

The contribution of reflexive design to ‘transitions in the making’: a comparison of three cases

Bart Bremmer, A.P. (Bram) Bos & Laurens Klerkx

Abstract

The multi-level perspective has proven to be a valuable framework to understand long-term trajectories of change. An important criticism on the multi-level perspective is that it has been largely based on retrospective studies focusing on macro processes and to a large extent neglecting the role of agency. This gap might be filled with the help of the concept of institutional entrepreneurship, referring to actors who initiate changes that contribute to transforming existing and creating new institutions. In this paper the concept of institutional entrepreneurship is used to analyze three projects that aim to contribute to a transition in animal production systems. All of these projects make use of the Reflexive Interactive Design (RIO) approach, but each of them has a different methodical set-up. It is examined what the effects of the three projects are in terms of novelty introduction, creation of a vision and coalition building: the last two being strategies for institutional entrepreneurship. These effects are related to the most essential differences in the methodical set-up. The analysis does not only lead to a better understanding of the three projects, but also gives some important clues for future redesign projects and other initiatives that try to stimulate transitions in the making.

1. Introduction

The multi-level perspective on socio-technical transitions (MLP) has proven to be a valuable framework to understand long-term trajectories of change. MLP distinguishes three levels of analysis, namely (1) the socio-technical landscape of the external environment which is relatively static, (2) socio-technical regimes that comprise established practices which are produced and reproduced by a set of rules, and (3) niches where novelties that break with the existing routines of the regime can develop (Geels 2002b). MLP clarifies how these levels can influence each other and how different transition pathways come about, transforming or replacing an existing socio-technical regime (Geels & Schot 2007). An important criticism that emerged on the MLP is that it has been largely based on retrospective studies focusing on macro processes, leading to a relative neglect of agency (Smith et al. 2005; Farla et al. 2012; Spaargaren et al. 2012). Several contributors have recently dealt with this gap, looking at the role of agency in ‘transitions in the making’, especially focusing on linkages and reflexive relationships between niche and regime.

Around such niche-regime interaction terms have emerged such as translation (Smith 2007), anchorage of innovations (Elzen et al. 2012b), strategic niche management in practice (Lovell 2007) and conceptual niche management (Monaghan 2009; Hegger et al. 2007). Although agency is more central in these publications, the studies are still largely retrospective, looking at processes at meso and macro level, without a specific focus on agency of individual and organizational actors. Farla et al. (2012) suggest the introduction of the concept of institutional entrepreneurship coming from institutional theory (DiMaggio 1988) into MLP. Institutional entrepreneurship looks at how change agents in transition processes interact with the different institutional configurations that constitute the regime (Fünfschilling & Truffer, forthcoming). The adoption of Institutional Entrepreneurship within MLP seems promising to get a better grip on the role of micro level ideas, decisions and actions within transition processes. It might also give some clues about how transition processes can

be stimulated and (to some extent) steered. However, until now, the concept of institutional entrepreneurship has hardly been used to understand transitions.

In this paper we will look at how the Reflexive Interactive Design approach (RIO) has acted as a vehicle for institutional entrepreneurship, and how different projects using this method have enabled different ways of engaging with the incumbent regime and influencing it in a very early stage of niche formation processes. This may provide insights on how institutional entrepreneurship may be purposefully supported.

2. Theoretical framework: reflexive interactive design as a way to shape and support institutional entrepreneurship

Contemporary Dutch (and European) agriculture is in a threefold crisis (Van der Ploeg 2003; Swagemakers 2008):

- An economic crisis of stagnating revenues and increasing costs for farm households, putting their incomes under pressure.
- An ecological crisis of environmental pollution, deconstruction of natural habitats and loss of biodiversity.
- A social crisis of growing distrust in the food production system and an increasing demand for performance of more diversified functions in rural areas.

The agricultural sector, policy makers and scholars have been trying to tackle these problems since the 1980's. At some points this has been successful, but most of the problems have exacerbated and new issues have emerged. The problems are embedded in the system, they have been institutionalized (Marsden 2003) and are for the most part caused by modernization itself. Scholars have concluded that a transition in agriculture is needed. As a response the Dutch government started to promote a transition towards a sustainable agriculture in the 1990's (Slingerland & Rabbinge 2009).

Nowhere else the crisis in agriculture was (and is) more noticeable than in animal production systems. On top of the problems mentioned above they have difficulties with animal welfare issues, animal diseases, the risk of zoonosis, food scandals and (as a result) negative societal attention. Back in 2001 a commission led by former agricultural banker Herman Wijffels – one of the leading voices in The Netherlands on issues of sustainability – called for a redesign of the animal husbandry sector (Commission Wijffels 2001).

One of the initiatives following this call was a series of projects, under the overarching programme title *Designs for System Innovation* (2001-2013), financed by the Dutch Ministry of Agriculture. Each project in this programme aimed for the interactive redesign of a specific animal production sector in The Netherlands. In the course of this programme a specific approach was developed called Reflexive Interactive Design (RIO; Bos et al., 2011, Bos et al., 2009). This approach is characterized by a combination of system analysis, structured (co)design, stakeholder management and niche formation, in order to redesign systems starting from a heterogeneous set of values and goals. These projects had the explicit ambition to contribute to a transition in animal husbandry: to ignite or at least facilitate 'system innovation'.

To do so RIO does not aim at adjusting or optimizing the current system. On the contrary, it starts with defining the key challenges in the current system that have to be tackled and a critical reflection upon assumptions that are normally taken for granted. It follows the doctrine that, to tackle the problems that are institutionalized in the current system, actors have to break with existing routines. To do so, technical change is not enough; RIO also focuses on cultural and institutional change. Furthermore the projects make use of knowledge from multiple scientific disciplines, which is scrutinized and enriched with knowledge and experience from the field.

A central concept within the method is integral sustainability, which can shortly be summarized by saying that an improvement on one aspect may not lead to a regression on other aspects. RIO strives for synthesis and congruency instead of compromise (Bos 2008). To achieve this an analysis is made of the needs of the most important actors involved in the production system: the animal, the farmer, the environment and the consumer/citizen. Their needs are gathered in Briefs of Requirements, which form the basis for the actual redesign process.

The procedure for redesign is based on the structured design method, which is normally used to design machines and technical systems (Siers 2004; see also: Groot Koerkamp & Bos 2008; Bos & Groot Koerkamp 2009). First the needs in the Briefs of Requirements are translated into demands. For these demands solutions are generated in a brainstorm session. And finally solutions are selected and combined to build a new system. These last two steps of generating solutions and designing a new system are performed in close interaction with stakeholders to stimulate implementation of the results, to attain actual change.

