Dealing with incumbent regimes: Deliberateness and serendipity of innovation agency

Laurens Klerkx[a], Noelle Aarts[b], Cees Leeuwis[a]

[a]*Wageningen University, Communication and Innovation Studies; Laurens.Klerkx@wur.nl; Cees.Leeuwis@wur.nl*
[b]*Wageningen University, Communication Strategies / University of Amsterdam, Strategic Communication, Noelle.Aarts@wur.nl*

Abstract
This paper addresses how actors in niche innovation projects interact with existing socio-technical regimes. The focus is on actor strategies deployed to create changes in the institutional environment of projects in order to establish a more conducive environment for niche projects. The paper identifies several such effective reformism strategies: framing novelties within existing rules, seeking outright confrontation and challenging or bypassing the current institutional context, and "guerilla tactics" in which pressure is gradually built up at different economic and political levels. Tangible visions and boundary spanning actors that fulfill boundary spanning roles are essential here. Niche project actors need to continuously re-interpret the contexts in which they move, although they can only partly influence these contexts.

Keywords*: agricultural innovation systems, niches, agency, institutional environment, effective reformism, innovation journeys, The Netherlands*

Introduction

The multi-level perspective on socio-technological transitions (MLP) (e.g., Geels and Schot, 2007) is a comprehensive approaches to grasp the complexity and dynamics of system innovation. Based on long-term historical analysis, the MLP approach tries to explain how *niches*, spaces – usually protected - in which novelties are developed, eventually may overthrow, transform, substitute, or reconfigure an incumbent socio-technological regime. Niches and regimes have been found to have a reflexive relationship with circular causality (Geels and Schot, 2007): niches are conditioned by regimes, but themselves (try to) influence regimes that hence may exercise a different kind of conditioning on niches. Attention has been paid in the MLP literature to how different kinds of interaction between niche and regimes result in different transition pathways, through concepts such as translation Smith (2007a). However, these studies often still take a rather crude retrospective view and do not specifically focus on the agency of individual actors. In this sense, they still view the MLP as a global model that maps the entire transition process, as opposed to a local model that focuses on micro ideas, decisions, actions, or events in particular developmental episodes (Geels and Schot, 2007). In this paper, we take such a local perspective. We analyze how actors in niches deal with the regime. Roep et al. (2003) call this *effective reformism*: "the capacity of the project and its niche to change structural aspects of the existing regime". Effective reformism thus is about how innovating actors may realize and durably embed their innovation.

The socio-technical regime encompasses a broad set of dominant designs, incumbent technologies, practices, and use patterns. Given the fact that socio-technical change is determined in social interaction, innovating actors in niche projects have to change the rule set attached to incumbent technologies and practices, and hence the regime manifests to them as the 'institutional environment' in which they are embedded. By yielding detailed insights on how actors interact with their institutional environment in their effort to innovate, we hope to contribute to insights on effective reformism and offer building blocks for innovation policies. The paper continues by drawing a conceptual framework of agency and innovation networks (section 2). The aims and methods of the study are presented in section 3, followed in section 4 by an innovation journey case study in which the focus is on how the agency of innovators translates into networking for innovation. In section 5,

these findings are analyzed and discussed findings, and the paper ends with some final reflections (section 6).

Innovation agency and structure

Agency is the ability to take action and make a difference over a course of events (Giddens, 1984). Besides innovation agency being determined by the resources and competences that an actor or organization has at its disposal for innovation (i.e. knowledge, skills, material, and financial resources), it includes institutional features such as actors' norms and rules, a so-called 'innovation template' that orients and legitimizes action (Edwards, 2007). From a self-organizational perspective, it is acknowledged that no single actor can pursue its innovation goals without taking into account other actors, because of a lack of sufficient power and resources to do so (Aarts et al., 2007). This perspective sees actors/organizations interactively shaping a support network with a view to achieving individual and collective goals, and to obtaining resources, the nature and source of which is unknown ex-ante (Kash and Rycroft, 2002). The idea of a support network presupposes a core network with voluntary membership. This does not mean that network partner interests automatically align, as innovation networks are the scene of political play and negotiation (Wiskerke and Roep, 2007).

