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Communicating tensions among incumbents about system innovation in the Dutch dairy sector

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ABSTRACT

This article investigates the ways in which innovating incumbents address and deal with tensions in their daily conversations in a case of a dairy initiative aiming for sector transformation. Analysis of meetings shows that innovating incumbents employ three strategies to address and deal with tensions such as concerns about the initiative's impact: voicing concerns, questioning as starting point and questioning as response. In these ways, they address tensions at the boundaries between representative and initiative and between representative and constituency. The assigned staff members of initiatives play a key role in opening up conversations on tensions. Tensions among innovating incumbents are avoided in the formal meetings, but are addressed in the frequent bilateral contacts. The research adds to the understanding of the roles of incumbents in a 'transformation pathway', by showing how innovating incumbents in interaction question which actions contribute to a sector transformation.

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1. Introduction

Sector-wide changes are necessary to make Dutch agriculture more sustainable. Innovation initiatives play an important role in achieving such change. Research about system innovation efforts has mostly been focused on system innovation processes in which pioneering entrepreneurs, researchers and other actors jointly work on real-life manifestations of new products, processes and technologies (i.e. novelties). In contrast, initiatives in which innovating incumbents (such as established actors, firms and organisation) attempt to achieve sustainable development are relatively understudied in sustainability transitions literature. In this article, we investigate how innovating incumbents in an innovation initiative in the dairy sector deal with tensions that emerge in their effort to collaboratively develop a more sustainable dairy chain.

The emergence of tensions in system innovation initiatives is acknowledged in system innovation literature. Indeed, studies of the daily practice of innovation initiatives, report various tensions. [Hoes and Regeer \(2015\)](#) show that system innovation initiatives are dependent on the cooperation of diverse actors, but tensions emerge because of the different interests and normative perspectives of the actors which are difficult to align. Such tensions are especially salient when actors believe that the proposed change will harm their interests and values. [Van Mierlo et al. \(2010\)](#) note that tensions may surface when the long-term goals or visions of fundamental change are more out of reach than expected. And although

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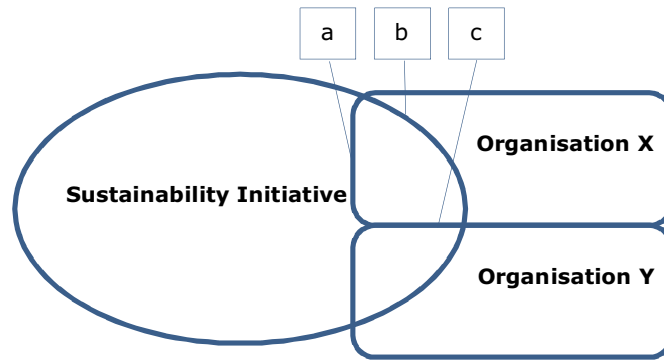


Fig. 1. Representation of the boundaries related to collaborative initiatives of incumbents.

these examples concern studies of innovation initiatives with pioneering entrepreneurs, such tensions may play a role if incumbents work on transforming a sector as well.

This study focuses on the daily conversations between incumbents that participate in a dairy sustainability initiative. In the next section, we elaborate on the role of incumbents in system innovation processes as currently described in transition literature and we argue that studying the everyday communication between innovating incumbents is a way to further our understanding of sector transformation efforts of incumbents. Next, in Section 3, we introduce the case studied, which is situated in the Dutch dairy sector, and specify the analytical framework we applied. In Section 4, we present our results and show three ways in which innovating incumbents collectively discuss tensions. We conclude with Section 5, in which we relate the results to current transition science literature.

2. Innovating incumbents and tensions

In sustainability transitions literature, the term incumbent refers to the established actors, firms and organisations of a sector. They are seen as central to the regime (Bosman et al., 2014). Regimes are characterised as rather stable due to the existing aligned rules guiding people’s actions, interdependencies between actors and technologies and infrastructure which counter change (Geels, 2011). Socio-technological niches offer protected space from selection pressures of the regime to path-breaking innovations. In this way, niches may facilitate the development of innovations and guiding rules that are considered more sustainable than the *status quo* and therefore play an important role “in broader processes of regime shifts” (Smith and Raven, 2012; p. 1025) which are a “result of a combination of external pressures [and] internal tensions” (Bosman et al., 2014; p. 47).

Several system innovation studies portray incumbents as actors that hinder the development and diffusion of niche-innovations, because incumbents “(financially) benefit from existing practices” while innovations can pose a competitive threat to existing practices (Smink et al., 2015; p. 87). Other studies go beyond this view, Berggren et al. argue for example that “regime actors may drive radical innovation at the niche level as well”, thereby criticising “the perception of ‘regime actors’ as conservative forces who resist change if not forced to embrace it by the dynamism of new niches” (Berggren et al., 2016 p. 11). They illustrate this with a case in the heavy vehicle industry in which incumbents also compete at niche level with new entrants.