One of the first projects in the *Designs for System Innovation* programme was *Houden van Hennen* (laying hen husbandry, 2002-2004) and has been extensively studied and reported (Zwartkruis et al. 2010; Klerkx et al. 2010; Groot Koerkamp and Bos 2008; Bos 2008; Spoelstra et al., 2013). However, in the meantime more than ten projects have been executed within this programme, and quite some changes have been applied in the methodical set-up. The most essential changes being:

- An even larger emphasis on integral sustainability. In former projects like *Houden van Hennen* the main focus was on farm income and animal welfare. In the more recent projects the environment gets equal attention and new issues like public health are introduced.
- The projects become more interactive. Farmers and other stakeholders are participating in more phases of the project. Moreover the group of participating stakeholders is more heterogeneous.

In this paper we want to focus on three of the more recent design projects, all applying the same RIO approach with a particular set-up and style: *Pork Opportunities* (pigs), *Broilers with Taste* (broilers), and a sample from *Het Nieuwe Veehouden* (The New Livestock Keeping, covering all sectors). The last one was not part of the programme *Designs for System Innovations*. However, it does build on the RIO approach and relates to the content and ambition of the programme. We will analyse how the different set-ups in these three projects help individual actors and heterogeneous groups of actors to contribute to a transition in agriculture. This is done with the help of the concept of institutional entrepreneurship.

The concept of institutional entrepreneurship helps to take away the tension between institutional determinism and limitless human agency. It assumes that behaviour of actors is enabled and constrained (but certainly not determined) by institutions (Battilana et al. 2009). Some actors are able to enlarge their room for manoeuvre and to use it in a strategic way. Institutional entrepreneurs are actors who have this ability and who initiate changes that contribute to transforming existing or creating new institutions (DiMaggio 1988). There are a number of tactics that these institutional entrepreneurs may apply to implement change projects (Pacheco et al. 2010; Battilana et al. 2009):

- Framing and re-framing: developing a vision that can convince others
- Coalition building: mobilizing people to support the change envisioned by institutional entrepreneurs
- Institutionalization: Motivating others to (structurally) achieve and sustain the vision

A central tenet of RIO is that the design process is not simply structured as a means to an end (the design), but as well a means to change perspectives on the goals and functions of the systems at hand by increasing reflexivity and learning, and to build new networks of collaborating stakeholders who together can act as change agents in the follow-up. Moreover, as Bos et al. (2011) claim the RIO-process and its (visual) products may play a vital role in changing institutional perspectives on sustainability, beyond the directly involved stakeholders. Thus, one might expect that the application of the design method results in institutional entrepreneurship.

Although the ultimate goal of Reflexive Interactive Design is to transform or create new institutions, we will focus on the former two strategies: framing and coalition building, and not on institutionalization. There are two reasons for this. First of all, the three projects that are examined here have been completed only recently. Institutionalization cannot be assessed yet, as it is a longer term effect. To get a sense of the potential future institutionalization, it is very helpful to look at the occurrence of framing and coalition building, as these are important conditions for institutional change (Battilana et al. 2009). Second, MLP offers several concepts to analyze and understand institutionalization, like translation (Smith 2007), anchorage (Elzen et al. 2012b) and niche management (Lovell 2007; Monaghan 2009; Hegger et al. 2007), which were referred to earlier. Within institutional entrepreneurship, on the other hand, the main focus has been on framing and coalition building; and there seems to be a gap in research to institutionalization (Battilana et al. 2009). The two theoretical frameworks seem to complement each other quite well.

In this paper we analyse how framing and coalition building derive from the different methodical set-ups of the projects. By doing so, we try to understand how institutional entrepreneurship arises from varying styles of doing RIO, and what this might imply for the projects' contribution to an actual transition in agriculture.

3. Methods

The ultimate goal of this study is to answer the question how the different methodical set-ups of the three projects contribute to a transition in agriculture. As is explained above, this question is impossible to answer, because transitions are change processes that often take several decennia. Moreover, it is very difficult to identify and distinguish causes and effects in these long-term and complex processes. At the same time, there is a gap in the theory development of the multilevel perspective, when it comes to agency-based processes at the start of niche developments. That is

why the concept of institutional entrepreneurship is introduced in this study: framing and coalition building can be considered prerequisites for institutional change. Besides the visible effects, these can give insight in the impact of the projects. If we make clear to what extent framing and coalition building have taken place and how this came about, we will not only understand the potential of the projects under examination, but it will also provide direction for future projects and initiatives trying to stimulate institutional entrepreneurship and contribute to a transition.

To examine the visible effects, as well as the occurrence of framing and coalition building as a result of the three projects, in-depth interviews were carried out with people who participated in Pork Opportunities, Broilers with Taste and The New Livestock Keeping. Per project three or four participants were interviewed. Most of them were farmers, but also system builders and agricultural advisors who were present in one of the workshops. The interviews were roughly structured as follows:

- The status of the farm as it is and the plans for the future were discussed. In the first part of the interview the respondent was asked not to refer to the project, to prevent that all developments on the farm would be placed within the context of the participation in the project.
- Thereafter the connection between the status of the farm and the future plans on the one side and the participation in the project on the other side was reviewed.
- Finally the respondents were asked to point out the effects of participation concerning opinions, motivation and contacts.

After the interviews a first analysis was made of the effects coming from the projects, leading to a first overview of the differences in effects between the three projects.

Thereafter in-depth interviews were held with seven project team members. Most of them had been involved in more than one of the projects under examination, so they were able to compare the projects with each other. These interviews were structured differently than the interviews with the farmers:

- The results of the analysis of the first interviews were critically reviewed and checked.
- Similarities and differences in effects between the projects were discussed.
- Similarities and differences in methodical set-up between the projects were discussed.

After these interviews a second analysis took place. Again, the effects of the three projects were compared, but now also the relation between methodical set-up and effects was thoroughly explored, specifically focusing on visible effects, and the occurrence of framing and coalition building. This was done by analyzing the story lines of the various respondents. These have been researched qualitatively, leading to a meta-narrative of the projects. The differences in methodical set-up were structured on the basis of themes that were indicated as important by the respondents to understand the differences in effects. This second analysis was complemented by an investigation of available project documents and was eventually discussed with some of the project team members to verify the conclusions.