Furthermore, such core networks are dependent on many other peripheral actors in the institutional environment whose involvement may not be voluntarily but, rather, predicated by mutual interdependence. In Giddens' structuration theory (Giddens, 1984), actors and the structures in which they are embedded have a dual relationship, because the "structural properties of social systems are both medium and outcome of the practices they recursively organize" (p. 25), i.e. the pattern of social practices reflects a "virtual order" of rules, resources, and transformative relations that constrains and at the same time enables social activities (Alexiou and Zamenopoulos, 2008). In the study of innovation systems, this reflexive relationship between actors and their institutional context that actors may adapt, change, or complement has been called *mutual embeddedness* (Markard andTruffer, 2008).

Actors reflexively monitor the actions and aspects of the contexts within which they move, taking into account past, present, and future events (Edwards, 2007), thereby aiming to reach their goals and reduce uncertainty in the process of achieving these (Geels and Schot, 2007). Often, the goals of innovating actors are embodied by more or less articulated visions that have an influential guiding, convincing, binding, and uncertainty mitigating function (Berkhout, 2006). The latter is particularly important, because innovation exposes prime moving actors to many uncertainties as regards, for example, complementary resource acquisition, development of consumer demand, policy and legislative adversity or instability, and network partner and competitor behavior (Meijer et al., 2007). Although actors may deliberately try to influence their institutional environment (structure) to reduce these uncertainties, they are always bounded in their influence. Random and external events, in the form of unintended consequences of agency, as well as exogenous events that lie outside the sphere of influence of agents themselves, play an important role in bounding, or conditioning, further activities, and thus constitute an important source of structure variation (Giddens, 1984). Innovation is influenced, for example, by consumer preferences, government policies, and market factors at regional, national, and global level (Geels and Schot, 2007).

From this review on innovation agency, it has become clear that shaping an innovation involves a good "story" (e.g. visions, discourse), told by the right people (with conviction, credibility, power), at the right time, in the right place, and to the right people (acquiring complementary assets, building and capitalizing upon momentum) (Aarts et al., 2007; Swan et al., 2007a).

Goal and method

Goal

It is clear from section 2 that, in networking for innovation, actors employ resources to achieve their goals and reduce their uncertainties by influencing their environment while being mediated by it. By looking at what deliberate strategies are employed, as well as the influence of unintended consequences or external events, the present study explores how core innovation network actors (sometimes called 'innovation champions' and referred to hencefort as 'the innovation network) interact with their institutional environment.

Method

To analyze innovation dynamics, the literature points to event analysis (Van de Ven et al., 1999) as a suitable method. Data were gathered through semi-structured interviews with innovation network and institutional environment actors, who acted both as respondents telling about their own experiences and as informants giving the broader picture and observations. When such an analysis is conducted at the actor level, it should take into account influences that lie beyond the actor level – an aspect that is sometimes overlooked in actor-oriented analysis. The interviews were fully transcribed, and analyzed with qualitative data analysis software (Atlas 5.0). The perspectives of both innovation network and institutional environment actors were analyzed in order to reconstruct agency-structure interactions. It is important to note that the innovation networks themselves are not stable entities: as a result of interaction with their environment, resource needs, and external events its composition may change over time. Nonetheless, one can distinguish between a core network of innovators, and peripheral actors in its environment. This analysis was complemented with analysis of a range of internal network documents (e.g. meeting minutes) and external documents (e.g. policy documents and newspaper articles). Furthermore, this multi-stranded approach permitted triangulation: a research methodology to prevent the risk of distortions in post-factual accounts , increasing internal validity. Table 1 outlines the data collection.

We discuss an innovation journey in the Dutch agri-food sector dealing with the development of an environmentally and animal-welfare friendly poultry husbandry concept (called Rondeel) that resulted from an interactive design process (Groot Koerkamp and Bos, 2008). This niche project forms part of in broader developments in welfare innovations in Dutch animal husbandry, which would form the 'complete niche' (see e.g. Wiskerke & Roep, 2007), in contrast to a production system characterized by industrialized animal production with low animal welfare.

