an iterative social learning process turning into a double or triple loop learning process (Argyris & Schön 1978). In line with these scholars, we regard reflection as the mental or communicative activity of considering knowledge, ideas, the outcomes of actions, goals and more. As such, reflection is a conscious individual or social / collaborative activity, that can, to some extent, be organised, facilitated and planned. We propose however to distinguish it more clearly from reflexivity as described above and learning to which we now turn.

In order to be able to separate learning as an outcome of interaction from reflexivity as the condition of a system innovation initiative, we take a discursive perspective on learning (see Beers et al. 2014; cf. Edwards & Potter 2001). We see *learning* as a communicative interaction process of giving meaning to problems, new technology, social innovations, societal developments, et cetera (cf. Dewulf & Bouwen 2012; Leeuwis & Aarts 2011; Sol et al. 2013). This means that learning may occur during regular project meetings as well as special learning occasions like workshops.

A learning process in communicative interaction that contributes to system innovation is assumed to include knowledge, actions as well as relations (Beers et al. 2014). Knowledge concerns among others individual or shared information and ideas, but also new problem definitions, ideas for how to solve problems, shared / common values, et cetera. In the learning process, knowledge refers to the content that participants exchange and produce: new insights, ideas, changed views, and new visions, while they are pursuing their goals (Wals 2007).

A second aspect of learning concerns action. With action, we indicate the agreements, decisions, and other forms of action that are voiced during communicative interaction about the proposals for real-world actions as they are contributed during meetings or otherwise, including when they are rejected, and the decisions that may ensue.

A third aspect concerns relations, including roles and identities. Authors like Pahl-Wostl (2006), Leeuwis and Aarts (2011) and Van Mierlo et al. (2010a) have noted that interactive learning does not only produce knowledge, but also new relations between actors. This may happen, for example, when external actors are discussed and put in a certain light that changes their relational status. Similarly, when a previously unknown resource or capability of a participant comes to the fore, this may change his / her status within a network.

Not only the learning process, but also its outcomes take place in a discursive setting. A learning outcome occurs when knowledge (the what), actions (the how) and relations (the who) become substantively intertwined (cf. Argyris & Schön 1978). The interweavings themselves are the learning outcomes. It is important to note that this definition yields a rather straightforward distinction between learning outcomes and the real-world actions that possibly follow.

2 Research design

For a preliminary empirical analysis of the relations between reflexivity and learning taking place in discursive interaction, we conducted a case study of an innovation initiative in the Dutch greenhouse sector that aimed to change a complete sector. Our view of learning has several methodological consequences. First of all, although facilitated interaction can be part of a larger learning process, we see it essentially as a process that takes place over longer time periods within various configurations within and across the network of an innovation initiative. Therefore, we studied the communication at different types of meetings over a longer period of time in chronological order. Second, our predominant view of learning as a process taking place in communication (leading to learning outcomes) suggests that the moments of interaction as organised by initiatives themselves are the main source of data. This could be in the form of extensive notes, audio recordings or full transcripts of meetings. The data for this chapter are nine meetings of the general board and of the related chain knowledge platform in the period from January to July 2013, all but one attended by the first author. The other meeting was attended by another project member. We collected extensive notes on six meetings as well as complete transcripts for another three.

These data were used to analyse the moments at which knowledge, relations and actions became interwoven, that is, learning outcomes. First, transcripts and notes were segmented into interaction episodes related to one topic. An episode was coded as having resulted in learning if 1) it contained conceptual content, relational content and actions, 2) clear conceptual relations existed between these content types, and 3) at least one action discussed concerned a *decision*, meaning that an intention existed to carry out that action.

We first identified the episodes in which a decision was taken, those being the segments with the highest probability of having a learning outcome. Next, we coded the learning content of each of these episodes, distinguishing the three main content categories—conceptual content, relational content, and actions. The details of the coding procedure are described in section 2.1 below. This procedure led to the identification of 14 episodes with a learning outcome.

2.1 Coding the three dimensions of learning outcomes and reflexivity

Action content was coded for any statement that included an actual decision or an opportunity for action. In that sense, action content does not necessarily entail a concrete decision. Many options for action can be mentioned (“We’ll organise an event, preferably with live cases.”) without an actual decision being taken (“Okay, so we’ll organise that meeting.”) In our coding, we distinguished between action content as *options for action* and action content as *decisions*. A decision includes an explicit or entailed commitment to a future (material) action by one or more participants in the meeting. Furthermore, a proposal for action is sometimes put on the agenda, while during the meeting it becomes clear that the proposal has insufficient backing. Such content was coded action, even though the proposal, as is, was not accepted.