4. Findings

4.1 Three interactive design projects and their differences in methodical set-up

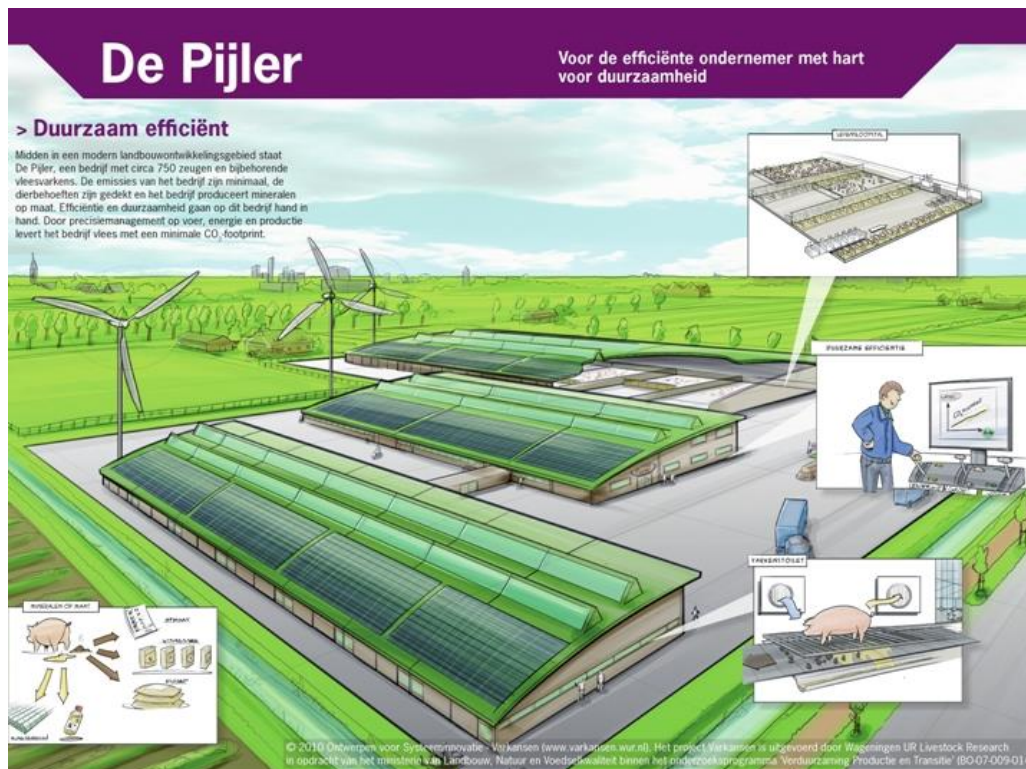
Pork Opportunities, Broilers with Taste and The New Livestock Keeping share a similar methodical foundation with respect to the basics of Reflexive Interactive Design (RIO, as described in the theoretical framework), but also differ in important respects because of deliberate choices in their set-up. Later in this chapter the differences between the set-ups of the projects will be discussed that are important to understand the differences in effects. This is done on an analytical level. In this paragraph however, we will introduce the three projects to give the reader a first glimpse of how these RIO projects were carried out, and to what extent they differ. These differences become very clear when we compare the graphical results of the projects: the new animal production systems that are designed in the workshops.

Pork Opportunities

Pork Opportunities was carried out from 2008-2010 with the aim to redesign the pig husbandry system. The project team was asked to come up with new ideas to 'produce pork in a way that is good for People, Planet, Profit and Pigs'. As most RIO projects, it started with a system analysis: the needs of the pig, the pig farmers, the environment and the consumer/citizen were assessed. Besides that the key challenges in the present day system were identified, as were the possibilities for change. After the system analysis three three-day-workshops for around twelve people were organized, with an ascending heterogeneity in group composition:

- In the first workshop the only participants were researchers for multiple scientific backgrounds. This workshop can be seen as an exercise and experiment prior to the other two workshops. In the end there was not enough time in this workshop to finish the designs that the subgroups worked on.
- In the second workshop researchers and pig farmers were both invited. They worked together on three designs for a new way of keeping pigs.
- In the third workshop researchers were only present to facilitate: the actual design process was carried out by participating pig farmers, system builders, agricultural advisors and civil servants. Again, at the end of the third day three designs were made that showed alternative systems of pig husbandry.

In the workshops solutions were generated to fulfill the needs of all actors and combine these solutions in newly designed pig husbandry systems. After the three workshops, the project team made a wrap-up of all the solutions and designs and on the basis of that they constructed three final designs which were put in an attractive brochure for a wide audience. The figure below shows one of these designs.

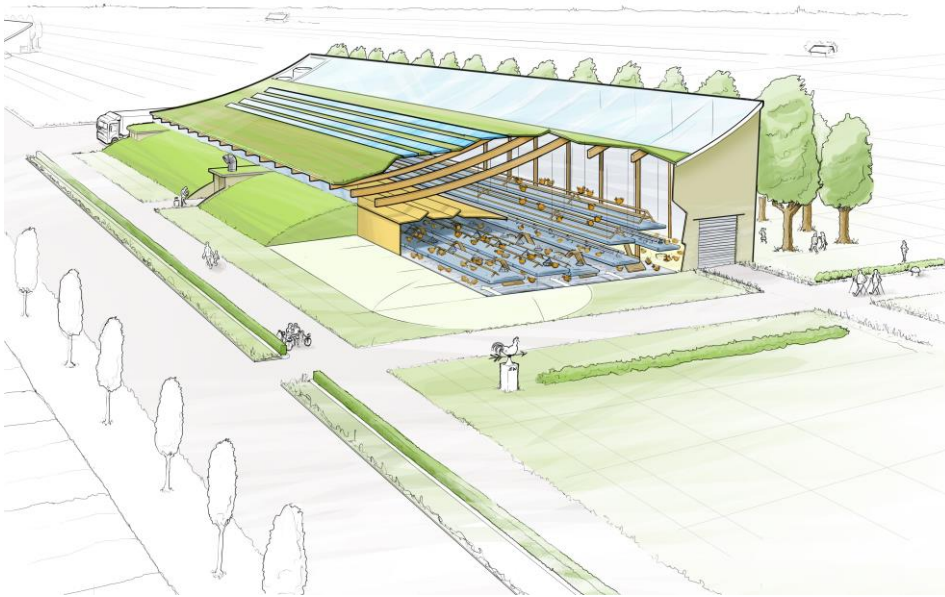


As can be observed, the designs are comprehensive total concepts. However, a lot of attention is paid to partial solutions which can be seen in the smaller pictures that 'zoom in' on the overall design. This leaves room for pig farmers and others to puzzle with the elements themselves. The designs of Pork Opportunities are mainly meant as source of inspiration. Technically and economically, they have not been worked out in any detail. Also, there is a strong focus on the farm and the keeping of the pigs. There is very little focus on the production chain and the market.