Table 1. Data gathering methods.

Type of data gathering	
Semi- structured interviews geared at identifying actor experiences and perceptions	32 interviews: 6 with Vencomatic/Rondeel Ltd. staff; 1 with Kwetters staff ;5 with civil servants (Barneveld/LNV[a]); 4 with interested farmers; 7 with service providers (architect, environmental consultant, ASG researchers); 4 with facilitators (Transforum/Transition and Society); 3 with funding agencies (Oost NV/Gelderse Vallei); 2 with representatives (ZLTO[b]/APS[c])
Observation of actor interaction	At 8 meetings (3 workshops and 5 steering committee meetings)
Document analysis	Analysis of meeting minutes over 3 years (2006-2009), newspaper articles over 4 years (2005-2009), communication with LNV

a: LNV= Ministry of Agriculture, Nature, and Food Quality; b: ZLTO=Southern Farmers' Organization; c: APS=Animal Protection Society

Results

In section 4, we first crudely describe the case, followed by a more in-depth description of specific agency-structure loci.

Event analysis Rondeel

Rondeel (see Figure 1) started with the interactive design project 'Houden vcan Hennen' (see Groot Koerkamp and Bos, 2008; which we translate as Caring for Hens - CfH), resulting in visualizations and briefs of requirements (BoR) for novel poultry husbandry systems (Plantage and Rondeel). The Rondeel concept has as it most apparent distinctive feature that it is a round hen housing system as opposed to the normal rectangular ones. It furthermore integrates animal welfare standards comparable to organic (open air) laying hen husbandry (e.g. natural shelter) with the advantages of closed hen housing systems producing cage eggs or indoor free range eggs (e.g. protection against aviary airborne diseases). After a failed attempt at cooperation between Kwetters (an egg packing firm participating in CfH) and the Animal Science Group (ASG – a research institute that facilitated the CfH project), Kwetters and Vencomatic (a poultry husbandry systems manufacturer) teamed up and formed a technical committee to develop a working prototype. Vencomatic dealt with technical issues, such as nesting, egg collection, and manure transport. Kwetters dealt with marketing a segment that would come in between free range and organic eggs, having increased animal welfare as its main selling point.

Alongside technical development activities (e.g. a manure drying carrousel based on a chimney effect airflow), suitable places to build the new system were sought. The search initially concentrated in Barneveld, a municipality in which poultry-related industry is clustered and that positions itself as a global poultry centre. Barneveld officials were lobbied, and interaction took place between farmers interested in building a Rondeel and different service providers (architect, construction contractors, feed suppliers, ASG researchers, environmental consultants, animal welfare consultants, and business incubator organizations). This networking supported the fine-tuning of the design, facilitated the permit obtainment process by checking compliance with building and environmental norms, and provided access to subsidies. Simultaneously, talks were started with the Dutch Animal Protection Society, who had been a partner in CfH and was piloting a certification system indicating animal welfare value (by assigning welfare stars), in an in-between segment for poultry meat (the *Volwaard Chicken*). The goal was to negotiate criteria for the assignment of one, two, or the maximum of three welfare stars. Finally, two stars were awarded.