Conceptual content was coded for any statement describing the initiative, its context, its problem orientation, et cetera, such as “There is a difference between producing for bulk or producing for Japan: Japan has much higher quality standards.” Conceptual content, as we coded it, included the current state of affairs in the initiative, problems and challenges confronting the initiative, and goals, visions, strategies and ways of working towards change. Other examples of conceptual content include illustrative stories about cases. Sometimes, conceptual content really concerns discussion about the meaning of a concept, e.g. “What do we mean by communication?”

Relational content was coded for data fragments about actors. Usually, this concerned actors outside the initiative, and their relations with (the goals of) the initiative. Relational utterances concern actors and their 1) activities and development, 2) constituency, 3) disposition towards (the goals of) the initiative (roughly: insiders vs. outsiders), 4) importance for the initiative, and 5) the desired position towards the initiative. Furthermore, aspects such as culture and practice of other actors were coded relational content, such as when someone remarked that we should speak the language of growers. Participants could be members of multiple groups and they also could change groups over time (cf. Akkerman et al. 2008).

Reflexivity was operationalised in terms of 1) rules guiding actors’ practices (organisationally, legally, politically, symbolically), 2) relations between actors, and between initiative and context, 3) practices (common ways of working) and 4) discourse related to the future of the initiative’s sector. These four analytical aspects of reflexivity are based on Grin’s work on reflexive governance (Grin 2006) and Van Mierlo et al.’s (2010a) on reflexive monitoring, which point at all of these aspects. It was analysed by comparing changes in these four dimensions over time with the initial state of the initiative (the baseline).

As sources of evidence we used statements about such changes in the meeting transcripts which were triangulated with the documents that were prepared for the meetings and informal talks with key persons in the initiative. Our analysis of rules, was guided by Klein Woolthuis et al. (2005; also see Van Mierlo et al. 2010b), who include standards, laws and the legal system as a whole (e.g. contracts, intellectual property rights), the political culture, and social norms and values. Applied to our case, we categorised the establishment of a new platform as institutional change, as well as the policy changes announced in a new policy letter from the Dutch Minister for Agriculture.

With regard to relations, the analysis focused on interpersonal and interorganisational relationships and strategic alliances / coalitions, in other words, changes in organisational ties (cf. Klein Woolthuis et al. 2005). This included also analysis of how actors are related to each other in terms of (dis)alignment of values and interests, as well as the way in which the initiative positioned itself towards others. Applied to our case, for instance the changes with regard to which body within the initiative is in the lead were categorised as a change in relations.

Practice was characterised rather broadly, concerning not only practice in the sense of a shared enterprise of a community with an associated repertoire of actions (Wenger 1998) but also decisions and developments that changed the potential practice of the initiative. For instance, when an option for a range

of future actions disappeared, because of changed networks or institutions, this change in options was categorised as changed practice.

For discourse, we concentrated mainly on changed terminology, 'language' and elicited common future perspectives (Van Mierlo et al. 2010b; cf. Beers et al. 2010; cf. Grin 2006). In other words, the way in which the initiative speaks or writes of, or treats its main challenge and how to overcome it. This can be recognised in explicit comments on writings about the greenhouse sector, but also implicitly in the case of materials and anecdotes. Note that this concerns 'shared' expressions, to the extent that the individuals appear to agree, or at least that the expression is non-controversial. An example from our case was the main challenge in question, when it was reframed from being insufficiently market oriented to being insufficiently society oriented.

Sometimes these categories overlapped, for instance when a culture within a sector is indicative for mutual relations, the same fragment would be coded as both institutions and relations. The resulting case history constitutes an account of increases and decreases in reflexivity, based on changes in rules, relations, practices and discourse.

As the final step of the analysis, we identified whether the contents of the learning outcomes related to the changes in reflexivity and in what chronological order. In each period of a reflexive turn, for each of the reflexive changes (in a rule or relation for instance) we explored whether they could be traced back to any of the 14 learning outcomes. This enabled us to detect which learning outcomes were and which were not represented in a reflexive change, and which reflexive changes could and could not be traced back to a learning outcome.