Broilers with Taste

Broilers with Taste was carried out from 2010-2012 to redesign the broiler husbandry system. The project started with a system analysis, similar to the one of Pork Opportunities. After this first phase two workshops were organised:

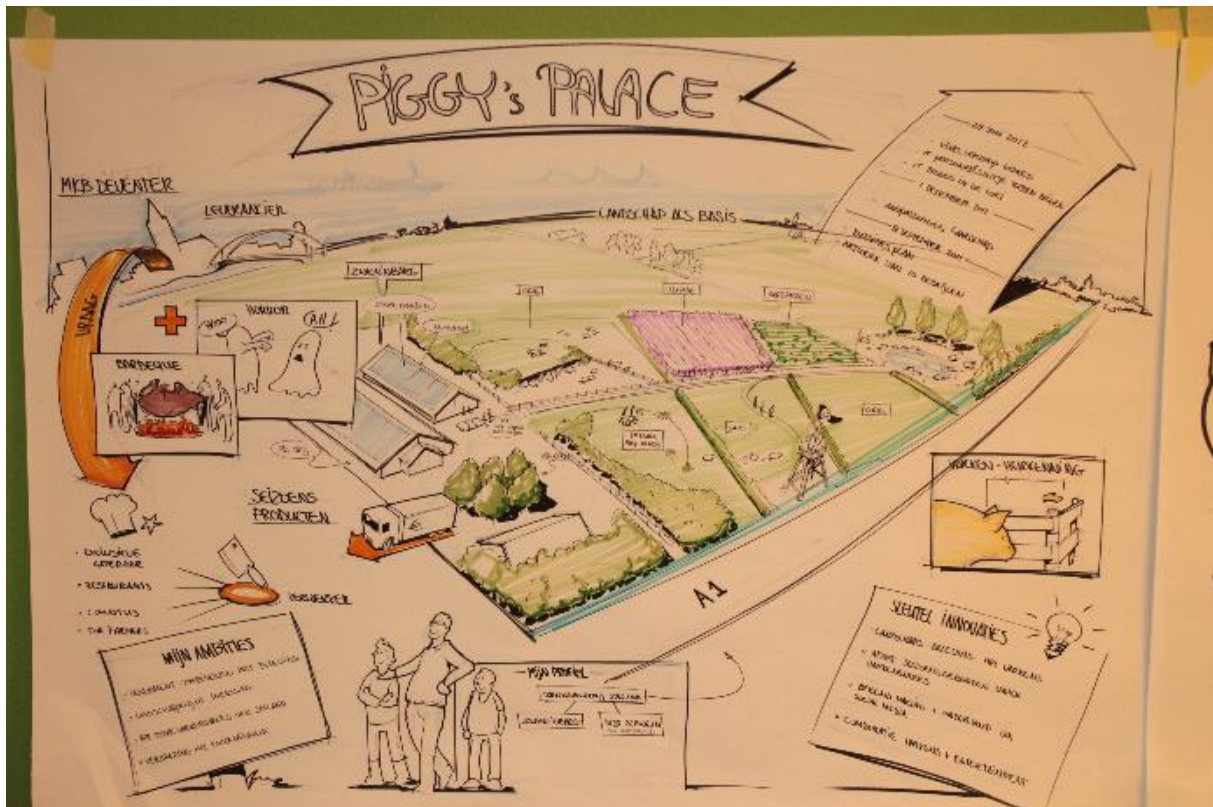
- First a three-day workshop with a heterogeneous group (over 15 people) in which the whole production chain and some periphery were present. At the end of the third day two alternative designs for broiler husbandry keeping were ready, in terms of concreteness comparable to the designs that were made in Pork Opportunities
- In a seven-day workshop the design group was considerably smaller: only a broiler keeper, a veterinarian, a system builder and two researchers were participating. They started where the other workshop had ended, building on the designs that were made in the first workshop. At the end two designs were made. A drawing of one of these is presented below.



The final designs in Broilers with Taste are reasonably worked out: economic and technical calculations have been made, and the equipment of the system has been thought out thoroughly. The designs of this project are not primarily meant as source of inspiration; they offer a complete and concrete interpretation of 'what might be'. The designs are also set-up as a coherent big picture; it is not the intention to trigger the creativity of farmers or system builders. An important aspect of Broilers with Taste that does not become clear from the picture, is that the designs are broader than the farm. They spread out over the whole production chain.

The New Livestock Keeping

The New Livestock Keeping does not focus on a particular animal husbandry sector. Several five-day workshops are organized, each of them focussing around a specific sector. In each of these workshops between five and eight farmers and the same amount of agricultural advisors is present. The workshops are split in three phases. In the first phase the farmers are stimulated to identify their individual ambitions. The second phase focuses on the challenges that interfere the accomplishment of these ambitions. Solutions are generated to overcome the challenges. In the third phase solutions are selected and combined to a new design and an action plan is set up. The result is personal and fits with the personal ambitions and situation of the individual farmer. One of the posters that was made in The New Livestock Keeping is presented below.



As can be observed on the poster, the focus of the design is on the farmer and his family (not the system). The plan is very personal with specific emphasis on the context of the farm, with a link to the present situation. The focus is mostly on the farm and the direct environment: the sphere of influence of the farmer. Some aspects of the plan are technical, but most of them are non-technical and address issues like management, organisation, communication and collaboration.

4.2 Effects

Pork Opportunities: novelty introduction

In the second workshop of Pork Opportunities five pig farmers were participating, but none of them seems to put the results of the design process into practice. After the third workshop one of the participating pig farmers almost immediately starts with a realization process. She forms a consortium with consisting of project participants and ‘outsiders’, and she is granted a subsidy for Small Business Innovation Research (SBIR). After several years of hard work a new farm is established with several elements that can be traced back to Port Opportunities. Also other farmers use elements of Pork Opportunities when developing their farm. However, this is often not directly inspired by the brochure of the project. Mostly, the effects are indirect: as an effect on initiatives that can be considered as a spin-off of Pork Opportunities.

Pork Opportunities: creation of a vision

Pork Opportunities addresses a sense of urgency and stimulates stakeholders to create an alternative vision on pig husbandry. The designs ought to make people reflect on the contemporary situation, discuss the alternatives with others and ultimately to take action. The designs are not only a source of inspiration for pig farmers and system builders, but also for institutional players. The future vision, mental shifts and solutions from Pork Opportunities are embraced among others by civil servants of

the ministry of agriculture, civil servants from regional and local governments, and by one of the most influential animal welfare agencies in the Netherlands. Various stakeholders create their own future vision on the pig husbandry sector, using building blocks from Pork Opportunities. A central element in all of these future visions is the awareness that it is possible to change for better at several aspects at the same time. The 'pig toilet' is the most illustrative example of this. By using the cleanliness of the pig animal welfare improves, ammonia emissions decrease and the quality of the manure rises.