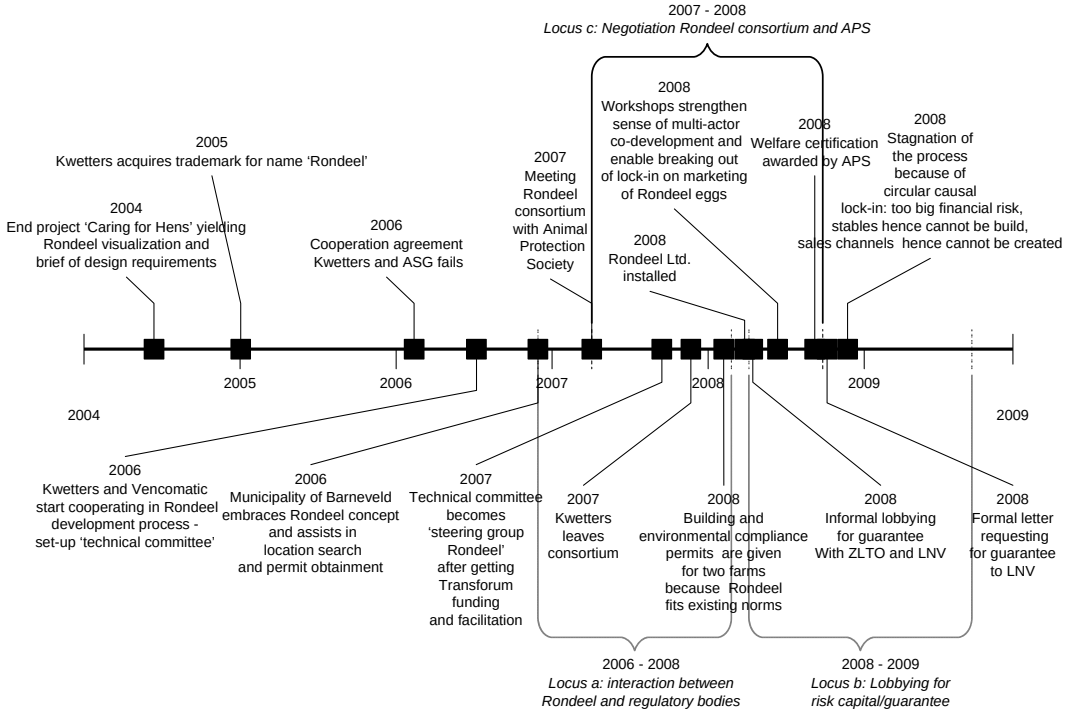

Figure 1. timeline development Rondeel with important events**.**

In their search for development funds, Kwetters and Vencomatic applied for funding and facilitation from TransForum, an organization that executed a government funded innovation programme consisting of R&D funding and process facilitation. After Rondeel became a TransForum project, internal strategic choices at Kwetters induced withdrawal from the project. Vencomatic then set-up a spin-off development firm, Rondeel Ltd. The withdrawal of Kwetters opened new perspectives and, to support new idea formation and network consolidation, TransForum instigated workshops on the network's functioning, marketing (in which consultants and champions of other welfare innovation innovation networks, e. g, the one described by (Wiskerke and Roep, 2007), participated), and future development steps. This led to a greater sense of co-development between Vencomatic and farmers, who were first seen as mere Rondeel adopters. It also led to co-operation between Rondeel Ltd. and the Southern Farmers' Organization (ZLTO) that had experience with marketing the Volwaard Chicken. The Volwaard Chicken was a poultry meat concept, that similar to the Rondeel egg aimed to position itself in between a conventional and a organic product.

Because the Rondeel house requires higher investments than normal hen housing systems, the welfare value egg has higher production costs. This makes it more expensive than normal free range eggs, and it is uncertain whether consumers will see the difference and pay extra. Hence, interested farmers, as well as their banks, were hesitant to invest if the risks of non-return on the extra investment were not covered (if the eggs had to be sold as free range). This was a lock-in situation between concept development and application that inhibited further development: to have sufficient product volume, there have to be sufficient Rondeels, but to have sufficient Rondeels, there have to be sufficient guaranteed egg purchases by retailers (supermarkets); however, supermarkets were hesitant to market the egg because of the risk of their not selling, and they also demanded a large volume right away; but supermarkets were not yet thinking about marketing the egg, they first wanted to see the rondeel functioning, but without guaranteed purchase, no Rondeels would be built. To resolve this dilemma, Rondeel Ltd. engaged in talks with ZLTO and LNV to obtain a guarantee that would cover the extra investment in the event of the Rondeel eggs not being successful and having to be sold as normal free range eggs at a lower price. In July 2009 this guarantee was given, thus enabling the construction of the first hen housing system systems.