2.2 Case

STAP is an innovation initiative of greenhouse growers. STAP means Foundation for Strengthening the Sales and Marketing Position of Greenhouse Vegetable Producers in the Netherlands (in Dutch: Stichting versterking Afzetpositie Producenten van glasgroenten in Nederland). It was founded a few months after the so-called EHEC crisis in March 2011 when fresh greenhouse vegetables were contaminated with enterohemorrhagic Escherichia Coli (EHEC), causing a syndrome (haemolytic-uremic syndrome, HUS) in consumers as a complication of infection. In Germany 53 people died because of HUS (Wikipedia). Although Dutch produce was not infected with EHEC, the crisis strongly affected growers' market position when consumers turned away from tomatoes and cucumbers. Because the initiators had been concerned about their market position for a long time, they used the momentum created by the EHEC crisis to stimulate greenhouse growers to innovate. STAP was founded around August-September 2011, to strengthen the market position of greenhouse growers and to prevent another EHEC crisis from happening.

STAP is a network of various greenhouse growers, researchers, educational institutes and intermediaries. At the beginning of our study (January 2013) STAP consisted of an executive board with three members and a larger general board, both mainly of greenhouse growers. Some of them were also active as salespersons and traders. Meetings of the general board were also attended by representatives of the Dutch Federation of Agriculture and Horticulture. In February 2013, STAP additionally established a platform of research and education institutes and intermediaries: the chain knowledge platform (henceforth: STAP-CKP). See Figure 1.

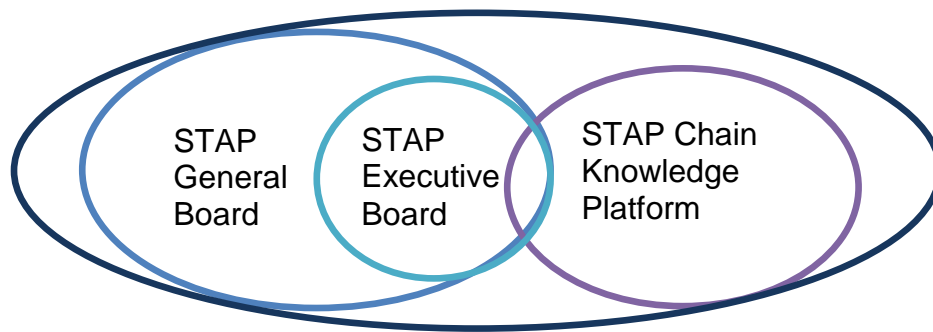


Figure 1: STAP organisation

To give an idea of the participants of STAP, we describe the main members of the knowledge platform. One is the representative of the Executive Board: a large greenhouse grower with a strong ambition to produce what society will require in the future. His company has implemented several innovations to save energy in the greenhouse, and is one of the most innovative businesses in the sector. Another CKP member represents a Higher Professional Education institute. A third member is a researcher from the Agricultural Economics Research Institute that studies innovative business models and who facilitates innovation processes among greenhouse growers. A fourth member also facilitates innovation processes, working for Syntens, an innovation institute in the public sector.

The various members of STAP have a large network in the wider sector, including several other innovative greenhouse growers but also representatives of businesses further down the production chain such as sales organisations and growers. Furthermore, some have contact with politicians at the national level, including the Dutch Minister for Agriculture.

2.3 Role of the researchers

We used Reflexive Monitoring in Action (RMA: Van Mierlo et al. 2010c; Van Mierlo et al. 2010a) not only to study learning and reflexivity, but also to support it. RMA is a form of action research in which the researcher acts as a monitor for an innovation initiative. In RMA, monitoring concerns stimulating reflection among initiators, so that they may learn, evaluate the outcomes of activities in the name of the initiative in the light of the system innovation ambition and adapt its actions to increase reflexivity. The first author acted as reflexive monitor in STAP. This was not an official role, rather, we conducted the research while supporting and advising on STAP's innovation process. The STAP members were aware that our main scientific interest concerned their communication and their learning processes.

3 Reflexivity changes and learning

In the period of study, three reflexive turns could be distinguished (see Figure 2). After sketching the situation at the start of our study, about two-and-a-half years after STAP had started, we present the three periods in STAP distinguished by the reflexive changes that demarcate them. For each period, we first describe the reflexive changes that herald that period and then we describe which learning outcomes were substantively related to these reflexive changes. Below, we describe each reflexivity turn and for each which learning outcomes around these turns were substantively related to the turn and which seemed to be unrelated.