Pork opportunities: coalition building

Coalition building seems to arise more or less spontaneously from the strong vision that was developed. However, building coalitions on the basis of the intellectual legacy of Pork Opportunities is not as obvious as it seems. It is the merit of two (small) groups of institutional entrepreneurs that follow two different tracks. On the one hand there are pig farmers and system builders trying to build coalitions to realize an alternative pig husbandry system into practice. On the other hand there are stakeholders who are at influential positions within institutions (examples mentioned earlier), and who make resources available for these pig farmers and system builders. Although changes are not being institutionalized yet, there is a strong connection here between niche and regime, that might become even more valuable in the future.

Broilers with Taste: novelty introduction

Broilers with Taste has resulted in a consortium that works on the realisation of *De Windstreek*: one of the two final designs. The consortium does so with the help of SBIR: the same subsidy arrangement that was used by the consortium around Pork Opportunities. At this moment *De Windstreek* has not been built yet, but with a grant of almost €500.000 of subsidy, a prototype will be realised on the short-term. Outside the consortium the brochure does trigger reactions (positive and negative), but this does not lead to other initiatives.

Broilers with Taste: creation of a vision

In Broilers with Taste a vision is created, but in a different way than in Pork Opportunities. The designs are much more technical and underpinned by calculation. The final designs are meant to be built in the way they are presented. There is not much room for one own interpretation. One might say the designs outline the contours of a possible new regime. The vision developed in Broilers with Taste is very strong, but at the same time fixed.

Broilers with Taste: coalition building

Initially the project team members of Broilers with Taste are the institutional entrepreneurs in the project. They are the owner of the ambitions and the vision, and they start building a consortium. When this consortium is expanded the ownership and the institutional entrepreneurship is shifted from the researchers to the other partners. Eventually the consortium is bigger than the group of participants in the second workshop of the project. However, reframing and coalition building are limited to the consortium.

The New Livestock Keeping: novelty introduction

Two third of the participating farmers in The New Livestock Keeping get seriously started with the plans they develop in the workshop. A part of the participants has already realized, or they are in the middle of their realization process at this moment. Others are improving their plans and make

preparations for realization. The radicality of the things they realize varies to a large extent. Some farmers chose for adjustments within the present system; others build a completely new farm and develop their own supply chain.

The New Livestock Keeping: creation of a vision

In The New Livestock Keeping participants are forced to reflect on their real ambition. On the basis of what they learn about themselves and the context in which they operate, they create their personal vision. Although all of these visions are quite progressive in comparison with the average business plan of a Dutch farmer, most participants easily adapt to the rules of the regime. Ultimately, most of them wish to transform their own farm and their direct environment; not a complete production sector. Most participating farmers in The New Livestock Keeping can be considered change agents; only a few can be considered institutional entrepreneurs.

The New Livestock Keeping: coalition building

The New Livestock Keeping consists of separate innovation trajectories that have little connection with each other. A lot of farmers have difficulties to find the right partners and to build a strong consortium. Because all participants in The New Livestock Keeping are there for themselves, there are almost no establishment of important new contacts takes place. Also, the farmers have a lack of resources and abilities to build a coalition. The same applies here as with the creation of a vision: the majority of the participants aim for changes within their own sphere of influence. This means decent coalition building is not always necessary.

4.3 Main differences in methodical set-up

In this section the main differences in methodical set-up with regard to the effects and potential effects are discussed. These differences are derived from the interviews with the project team members.

System barriers

In Pork Opportunities the main focus is on the farm. At the start of the project, the project team deliberately chose not to include the production chain, the market and the environment, because that would make the design process too complex. Due to the limited system barriers Pork Opportunities has not only been manageable during the design process, but also in the realisation phase: pig farmers can get started with it on individual basis, or with a small consortium. At the same time it is difficult to connect with market players, as they are not part of the vision that was created in Pork Opportunities. But products with added value need a specific market to turn the added value into cash. Pig farmers who have ambitions in this direction should actively search for partners who can help them.

In Broilers with Taste the production chain and the market surely are subject of the design process. The system barriers are not chosen for practical reasons; they are shaped by sustainability issues. This leads to a vision that addresses bottlenecks much wider than the farm, covering the whole production chain and part of the periphery. Doing so, the potential is created to tackle problems in a comprehensive and fundamental way. At the same time a difficulty is created, because a larger part of the production chain has to be mobilized.

The New Livestock Keeping does not take a fixed position with regard to system barriers. The barriers are determined by the participating farmers. Therefore the designs match with the farmers and their situation, increasing the feasibility. Simultaneously the same remark can be placed as with Pork Opportunities: large bottlenecks remain unaffected.

Ambitions

High ambitions enable radical institutional changes and in the long-term the dominant regime may even be overthrown. At the same time high ambitions lead to designs that are more difficult to put to practice. Although this does not always have to be the case. High ambitions may also lead to an attractive future vision that grasps people's imagination. This is the case in Broilers with Taste. High ambitions lead to radical designs and ground-breaking solutions which make realization difficult and simultaneously attracts people to join in.

In The New Livestock Keeping individual ambitions are leading: the feasibility is enlarged, but just like with the system barriers this often leads to concessions and compromises.

Pork Opportunities takes a middle position. Briefs of Requirements (which set high ambitions) are put forward in the design workshops, but in the end the participants determine what the design ambitions will be.

Target groups

Various target groups in various projects may lead to different development pathways. In The New Livestock Keeping for example the participating farmers are the primary target group. This causes a limited effect, but the effect is relatively predictable and the chance of success is relatively high. The New Livestock Keeping stimulates participants to become change agents. Some of them become institutional entrepreneurs. It is not very hard to make them move, but it is often difficult for these farmers to make others move. This is both caused by the fact that designs are personal.

This is totally different for Broilers with Taste. In that project there is a broad target group of poultry farmers, system builders and several chain parties. Given the high ambitions only the progressive among them are addressed. Because of the broad target group it is relatively easy to establish new connections.

Pork Opportunities has a special position. From the start of the project it has been working with two separated target groups: pig farmers and system builders on the one hand; institutional players on the other hand. To mobilize people this seems to work very well. Pig farmers and system builders try to realize something in practice. And at the same time a select group of institutional players provides resources that make it easier to get to realisation.

Diversity of participants

Pork Opportunities has been working with a diverse group of participants: pig farmers, system builders, civil servants and agricultural advisors. This makes it possible to make use of various perspectives and to explore a wide range of opportunities, which is important for creation of a vision.

Broilers with Taste has been working with an even more diverse group of participants in the first workshop. The second workshop was carried out with a smaller (but still relatively diverse) group of two researcher, a poultry farmer, a system builder and a veterinarian. This smaller group was very efficient in sharpening the vision and preparing the designs for mobilizing people.