Agency in particular agency-structure interaction loci in the Rondeel case

On the timeline in Figure 1 a number of agency-structure interaction loci in the Rondeel case are indicated that will be further analyzed. These agency-structure loci are instances in which the innovation network (the agents) interact with the institutional environment (the structure), or more broadly how niche projects deal with how the regime manifests to them at the micro-level. These reflect how the prime moving actors dealt with: a) getting building and environmental permits for a hen housing system design that did not fall neatly into an established category ('legislative regime'- political uncertainty), b) getting a guarantee to cover the extra investments in the event of Rondeel failing ('financing regime' - financial uncertainty), and c) getting certification from the Animal Protection Society as a proxy for consumer approval of the egg ('consumption regime' - consumer/political uncertainty).

Rondeel interaction locus a: getting a new design accepted by current environmental and construction legislation

The Rondeel design is different from other hen housing system forms, because it is round. Hence it is not integrally described within legislation on hen housing system construction and environmental prescriptions. This could cause potential conflicts with regulatory bodies on issues such as construction dimensions, fire safety, aesthetic fit within the landscape, and gas emissions. However, in the case of Rondeel, both construction and environmental permits were given rapidly. This was due to a number of factors. One factor was that the Rondeel concept was embraced by the Barneveld municipality, which saw it as a chance to profile itself as an international poultry centre. Kwetters' marketing manager framed Rondeel within this aspiration (helped by vivid illustrations

from the CfH project and a scale model built later), and it was further enhanced by Kwetters' CEO who strategically mentioned that other municipalities were also interested; this made Barneveld even more eager to have the first Rondeel built. As a result, the civil servants involved in economic development acted as innovation champions within their organization, chasing up the civil servants responsible for the permit procedures and stressing that this was an innovative concept that would be beneficial for the municipality.

A parallel purposive strategy of the developers was to fit out the Rondeel with existing husbandry sub-systems (feeding, manure extraction, ventilation, etc.) that were already approved for ammonia emission norms. This was made feasible by presenting authoritative ASG calculations, despite the fact that the researchers and consultants acknowledged that these figures might be different in practice. Nonetheless, instead of having to go through a protracted admission and verification procedure for emissions (taking >5 years), the hen housing system fitted existing norms. Furthermore, by hiring a local environmental consultancy firm and architect, with good connections with the Barneveld civil servants, some remaining conflictive issues were fine-tuned in interaction, such as the fit of the Rondeel within the landscape. An issue that was more troublesome was getting approval for fire safety because, despite having outdoor spaces, the Rondeel was considered as a closed building with resultant safety issues. However, because the responsible official liked the project, the architect, in close interaction with the fire department, was able to look for a solution (fireproof curtains that drop down in the event of fire) that was verified by a specialized consultancy agency. This strategy to frame Rondeel's component technology and appearance to fit with existing rules was enhanced by using specialized consultancies and researchers to verify its compliance with existing norms, thus enabling the integral concept to be executed as designed, with only minor adaptations.

Rondeel interaction locus b: overcoming risk adversity towards non-proven market concepts

As mentioned in section 4.3, to overcome the lock-in situation whereby hen housing system building depended on guaranteed sales volume and vice versa, and hence make investment risks acceptable to Rondeel Ltd. and farmers, Rondeel Ltd. needed to find ways to cover this risk. Whereas for coverage of, e.g., R&D costs, innovation subsidies from incubator organizations and innovation programs such as TransForum were available, a major problem was finding a risk funding (in the form of venture capital or provided through business angels/serial entrepreneurs), or a guarantee, to cover the risk of the surplus investment that was needed as compared to normal free range hen housing systems. The core network around Rondeel Ltd. noted in this respect that public policy discourse was very supportive of animal-welfare-enhancing innovations such as Rondeel, but that in practice they were not willing to provide financial guarantees. Being an SME, Vencomatic as the mother organization of Rondeel Ltd. could cover only part of the risk, and the existing financing regime, i.e. banks, would only fund up to the amount for a normal free range hen housing system, the returns on which are known.