3.1 Baseline

At the beginning of 2013, the start of our analysis, STAP exists as a formally established organisation, consisting mainly of greenhouse growers. STAP's context is that of production- and efficiency-oriented growers with a bad market position. Product chain partners are seen as both part of the problem and the solution for improving the market position of greenhouse growers. STAP conceives of its role as working towards the transformation of the whole greenhouse sector to become more consumer-oriented. It understands the necessity of good relations and collaboration with the other organisations in the production chain. STAP does not officially represent all greenhouse growers. Rather, it is an initiative of specific greenhouse growers who see themselves as innovative and who worry about the future of the sector as a whole. STAP does not have a clear strategy at that time, since an approach with workshops has not succeeded and no alternative approach is available yet.

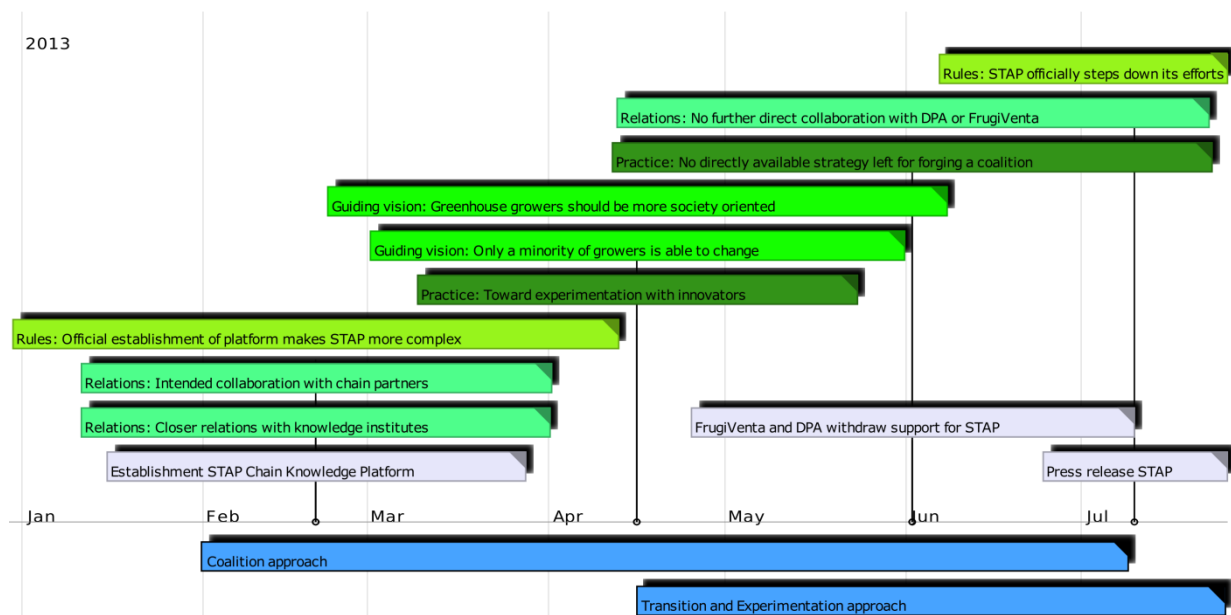


Figure 2. Reflexive turns in STAP: mid-February to mid-April (establishing the Chain Knowledge Platform); mid-April to June (experimentation approach); and June to July 10th (failing network strategy).

For both the general and executive boards (the CKP was not established yet) the main issue of STAP is the bad market position of greenhouse growers. In their view, growers are too much oriented at decreasing production costs, lack a market orientation and also because financial margins are low. STAP Executive: *“The central issue: a more competitive position for greenhouse growers”* (2013-02-12). However, because the workshops had not resulted in change and a separate initiative for horizontal bundling in bell peppers had failed, STAP searches for other, more effective strategies. The executive board concludes that it cannot effect this change on its own, because sales and trade parties possess knowledge about the market that growers need to be able to become more consumer-oriented. STAP therefore needs to collaborate with other parties in the sector.

3.2 Increased reflexivity: Established Chain Knowledge Platform

In a general board meeting on February 20, STAP officially establishes the Chain Knowledge Platform (CKP). The idea is that such a platform, bringing together educational and research institutes, will be able to provide knowledge in answer to questions of entrepreneurs and in this way stimulate them to innovate. The board expects the platform to have a catalysing effect on the innovative capacity of the sector as a whole.