In The New Livestock Keeping only farmers and agricultural advisors were present. Because of the limited variety the change in perspective on sustainability is smaller than in the other projects. The project especially helps to give a boost to start changing, it leads to a coherent vision. The external influences within the project do make people think, but only some of the participants chose for radical changes comparable to those in Pork Opportunities and Broilers with Taste.

Control over design

The party that has control over the design can steer various elements, and by doing so can influence the possibilities for institutional entrepreneurship. If the researchers take control this usually means higher ambitions, wider system barriers and a vision that matches with a wide target group. If participants take control this may not only increase the feasibility, but also the sense of ownership.

In Pork Opportunities farmers have control over the design process, so that feasibility and ownership are stimulated. But after the three design workshops the project team makes a selection of all generated solutions and develops three final designs for the brochure. In this way the final designs are made suitable for institutional players.

In the second workshop of Broilers with Taste researchers and some progressive participants worked together on two designs. These are also the designs presented in the brochure. Because of this co-production the researchers kept a high level of control, at the same time creating ownership among the participants.

In The New Livestock Keeping there is no brochure with designs. The participating farmers had full control over their own design process. The end result is personal, which makes it difficult to mobilize others. However, the high degree of enthusiasm and drive among the participants might trigger others to join them.

Potential scope of the design

The potential scope of the designs in the three projects differs. The nature of the designs may trigger different development paths as has become clear above. The designs in Broilers with taste for example are generic, free of context. The idea behind this is that they can be built everywhere. If the prototype that will be built will be successful, this might give an enormous boost to the spread of the vision and the possibilities of mobilizing people.

In The New Livestock Keeping the designs are personal which makes their scope very narrow. The designs are an enormous help for individual farmers, but it is very hard to translate them to another context. Every farmer needs another design.

Pork Opportunities takes a middle position with regard to the scope of the designs. The designs are generic like the ones in Broilers with Taste, but they are meant primarily as a source of inspiration.

People are free to develop their personal vision and personal design with the building blocks that Pork Opportunity offers. Here the shared core as well as the freedom for own interpretation are important to build coalitions.

5. Discussion

Three different projects share a core approach in applying interactive design to envision more sustainable forms of livestock husbandry systems. All three are also legitimized and financed for their promise of realizing change in practice. Yet, the setup of the three projects differed in significant respects as well.

In the present study we tried to identify their effects until now, differentiating between (1) novelty introduction into practice, (2) creation of a (shared) vision and (3) coalition building. We hypothesize that these three types of effect facilitate subsequent institutional entrepreneurship by individual stakeholders or groups of stakeholders

Firstly we will try to answer the question whether the differences in effect can be explained by the differences in methodical setup of the projects (table 1 and table 2). Secondly, we will speculate / argue how these different effects may contribute to subsequent institutional entrepreneurship.

Thirdly, we draw conclusions with respect to the question whether there is a preference for one or the other methodical setup in terms of the chances of introducing a system innovative change in practice in the future.

	Pork Opportunities	Broilers with taste	The New Livestock Keeping
A system barriers	Housing system	Production chain	Depending on the farmer; often housing system
B ambitions	High but with an eye on feasibility	Very high	Depending on the farmer
C target group	Farmers	Innovative system builders, farmers and others	Farmers and agricultural advisors
D Diversity of participants	Farmers, researchers, advisors, civil servants, systems builders (diverse larger group)	Farmers, system builders, others (diverse but small group)	Farmers, advisors
E Control over design	Researchers create their designs on the basis of the workshops	Researchers and participants create designs together	Every participant creates his/her own design
F Potential scope of the design	Generic designs mainly for inspiration	Generic designs that can actually be build	Designs are specific, customized

Table 1: differences in methodical setup

	Pork opportunities	Broilers with taste	The New Livestock Keeping
novelty introduction into practice (visible effects)	Novelties are introduced in existing and new housing systems (incremental)	Some radical interrelated novelties will be introduced in a new housing system	Novelties are introduced in existing and new housing systems (incremental)

	and radical), notably after institutional changes		and radical)
Creation of a vision	Shared vision created on the level of ambitions. Designs have limited communicative function	Shared vision created in terms of ambitions and made plausible in designs.	Individual visions made explicit and more feature rich. Poster-designs communicate these visions visually.
Coalition building	Coalition build around individual farmer, and coalition build around the vision (to further explore it). Designs play no important role.	Coalition build around one of the two design-concepts. Design concept is major sustaining factor.	Some individual participants successfully create local coalitions to further their vision. Highly dependent on individual drive.

Table 2: differences in effects

Novelty introduction

In all three projects novelty introduction can be observed, but they differ widely in number and character. On the one hand, the designs that result from Broilers with Taste are packed with features that radically diverge from standard broiler production, and bear the promise to find a new and better optimum on several aspects of sustainability (welfare, labor conditions, animal health, energy use, local air quality, biodiversity, transparency) at the same time. Yet, this promise can only be fulfilled if these novelties are realized in combination, which requires further R&D on the individual novelties as well as on the encompassing system. Because of this, new institutional conditions have to be created as well, for instance market access and experimental statuses for pilot barns. The (combined) potential of the novelties in the designs, and their generic character, increases the likelihood that these designs will have a structural impact on the regime in the longer term, but at the same time the high level of integration increases the risk of a total failure if not all conditions are met.

On the other end of the spectrum, the design concepts of individual farmers and their advisors in The New Livestock Keeping most often contain a lot of existing innovations and only a small number of really new ideas (novelties). This is highly dependent on the individual motivation and ambition of the farmer. From his or her perspective a huge leap forward is proposed (compared to standard practice), but in most cases the need for short term realization and mitigation of individual risks limits the radical potential of these concept-designs. Typically, participants stress the importance of a separate (and individually controlled) market channel to increase their margins and pay for the special characteristics of their farm.

The Pork Opportunities project takes the middle ground in this respect. A number of novelties are introduced by the project (especially: the pig toilet), but their potential application is independent of system wide changes. This makes it much more easy to adopt elements in further development and practice, but also tends to contribute to incremental, rather than leapwise or radical improvements. Also for this reasons, the sustaining role of the designs in further activities down the road is limited, which is in sharp contrast to the role of the designs in the follow-up of Broilers with Taste.

These differences are primarily related to the following differences in methodical setup: B. ambitions; F. Potential scope of the design; and D. Diversity of participants.