An initial search for risk funding with Oost NV, a business incubator, proved unsuccessful because Oost NV targets Gelderland Province in which Barneveld is located, but as Rondeel Ltd. was from Brabant Province Oost regarded it as not being its concern. Furthermore, Oost NV is funded by the Ministry of Economic Affairs, and Rondeel was regarded as an agricultural affair pertaining to LNV. To obtain risk funding or at least a guarantee, Rondeel Ltd. tried to convince ZLTO and LNV that they needed to provide these, by having high level talks between the Vencomatic CEO, the president of ZLTO, and high LNV officials. Both ZLTO and LNV, however, stated that they could not give support to specific firms: ZLTO because it is a political representative of all farmers, and LNV because of European state support rules – they stated that their responsibility had been funding the CfH project, a feasibility study, and, through TransForum, R&D and facilitation. ZLTO, however, offered in-kind support by providing their experience and expertise with the Volwaard Chicken because they endorsed the Rondeel concept. Because the risk funding/guarantee issue could not be resolved through other means, Rondeel Ltd. tried to influence LNV first through informal probing by an ASG representative, but this was not appreciated: LNV stated that businesses should take some risk and

should not merely rely on government, and for the state to play a role, they would need to develop generic instruments. Furthermore, it was unrealistic for the Vencomatic's CEO to expect that on the basis of the Rondeel vision alone a guarantee could be provided. Despite this setback, thanks to the mediation of a consultant hired as part of the TransForum project for process facilitation and expertise on marketing of welfare innovations who had good connections with LNV, a new opening for contact was forged. The people at Rondeel Ltd. highly esteemed the role of this consultant, as the following quote shows:

> [The consultant], we call him here "the crowbar for opening closed doors".

A formal request for support was sent, and later a formal meeting was arranged. On the basis of this meeting, a more detailed business plan with well calculated financial figures was drawn up. The minister had frequently mentioned Rondeel as a promising concept, so explicit reference to this was made in the request and the business plan. LNV was willing to see what would be possible, and coincidentally it was discovered that Rondeel could make use of an existing guarantee regulation to individual farmers for large investments. Thanks to a recent change in this regulation, the maximum amount for the guarantee had risen, and this meant that Rondeel could be accommodated within this scheme. This also enabled negotiations to be re-opened with banks on financing the building of individual Rondeels, and with retailers, who earlier had been hesitant to co-develop the Rondeel egg concept until there was a perspective of guaranteed supply.

Rondeel interaction locus c: getting societal support for Rondeel's husbandry concept

The third interaction locus concerns the dealing of Rondeel Ltd. with what could be seen as a friendly environment, the Animal Protection Society (APS), because APS embraces animal welfare innovations. This involved dealing with retailers, to convince them of the unique selling point of the egg. Particularly the Rondeel visualization/scale model and the BoR opened the doors to negotiations, as there was a clear fit with APS' interests. However, in the certification process, hurdles needed to be overcome. One hurdle was that the APS needed to interpret and have approval of its members for the pilot it had in relation to awarding the welfare stars to the Volwaard Chicken. This arose because APS perceived a risk in attaching their reputation as a civic advocacy organization to a product, despite thus stimulating animal welfare. A food safety scandal, for example, would reflect badly upon the organization. These deliberations caused a delay in the awarding of the stars that were instrumental in convincing others in the quest for support, e.g. LNV. Furthermore, although the vision and BoR had attracted APS, the fact that the hen housing system system could not yet be tested in practice meant that provisionally two stars were awarded, whereas Rondeel had aimed for three. Another issue that needed to be resolved was interactional uncertainty between Vencomatic's CEO and the APS representative. Conflicts about APS' critical opinion on other Vencomatic products, coupled to the straightforwardness of the CEO as an innovation champion, were bound to negatively influence the Rondeel trajectory. This was mitigated by appointing the consultant that mediated the LNV guarantee issue as a neutral go-between to take the sharp edges off the interaction and mediate an agreement.

Analysis and discussion

From the agency-structure interaction loci presented above, we can distill a number of strategies, either straightforwardly purposeful or more often in an adaptive manner, as institutional environment response and serendipitous external events are relatively unpredictable. These strategies were applied alternately in the different agency-structure loci. We now discuss the strategies in more detail.