The members of the CKP include Inholland, a higher agricultural education institute, the Agricultural Economics Research Institute, Syntens, an institute that facilitates innovation (innovation brokerage) and Wageningen University (i.e. the authors of this chapter). Furthermore, STAP seeks collaboration with traders and sales organisations and plans to form a coalition with the organised trade organisations (FrugiVenta) and sales organisations (DPA). These chain organisations are intended to give direction to the activities of the CKP, together with STAP. Hence, the platform is established with a position in mind for these two organisations in the production chain. This is a new step towards closer organisational relations with these partners.

With the establishment of the Chain Knowledge Platform, the organisation of STAP becomes more complex. In effect, this is a spin-off of STAP, representing a more official relation between STAP entrepreneurs and related knowledge institutes. In that sense it represents an increase in reflexivity, with regard to rules (the official establishment of the platform) as well as relations (strengthening the relations with knowledge institutes). In addition, the CKP is intended to be a platform by and for the greenhouse sector as a whole. This can be seen as another way in which the CKP increases reflexivity in terms of relations.

The first learning outcome related to this increase in reflexivity concerns the topic of “bundling”. In an earlier meeting on February 12 with the future members of the CKP the participants first explore the differences between “horizontal bundling”—more collaboration within each of the links of the production chain, especially greenhouse growers, to get a stronger competitive position, and “vertical bundling”—more collaboration *across* the links of the production chain, growers, sellers and traders working together. Many growers have advocated horizontal bundling, but in this meeting vertical bundling is seen as more important. A decision is taken to do a small-scale study of different interpretations of bundling to learn about obstacles to bundling. This learning outcome precedes the reflexivity change in relations in this period.

A second learning outcome during this meeting, about the idea to organise student projects to support small-scale growers, does not seem to be related to the changes in reflexivity.

The main learning outcome in this period emerges during the general board meeting when it is decided to establish the platform. Discussions focus first on what STAP’s next step should be. Board members conclude that there is a need to address questions by growers to help them forge more market-oriented production chains. The Chain Knowledge Platform is seen as the answer to these challenges. The board members explicitly see this platform as guided by both STAP and FrugiVenta, an important chain partner. Practically, the role of the CKP is to work on knowledge in a pre-competitive manner, to answer questions to benefit the sector as a whole, not individual growers’ questions. This learning outcome offers a one-to-one mapping to the observed changes in reflexivity.

3.3 An experimentation approach

Mid-April, as evidenced by transcripts of a meeting on April 16, STAP reconsiders its own position due to changed (perceptions of) relations with chain partners, institutional obstacles (insufficient number of good salespersons) and relations with growers. The discussions at this meeting focus on transition issues. This is the first moment of seeing STAP’s challenge in a broader, societal light with a long-term perspective, as opposed to the more consumer-oriented short-term market perspective taken within STAP’s general board. STAP executive in the CKP: *“Growers should think in much broader terms. They used to think that they were sustainable when they had a combined-heat and power-installation”* (2013-05-13). Furthermore, STAP-CKP members mention that only a small part of the growers will be able to make the necessary changes, and that the obstacles for change are much more pervasive among sellers (DPA especially) than previously thought. Several contributions during the discussion together shape the contours of an alternative innovation strategy; a situation in which radical product changes are necessary but the majority of growers is not able to create these on its own, which calls for an approach of experimenting with innovation and sharing of successful examples of innovation. These changes in proposed goals and practice of STAP are indications of an increase in reflexivity.

Indications of reflexivity thus include a change of goals and activities (practice), in light of a changed perspective on relations with other actors and the relation with society (citizens) as a whole. However, this increase in reflexivity only concerns the CKP and not the STAP general and executive boards.

An important learning outcome seems to be related to these reflexivity changes. In a later CKP meeting on May 13, a small note on bundling is discussed, a follow-up to the earlier discussion. The note includes a reflection on horizontal and vertical bundling and suggests that vertical bundling better fits STAP's purposes than horizontal bundling, and that horizontal bundling could even pose a risk to vertical bundling. While STAP previously held a neutral position on this issue, the note advises STAP to explicitly favour vertical bundling over horizontal bundling. The CKP agrees. In contrast to our expectations, this substantively related moment of learning does not precede the reflexivity turn, but follows them. Interestingly, also several other learning outcomes occur during this period (since April 16) that refer to earlier changes in reflexivity, suggesting that the reflexivity turn *precedes* the learning outcome instead of the other way around. These learning outcomes involve 1) that meeting with the chain partners would be urgent and 2) that using a number of exemplary marketing cases for publicity purposes would be helpful.