Creation of a (shared) vision

In all three projects the role of creating a (shared) vision is very important, but the actual form and level of concreteness, and the degree to which it is shared differ. In Pork Opportunities a very general future vision on the desired character of future pork husbandry and production is delivered. It provides general directions to explore, but leaves room for a lot of different implementations, because it does not present clear choices on how this vision should be attained. The benefit of this is, that a lot of stakeholders can relate to the vision, because it is not controversial. This turns out to be functional to further develop several different novelties.

In The New Livestock Keeping the vision of the individual farmer is articulated and extended as much as possible. This is primarily functional in the empowerment of these individuals to build (local) coalitions to realize their dream. Due to their high specificity and context-dependency they have limited effects beyond these local contexts. Attempts of the project to generalize the visions and their novelties to inspire others have had very limited success.

In contrast, the vision of Broilers with Taste is primarily embedded into the integrated design concepts and their constituent novelties. They are technically and visually powerful, and also appealing for outsiders, but are difficult to be acquired by stakeholders that did not participate in their creation. However, due to the large variety of stakeholders involved in one or more steps of the whole process, ownership is not limited to the more exclusive group of researchers and participants that made the final results.

Differences in the creation of a vision are thus primarily related to the following differences in methodical setup: E. Control over Design; B. Ambitions; and D. Diversity of participants.

Coalition building

All three projects explicitly aim to build coalitions for follow-up, and succeed in this. However, different strategies are deployed. In The New Livestock Keeping, the process is oriented towards empowering individual farmers to identify and enroll important partners, both during and after the project. The visual representation of their idea is primarily meant to be a supporting communicative tool for this.

In the other two projects, possible coalitions are built during the process by deliberate casting of the participants by the project team. In Pork Opportunities this casting emphasized farmers and institutional players. In Broilers with Taste a broad range of participants was invited from the whole chain (including farmers) plus important ngo's, while explicitly avoiding the participation of board members from institutions. As a result, Pork Opportunities led primarily to individual farmer's initiatives and institutional arrangements (like the Varkensen Innovatieprogramma), while Broilers with Taste primarily led to participants forming a consortium of enterprises that is further developing one of the designs.

The actual (visual) designs of Pork Opportunities did not play a significant role in sustaining coalition building. Individual farmers developed their own concept, while for institutional players the more general (and broadly interpretable) guiding vision was important in the follow-up of the project. This is in sharp contrast to Broilers with Taste, where the visual representation and the specific promises of one of the designs played a vital role in extending the coalition and acquiring financial support. Differences in coalition building can be attributed primarily to the following differences in methodical setup: D. Diversity of participants, C. Target Group and E. Control over Design.

Overall observations

Overall, we can conclude that B. Ambitions, D. Diversity of the participants, E. Control over Design and F. Potential scope of the design are important aspects in the different methodical setups that relate to the specific effects observed.

A high ambition in combination with a setup aimed at generic designs that can actually be build results in a high level o integration of a range of novelties in Broilers with Taste. The diversity of the participants adds to this, both in terms of the ambition as well as the informed choices in the designs. If the ambition of one individual stakeholder is leading (as is the case in The New Livestock Keeping), and the scope of the design is limited to his or her farm, short term considerations are much more important, increasing the likelihood that more radical novelties will be left out to mitigate risks. A high level of ambitions, but with designs mainly meant for inspiration (Pork Opportunites), does not force the participants to attain a high level of integration. The introduction of novelties is dependent on the strength of individual good ideas, and the sustaining role of the broader vision.

The creation of a vision can be done in different ways. In order to have a sustained effect (after the project) such visions can be a. tailor made to a prime ambassador with real ownership (f.i. the farmers in The New Livestock keeping), b. more general and broadly interpretable to allow for a more loose but broad association (Pork Opportunites), or c. be a powerful and plausible sociotechnical construct that is strongly inspiring for some, but relatively closed for association by others. The sustained effect of the vision after the project thus is dependent on the casting and diversity of the participants. This also influences the way coalitions are built during the process, and on which level (farmers, enterprises, or institutional stakeholders).

Both in terms of the introduction of novelties, as in terms of the building of visions and coalitions the differences in methodical setup and their effects show that these three projects have fundamentally different perspectives on their expected contribution to a transition pathway.

The methodical setup of BwT (Technical sophistication, the building of a specific vision with clear choices and the building of selective coalition of stakeholders) assumes that radically new and integrated generic systems will have a more profound effect on the regime in the long run.

On the other hand, the methodical setup of Pork Opportunites and The New Livestock Keeping (designs as communicative vehicles, a broad and multi-interpretable vision, localized implementations) seems to assume that system innovation is a chaotic and unpredictable process, that results from the gradual addition and combination of smaller novelties, that are combined and recombined over a longer period of time, to which these projects can contribute with a number of ideas, a general vision, empowered farmers and inspired institutional stakeholders.

6. Conclusions

We studied the first effects of three recent projects in redesigning animal production systems in the Netherlands, and try to relate these effects to the different methodical choices made in these projects. Although the three projects studied share a common methodical core (in using elements of the RIO approach), they differ considerably in at least six features of the methodical setup, namely A system barriers, B ambitions, C target group, D Diversity of participants, E Control over design, and F Potential scope of the design. These differences turn out to have a significant effect on the outcome of these projects; not only in the nature and amount of novelties (visible effects), but also in their potential future institutional change. This becomes clear by looking at the tactics of Institutional Entrepreneurship – creation of a vision and coalition building – that were stimulated by the three projects. It can be concluded that all three projects acted as a vehicle of Institutional Entrepreneurship, which is promising for their future impact. But the character of the Institutional Entrepreneurship differs considerably between the three projects.

In Pork Opportunities creation of a vision and coalition building was particularly stimulated among institutional players. These institutional players enable and support novelty production and niche creation of farmers and system builders. By doing so, they create room for Institutional Entrepreneurship at the grassroots level for a broad range of actors without very clear goals and strategies concerning institutionalization.

In Broilers with Taste vision creation and coalition building are taking place around one powerful design. This design consists of a number of strongly interrelated novelties bearing a promise that can only be fulfilled by realizing the complete package. Here Institutional Entrepreneurship is mainly fuelled by this design and to a lesser extent (as is the case for Pork Opportunities and The New Livestock Keeping) by the sense of urgency and inspiration of individual actors.

The New Livestock Keeping realizes change by a personal approach. Vision creation and coalition building take place around a specific farmer, triggering tailor-made solutions and novelties. As a result Institutional Entrepreneurship of participants (farmers) is much more practical here; focusing not so much on changing (general) institutional arrangements, but much more on discovering hands-on solutions for context-specific problems.

We argue here that none of the chosen methodical set-ups is better than the other two per se. the projects represent three different perspectives on how system innovation can be facilitated. It depend a.o. on the actors involved, resources available and interim targets, which one is best.