Purposefully reproducing the institutional context

One salient strategy to smoothen interaction with the institutional environment is the framing by innovation network actors of their vision and/or design to fit with either constraints imposed, or with possibilities offered, by the institutional environment, as is the case Rondeel interaction loci a and b. This can be either a purposeful strategy because the conditions that have to be met are known beforehand, or the result of a reaction to a serendipitously emerging opportunity. In the case of the guarantee fund for Rondeel (interaction locus b) also, such a case of randomness can be seen: whereas initially framing it in the institutional environment's discourse produced institutional environment reactions but was nevertheless unsuccessful, the finding of a recently adapted suitable regulation made it possible (i.e. using a window of opportunity).

Adaptive strategies in agency-structure interaction: "guerilla tactics"

In cases in which no such framing within the institutional environment can be deployed right away, as was the case in Rondeel interaction locus b, we see that, in reaction to institutional environment responses, a innovation network tries out new strategies to look for new entry points in the negotiation with the institutional environment to create cracks in the institutional environment. In the Rondeel case, this was done by means of a guerilla tactic that consisted of building up pressure on the institutional environment by several informal and formal attacks, making use of boundary spanning actors and of the institutional environment's own discourse. This highlights the importance of durable connectivity between innovation network and institutional environments.

The fuzziness and unpredictability of agency-structure interaction

In addition to intentional action, unintended consequences of actions and serendipity play an important role. Whereas case-specific randomness in agency-structure interaction influences the course of the innovation journey, exogenous factors also condition actor's agency. Our findings confirm earlier observations by Meijer et al. (2007) that internal and external project factors such as new developments, policy discontinuities, actor involvement or exits, can induce both positive interaction cycles (decreasing uncertainties) and negative interaction cycles (increasing uncertainties) that influence the agency of prime movers. This may lead to increased momentum but may also lead to stagnation and regression, and a resultant need for adaptation of the innovation network's composition and vision. On the negative side, this is demonstrated a number of stagnations in the Rondeel case: innovation financing by Oost NV is prevented by higher level ministerial territories, and innovation financing by ministries is prevented by European legislation; the no guarantee–no built Rondeel–no retail space dilemma. On the positive side, innovation networks may assist each other by sharing their good and bad experiences (e.g. Volwaard Chicken and Rondeel, and the experiences of the pork in-between segment described by Wiskerke and Roep (2007) that were discussed in a workshop). On a higher level, the involvement of TransForum in both cases in which it was difficult to get risk funding or guarantees (a typical problem as Meijer et al. [2007] also found) led to increased attention being given to this in the policy circles to which TransForum has access, hence increasing pressure to come up with a solution.

The importance of informal contacts and boundary spanning actors in agency-structure interaction

When the agency-structure interaction is troublesome, either because there is a) no contact, b) conflict, or c) major uncertainty at both innovation network and institutional environment level as to how to resolve an issue, we see the importance of boundary spanners and mediators on interfaces at which there is no contact, or disturbed or otherwise dysfunctional contact. These actors may be casual actors that are used as boundary spanners, such as ASG researchers in the Rondeel-LNV interface. This resonates with ideas about the importance of informal interaction in innovation (Aarts et al., 2007; Swan et al., 2007a). However, it also stresses the importance of having specific and

dedicated actors for these roles. For, example in the case of the Rondeel-APS interface (c), specialized consultants fulfilled these roles in order to complement or mitigate the actions of championing actors who generally also fulfill such a boundary spanning function. Because of their relatively neutral position, such actors, who function as independent innovation brokers (see Klerkx and Leeuwis, 2009), can more easily resolve the interactional uncertainties and impasses that have built up between innovation network and institutional environment actors, and hence facilitate solutions. In a similar vein, the Rondeel case highlights the importance of influential and powerful external innovation champions in creating conducive institutional environment conditions (such as the ministers of agriculture, the Barneveld officials, scientific experts) when the institutional environment – or key actors therein – is not supportive of change. Such a role, albeit in the intra-organizational context of large firms, has been denoted that of a "godfather of innovation" (Smith, 2007b), such as a CEO who, despite having little active involvement in the innovation process, may induce activities in other parts of the firm. This role also seems a feature of broader, more heterogeneous innovation networks and agency-structure interaction, as has been found elsewhere also (Swan et al., 2007a).