3.4 Decline in reflexivity: failing network strategy

The first five months of 2013 are characterised by various actions towards more collaboration with other sector organisations, with entrepreneurs in the STAP General Board, and with the partners in the Chain Knowledge Platform. At first, FrugiVenta's director indicates in bilateral meetings with STAP executives that FrugiVenta will collaborate with STAP and the CKP, and that DPA is expected to do so later. At times however, FrugiVenta seems to be withdrawing. As time goes by, STAP tries to force a breakthrough by issuing a position statement with an analysis of the challenges of the greenhouse sector and the need for STAP and the chain partners to collaborate. This strategy seems to succeed at first, when at a meeting the 14th of May several prospective partners state their support for STAP's position statement, including FrugiVenta and DPA. But about two weeks later DPA and FrugiVenta withdraw their support, marking the end of STAP's efforts toward a coalition with them. This also marks a breakdown of STAP's strategy: making the greenhouse sector, as a whole, more market-oriented, necessitates support from and collaboration with DPA and FrugiVenta. Now that these organisations have withdrawn their support, this strategy is no longer viable, and STAP, again, is without a clear strategy forward. In response, STAP announces in a press release July 10, 2013 to become less active in innovating the greenhouse sector, among others because of a lack of collaboration from the chain partners.

The period from February to June can be marked as a stagnation regarding reflexivity, due to uncertain relations and partnerships. Furthermore, the beginning of June 2013 can be seen as a clear decline of reflexivity, because when the strategy to collaborate with chain partners failed (relations), STAP left its previous strategy (practice). The press release is a clear indication of the reduced reflexivity, because it explicitly states that STAP has few real activities left and it publicly establishes that relations with chain partners have cooled down. In terms of reflexivity, this period is marked by changes in relations and practice.

No related learning outcomes occur that precede this decrease of reflexivity. However, learning outcomes do occur in a CKP meeting June 3 that follows the previous reflexivity decline. First, a discussion takes place about the mandate of the CKP in relation to STAP. The question is whether the CKP can start collaborations with chain partners after STAP has announced that FrugiVenta and DPA will not collaborate with STAP. The discussion ends with the conclusion that the CKP is related to STAP but also has sufficient independence to set up its own contacts with partners from the chain.

Secondly, a discussion takes place on how to reach the goals of STAP. CKP members state that collaboration with the chain partners is necessary to reach STAP's goals. And even though FrugiVenta and DPA have just closed the door on future collaboration, CKP members say that it should not change their problem analysis. FrugiVenta and DPA should be able to join later on, if they want to. This position is reinforced by some notions about moving beyond the goal of a market-oriented sector towards the goal of

a society-oriented sector that will also be able to respond to citizens' concerns and deal with environmental issues. This would necessitate even stronger relations between STAP and the chain partners. This learning outcome seems to follow up on the earlier increase in reflexivity in the CKP, and might have been given room by the decline in reflexivity at the level of the whole STAP initiative

4 Conclusions and discussion

In this chapter we set out to critically discuss the often presumed tight, intrinsic relation between reflection, learning and reflexivity, in order to better inform approaches and methodologies that support system innovation initiatives. Our preliminary conclusions build on a review of the literature on reflexivity and a tentative analysis of the relation between learning and reflexivity in a case study. Since the data used cover a short period with just one obvious reflexive turn in which the reflexivity had increased, our conclusions about the relation between reflexivity and learning are preliminary with the aim to inform further study.

The literature review revealed that reflexivity has hardly been operationalised and seems not to have been studied empirically. The main conclusion is that given the general meaning of reflexivity it should be distinguished from reflection and learning and could perhaps best be seen as a property of the social object to which it relates (monitoring, research, governance or the learning). In the light of the ambition of initiatives to change complete socio-technological systems, we operationalised their reflexivity as changes in rules, discourse, practices and relations.

The preliminary empirical analysis suggests that learning outcomes are indeed not linearly related to increased reflexivity. A few of the 14 observed learning outcomes can be argued to have increased the reflexivity. Surprisingly, some other relevant learning outcomes seemed to be following on a reflexivity turn rather than preceding it. Furthermore, the other observed learning outcomes (seven in total) are mainly in line with the dominant rules that guide participants' practices and interaction, without an apparent stimulus to increase the reflexivity. This indicates that not all interactive learning outcomes contribute to system innovation. Furthermore, whereas sometimes learning indeed contributes to an increase of reflexivity, other learning outcomes are directed "inwardly," at substantiating reflexivity, rather than at (further improving) the initiative's position *vis-à-vis* the wider societal context.