Finally, Institutional Entrepreneurship does help to take a closer look at the process of niche formation, niche development and the interaction between niche and regime. It helps to address aspects that might otherwise have remain hidden, especially at the micro-level. However, Institutional Entrepreneurship does not offer a complete framework to understand these, and it cannot encompass the full complexity of these processes. The real understanding comes from the 'transformation stories' themselves. Only, by telling these stories the strategic and often intuitive coordination of tactics by Institutional Entrepreneurs can be captured.

Literature

Battilana, J., B. Leca & E. Boxenbaum (2009). How actors change institutions: Towards a theory of institutional entrepreneurship. *The Academy of Management Annals* 3:1, 65-107.

Bos, A.P. (2008). Instrumentalization theory and Reflexive Design in animal husbandry. *Social Epistemology* 22, 29-50

Bos, A.P. & P.W.G. Groot Koerkamp (2009). Synthesising needs in system innovation through structured design: A methodical outline of the role of needs in reflexive interactive design (RIO). In: K.J. Poppe, C. Termeer & M. Slingerland (eds.) *Transitions towards sustainable agriculture and food chains in peri-urban areas*. Wageningen Academic Publishers: Wageningen.

Bos, A.P., P.W.G. Groot Koerkamp, J.M.J. Gosselink, & S.J. Bokma (2009). Reflexive Interactive Design and its application in a project on sustainable dairy husbandry systems. *Outlook on Agriculture* 38, 137-145.

Bos, A.P., S.F. Spoelstra, P.W.G. Groot Koerkamp, K.H. de Greef & O.N.M. van Eijk (2011). Reflexive design for sustainable animal husbandry: mediating between niche and regime. In: Spaargaren, G., Loeber, A. & Oosterveer, P. (eds.) *A transition perspective on sustainable food and agriculture*. Routledge: London.

Commission Wijffels (2001). *Toekomst voor de veehouderij: Agenda voor een herontwerp van de sector*. LNV: Den Haag.

DiMaggio, P.J. (1988). Interest and agency in institutional theory. In: L. Zucker (Ed.). *Institutional patterns and organizations*. Ballinger: Cambridge.

Elzen, B., M. Barbier, M. Cerf & J. Grin (2012a). Stimulating transitions towards sustainable farming systems. In: I. Darnhofer, D. Gibbon & B. Dedieu (eds.). *Farming systems research into the 21st century: The new dynamic*. Springer Science: Dordrecht.

Elzen, B., B. van Mierlo & C. Leeuwis (2012b). Anchoring innovations: Assessing Dutch efforts to harvest energy from glasshouses. *Environmental Innovation and Societal Transitions* 5, 1-18.

Farla, J., J. Markard, R. Raven & L. Coenen (2012). Sustainability transitions in the making: A closer look at actors, strategies and resources. *Technological Forecasting & Social Change* 79, 991-998.

Fünfschilling, L. & B. Truffer (forthcoming). The structuration of socio-technical regimes: Conceptual foundations from institutional theory. *Research Policy*

Geels, F.W. (2002a). *Understanding the dynamics of technological transitions: A co-evolutionary and socio-technical analysis*. Twente University Press: Enschede.

Geels, F.W. (2002b). Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study. *Research Policy* 31 (8-9), 1257-1274.

Geels, F.W. (2005). *Technological transitions and system innovations: A co-evolutionary and socio-technical analysis*. Elgar: Cheltenham.

Geels, F.W. & R. Kemp (2000). *Transities vanuit sociotechnisch perspectief*. Universiteit Eindhoven: Eindhoven.

Geels, F.W. & J.W. Schot (2007). Typology of sociotechnical transition pathways. *Research Policy* 36 (3), 399-417.

Groot Koerkamp, P.W.G. & A.P. Bos (2008). Designing complex and sustainable agricultural production systems: An integrated and reflexive approach for the case of table egg production in the Netherlands. *NJAS* 55, 113-138.

Hegger, D.L., J. van Vliet & B.J. van Vliet (2007). Niche management and its contribution to regime change: The case of innovation in sanitation. *Technology Analysis & Strategic Management* 19, 729-746.

Klerkx, L., N. Aarts & C. Leeuwis (2010). Adaptive management in agricultural innovation systems: The interactions between innovation networks and their environment. *Agricultural Systems* 103, 390-400.

Klerkx, L., S. van Bommel, B. Bos, H. Holster, J.V. Zwartkruis, N. Aarts (2012). Design process outputs as boundary objects in agricultural innovation projects: Functions and limitations. *Agricultural Systems* 113, 39-49.

Marsden (2003). *The condition of rural sustainability*. Van Gorcum: Assen.

Monaghan, A. (2009). Conceptual niche management of grassroots innovations for sustainability: The case of body disposal practices in the UK. *Technological forecasting and social change* 76 (8), 1026-1043.

Pacheco, D.F., J.G. York, T.J. Dean & S.D. Sarasvathy (2010). The coevolution of institutional entrepreneurship: A tale of two theories. *Journal of Management* 36 (4), 974-1010.

Siers (2004). *Methodisch ontwerpen volgens H.H. van den Kroonenberg*. Wolters-Noordhoff: Amsterdam.

Slingerland, M. & R. Rabbinge (2009). Introduction. In: K.J. Poppe, C.J.A.M. Termeer & M. Slingerland (Eds.). *Transitions towards sustainable agriculture and food chains in peri-urban areas*. Wageningen Academic Publishers: Wageningen.

Smith, A., A. Stirling, F. Berkhout (2005). The governance of sustainable socio-technical transitions. *Research Policy* 34, 1491-1510.

Spaargaren, G., P. Oosterveer & A. Loeber (eds.) (2012). *Food practices in transition: Changing food consumption, retail and production in the age of reflexive modernity*. Routledge: New York.

Spoelstra, S.F., P.W.G. Groot Koerkamp, A.P. Bos, B.E. Elzen & F. Leenstra (2013). Innovation for sustainable egg production: realigning production with societal demands in The Netherlands. *World's Poultry Science Journal*, 69, 279-298.

Swagemakers, P. (2008). *Ecologisch kapitaal: Over het belang van aanpassingsvermogen, flexibiliteit en oordeelkundigheid*. Wageningen UR: Wageningen.

Van der Ploeg, J.D. (2003). *The virtual farmer: Past, present and future of the Dutch peasantry*. Van Gorcum: Assen.

Zwartkruis, J., L. Klerkx, E. Moors, J. Farla & R.E. Smits (2010). Co-innovation in Sustainable Laying Hen Husbandry Systems: Investigating the interactive framing of sustainability. *9th European IFSA Symposium*. Vienna, Austria.