The role of tangible vision objects in agency-structure interactions

Besides persons fulfilling boundary spanning functions, the case studies confirm the role of visions as having a guiding, convincing, binding, and uncertainty mitigating function in innovation (Berkhout, 2006). What we see, however, is that the breadth or depth of the vision matters for effectively selling the story, and that visions are not automatically vehicles for supporting an innovation process. In the Rondeel case the vision included a promise for all (i.e. local and national government, consumers, APS, retailers) – this is not surprising given the preparatory work done in CfH to base the design upon preferences of a multi-stakeholder audience (see Groot Koerkamp and Bos, 2008). However, the people that would have to realize the concepts (i.e. farmers) were not involved in further vision development and adaptation, and that made them hesitant to incur risks. Jointly building up a common discourse and symbolism is conducive in the process of radical change, as Swan et al. (2007b) have shown; and, as our results show, this is a process that continues throughout the innovation process as partners leave or enter the network, or circumstances change. Linked to this, the tangibility of the vision appears to be an important factor, i.e. how it has been materialized in, e.g., detailed business plans and scale models in the process of the realization of the innovation, and how that creates shared understanding and support amongst actors. These hence become boundary objects (see Swan et al., 2007b), which are objects that serve to gain a common understanding between different actor groups. These boundary objects increase the attraction value of the vision and help mitigate actors' uncertainty. On the other hand, they may also provoke lock-ins, when they serve as exclusion mechanisms (albeit unintended) and that may perpetuate situations of stagnation in the innovation process if they prevent core network partners from reacting adequately to changing environments, or disturb agency-structure interactions.

Concluding reflections

We have shown that, in the effective reformism effort, actors actively try to create a conducive environment for their projects. The question is however to what extent this niche project has established regime change? While innovation has happened, is it system innovation? In addition to the methodological caveat that a focus on the micro-level may run the risk of ignoring aggregate effects, looking at agency-structure interactions as niche-regime interaction bears a problem. Doing micro-level studies always entails a certain degree of selective focus on some interaction loci, hence selecting only some components of much broader 'complete niches' and 'complete regimes'. Maybe this is an inherent trade-off in capturing micro-level niche-regime interaction strategies as this requires more zooming in than MLP analysis, as Geels and Schot (2007) have observed. Nevertheless, lower level agency-structure approaches to studying innovation may offer the building blocks for a

better understanding of how system innovation comes about, although some efforts will never reach maturity in system innovation or transition terms (cf. Geels and Schot, 2007).

If we can effectively can consider the institutional environments in which the Rondeel network was embedded as the incumbent socio-technical regime, it shows that in fact regimes are not monolithic opponents of niche-projects, but also gradually change from within. They are also capable of accommodating changes without radically modifying their overall composition, or in Geels and Schot's (2007) terminology, they 'reconfigure' under the influence of effective reformism. The study has showed that effective reformism consists of reflexive interactions between innovation network projects and institutional environments that are partly intentional and partly random. Prime moving actors may support their effective reformism efforts by mobilizing strategies such as using experts to verify and legitimize their story, using tangible visions and artifacts to sell it, using boundary spanning actors to mediate or defend and advocate it. In line with ideas in structuration theory on the bounded influence of agency in modifying the structures that condition their agency, this process cannot be fully controlled. The strategies applied are thus not always or not fully purposeful, but maybe innovation networks being reflexive and capitalizing upon momentum (thus enhancing serendipity) could also be considered a strategy.

The notion that innovation networks self-organize in reaction to constraints, possibilities and changes in their institutional environment – as is also revealed in our study – limits the possibility of fully steering innovation. But as Van Mierlo et al. (2010) show, it can be enhanced by active reflection on the micro position of the innovation networks and their goals versus macro-level systemic possibilities and constraints.

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