This result leaves various questions to be answered. First, how is it possible that reflexivity changes occurred in the initiative that could not be traced back to learning outcomes of its members? A first explanation may be methodological. We were present in all board and CKP meetings of STAP during the study period, but learning could also have taken place in informal moments of meeting, phone calls, email exchange, maybe in the wider networks around the STAP initiative et cetera. Also, with the definition of learning as the interweaving of new ideas, relations and actions visible in communication, we left out relevant discussions on only one or two learning aspects, preceding the reflexivity turn. Furthermore, another approach to analysing learning outcomes, such as asking the stakeholders to define them, might have yielded different results. However, that would not help to critically address and investigate the assumptions regarding the possibilities to facilitate learning in collective settings of meetings and workshops.

Secondly, since there are signs that reflexivity of an initiative can increase without any internal learning preceding it, a second question is how these reflexive changes come about, if not through learning? Obviously, the position of FrugiVenta and DPA is not under STAP control. The ongoing changes in the relations with the chain partners are illustrative of the fact the innovation initiatives have only limited control over their environment, and that they are affected by changes occurring around them. While this is no new insight, our study indicates – to be validated later – that the reflexivity of an initiative is not only relatively independent of learning, but also a contingent outcome of both internal as well as external developments. This confirms our conceptualisation of reflexivity as a systemic property of a system innovation initiative.

In conclusion, our study suggests that it is possible as well as relevant to distinguish learning and reflexivity and investigate their relationship and interaction more in-depth¹. It provides initial evidence of the rather loose relation between the two; as two rivers springing from the same mountain following their own flow to the same sea and at times intersecting. Reflexivity of a system innovation initiative can best be understood as a systemic property, or condition of the initiative that may follow, but may just as well precede important learning moments. This conceptualisation links to ideas of reflexivity as a condition or property of a social network or societies rather than a human capacity and awareness. Hence, it is close to Beck's first meaning of the reflexive society, albeit as its positive counterpart, not undermining modern society further, but changing its basic assumptions.

To notions such as reflexive governance, reflexive research and reflexive monitoring, the study contributes the insight that conscious reflection on assumptions, values and the basic premises of the system that is supposed to be in need of change may not be the sole leverage to work towards system change. The familiar strategies of supporting reflection and learning in workshops and other special learning events are likely to be a hit-and-miss strategy. Scholars of learning perhaps have overestimated the relation between organised learning and transformative change and collective action. Our results suggest a more modest expectation regarding the importance of organised learning within an innovation network or group.

Tracking learning in the discursive interaction of a system innovation along the way of the innovation trajectory, and combining it with an analysis of the reflexivity turns and their relations with learning, may provide an intensive, but valuable way to stimulate learning towards system innovation. We think (and at this point we recognise in our thinking the same ambiguity as in the literature we criticise) that collective reflection of the initiators on the reflexivity history of an initiative, will help to increase its reflexivity.

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References

- Akkerman, S., Admiraal, W., Simons, R.-J., & Niessen, T. (2008). Considering diversity: Multivoicedness in international academic collaboration. *Culture & Psychology, 12*(4), 461-485.
- Argyris, C., & Schön, D. A. (1978). *Organizational learning: a theory of action perspective*. Massachusetts: Addison-Wesley.
- Bastrup-Birk, H., & Wildemeersch, D. (2011). Navigating the tides of change: revisiting the notion of reflexivity in the context of social learning for transboundary collective experimentation. *Studies in Continuing Education, 33*(3), 219-234.
- Beck, U., Bonss, W., & Lau, C. (2003). The theory of reflexive modernization. Problematic, hypotheses and research programme. *Theory, Culture & Society, 20*(2), 1-33.
- Beck, U., Giddens, A., & Lash, S. (1994). *Reflexive modernization: Politics, tradition and aesthetics in the modern social order*. Stanford, CA: Stanford University Press.
- Beers, P. J., Hoes, A.-C., & Van Mierlo, B. (2014). *Towards an integrative perspective on learning in innovation initiatives: The case of the Dutch greenhouse sector*. Paper presented at the 11th European International Farming Systems Association.
- Beers, P. J., Veldkamp, A., Hermans, F., Van Apeldoorn, D., Vervoort, J., & Kok, K. (2010). Future sustainability and images. *Futures, 42*, 723-732.
- Dewulf, A., & Bouwen, R. (2012). Issue framing in conversations for change: Discursive interaction strategies for "doing differences". *The Journal of Applied Behavioral Science, 48*(2), 168-193.

¹ Since we used the transcripts as the basis for the analysis of both learning outcomes as well as reflexivity, there is still some overlap between the two. In the next step, we intend to 1) use data over a longer period with more and more clear-cut reflexivity turns in practice; 2) analyse two cases in a similar way to look for counterevidence; and 3) focus only on clear-cut reflexivity turns in practice, and validate this analysis more firmly on evidence with interviews and documents.

- Dewulf, A., Craps, M., Bouwen, R., Taillieu, T., & Pahl-Wostl, C. (2005). Integrated management of natural resources: Dealing with ambiguous issues, multiple actors and diverging frames. *Water Science & Technology*, 52(6), 115-124.
- Edwards, D., & Potter, J. (2001). Discursive psychology. In A. McHoul & M. Rapley (Eds.), *How to analyse talk in institutional settings*. London, UK: Continuum.
- Geels, F. W., & Kemp, R. (2007). Dynamics in socio-technical systems: Typology of change processes and contrasting case studies. *Technology in Society*, 29, 441-455.
- Grin, J. (2006). Reflexive modernisation as a governance issue, or: designing and shaping re-structuration. In J.-P. Voss, D. Bauknecht & R. Kemp (Eds.), *Reflexive governance for sustainable development*. Cheltenham, UK: Edward Elgar.
- Hendriks, C. M., & Grin, J. (2007). Contextualizing reflexive governance: the politics of Dutch transitions to sustainability. *Journal of Environmental Policy & Planning*, 9(3-4), 333-350.
- Keen, M., Brown, V. A., & Dyball, R. (2005). *Social learning in environmental management. Towards a sustainable future*. London, UK: Earthscan.
- Klein Woolthuis, R., Lankhuizen, M., & Gilsing, V. (2005). A system failure framework for innovation policy design. *Technovation*, 25(6), 609-619.
- Leeuwis, C., & Aarts, N. (2011). Rethinking communication in innovation processes: Creating space for change in complex systems. *Journal of Agricultural Education and Extension*, 17(1), 21-36.
- Lynch, M. (2000). Against reflexivity as an academic virtue and source of privileged knowledge. *Theory, Culture & Society*, 17(3), 26-53.
- Pahl-Wostl, C. (2006). The importance of social learning in restoring the multifunctionality of rivers and floodplains. *Ecology & Society*, 11(1), art.10.
- Popa, F., Guillermin, M., & Dedeurwaerdere, T. (in press). A pragmatist approach to transdisciplinarity in sustainability research: From complex systems theory to reflexive science. *Futures*.
- Smith, A., & Raven, R. (2012). What is protective space? Reconsidering niches in transitions to sustainability. *Research Policy*, 41, 1025-1036.
- Sol, J., Beers, P. J., & Wals, A. E. J. (2013). Social learning in regional innovation networks: trust, commitment and reframing as emergent properties of interaction. *Journal of Cleaner Production*, 49, 35-43.
- Van Mierlo, B., Arkesteijn, M., & Leeuwis, C. (2010a). Enhancing the reflexivity of system innovation projects with system analyses. *American Journal of Evaluation*, 31(2), 143-161.
- Van Mierlo, B., Janssen, A., Leenstra, F., & Van Weeghel, E. (2013). Encouraging system learning in two poultry subsectors. *Agricultural Systems*, 115, 29-40.
- Van Mierlo, B., Leeuwis, C., Smits, R., & Klein Woolthuis, R. (2010b). Learning towards system innovation: Evaluating a systemic instrument. *Technological Forecasting and Social Change*, 77(2), 318-334.
- Van Mierlo, B., Regeer, B., Van Amstel, M., Arkesteijn, M., Beekman, V., Bunders, J., et al. (2010c). *Reflexive monitoring in action: A guide for monitoring system innovation projects*. Oisterwijk, The Netherlands: Boxpress.
- Voss, J.-P., Bauknecht, D., & Kemp, R. (Eds.). (2006). *Reflexive governance for sustainable development*. Cheltenham, UK: Edward Elgar.
- Wals, A. E. J. (Ed.). (2007). *Social learning towards a sustainable world*. Wageningen, The Netherlands: Wageningen Academic Publishers.
- Wenger, E. (1998). *Communities of practice: Learning, meaning and identity*. Cambridge, UK: Cambridge University Press.