A different perspective on how incumbents may play a role in system change from within is provided by Geels and Schot (2007) who introduced the so-called *transformation pathway*. This pathway of system change does not emerge through radical innovations that are developed and experimented with in niches. Transformation pathways emerge when outsiders (e.g. from Non-Governmental Organisations, NGOs) draw attention to negative side effects of the practices of incumbents. Such ongoing pressures cause frictions within the socio-technological regime that eventually trigger regime reorientation, provided that they are strong and prolonged, so that incumbents “perceive performance problems as structural rather than temporary or operational” (Geels, 2014; p.271). This is necessary for incumbents to “gradually question more foundational regime elements” (Geels, 2014; p.271) and to rethink the sector’s core beliefs and practices. A sector hence may gradually transform in case incumbents modify established rules and form symbiotic relations with add-on novelties (Geels and Schot, 2007).

Current literature has not yet addressed the role of incumbents collaboratively working on transition efforts. Geels (2014, p.275) acknowledges that many issues regarding the role of incumbents remain unclear as studies do “not address what goes on inside firms, which would introduce another layer of complexity”. To add to the understanding of innovating incumbents’ roles in transitions, we explore how incumbents deal with tensions that emerge in the communication between the multiple actor-groups that collaboratively work on a sector transformation.

In the context of this article, we use the term ‘innovating incumbents’ to refer to influential actors in a sector, who participate in a sector-wide sustainability initiative and persistently work on a sector transformation. Fig. 1 shows an abstract representation of multiple innovating incumbents (i.e. organisation X and Y) participating in a sustainability initiative to

enable collaborative action. The sustainability initiative transcends the boundaries of several organisations. Studies in the field of science and technology show that the transcending of boundaries can create tensions as each organisation has specific interests, goals and practices that may be hard to reconcile (Gieryn, 1999; Halffman, 2003; Star and Griesemer, 1989). Fig. 1 distinguishes three boundaries at which these tensions may emerge. These are the boundaries between (a) the innovating incumbent and the overall initiative; (b) the person being a participant of the initiative and his or her employer or supporters; and (c) between the innovating incumbents.

Studies on collaborative initiatives show that boundaries manifest through rhetoric acts of people (Metze, 2010) and tensions on boundaries similarly become visible during conversations (Akkerman and Bakker, 2011). Also, people seek for ways to bridge the boundaries between different groups through communication (Aarts, 2015). Or as Beers et al. (2005) notes, communication between multiple actors is important for solving problems as it can bring the sharing and integrating of multiple knowledge, expertise and point of views.

Although communication is key for identifying and dealing with tensions that emerge between multiple groups that collaborate, studies show that people find it difficult to openly discuss tensions in multi-actor settings. For instance, Regeer (2009) observes that people have a tendency to sweep tensions under the table. Moreover, Akkerman and Bakker (2011) state that a key mechanism that hampers co-creation in collaborative initiatives is that concerns of participants are easily neglected by other participants. Angman (2013) argues that people suppress tensions with their language to be able to uphold a conflict-free experience, by for example disqualifying or neutralising different point of views.

Another study on day-to-day communication in a complex systemic setting suggests that interdependent stakeholder groups indeed avoid discussing sensitive issues related to boundaries openly even in an intensive learning-facilitation process (Kouévi et al., submitted). However, the stakeholder groups addressed some of the sensitive issues with indirect communication strategies, such as giving an example without conclusion and using soft wordings, in order to find ways to improve the situation without the risk of producing a conflict. Beers et al. (2005) suggest that implicit communication and the avoidance of verifying whether one's understanding aligns with another's intentions can result in undetected misunderstandings that might later on, when finally surfacing, become a threat to collaboration.

So, although indirectly communicating about tensions might ease the process of addressing tensions without ignoring them altogether, the downside may be that possible collaborative actions to solve tensions more fundamentally are not explored. This may mean that opportunities to communicate tensions in such a way that foundational regime elements are discussed, rather than communicating tensions as temporary or operational, (Geels 2014) are not seized.

The aim of this article is to further our understanding of the ways in which innovating incumbents communicatively address and deal with tensions in their daily conversations when working towards a sector transformation. In this article we address the following question: How do tensions on the boundaries manifest during conversations among innovating incumbents and how do they deal with these tensions? We studied an ongoing case (Yin, 2009) in the Dutch dairy sector to answer this question.

3. A case study approach: the sustainable dairy chain initiative

3.1. *Innovating incumbents in the Dutch dairy sector*

Recent developments, explained below, have triggered collaborative sustainability initiatives within the Dutch dairy sector to ensure that these developments will not result in an unsustainable sector. We studied one such sustainability initiative, the Sustainable Dairy Chain (In Dutch: 'Duurzame Zuivelketen'). This case fits the transformation pathway, primarily because it is a sustainability initiative in which powerful companies and organisations collectively take the lead in improving the sustainability performance of the agricultural subsector of which they are part, thereby proactively responding to recent, and potentially threatening, developments. Below, the strategy of the Sustainable Dairy Chain is explained.

3.1.1. *Recent developments in dutch dairy sector*

As of 2014, the Netherlands is home to roughly 17,000 dairy farms and 1,400,000 cows. The milk is processed in factories and eventually sold to consumers (as milk or other dairy products such as cheese, butter and cream). Many Dutch dairy factories (i.e. dairy processing and marketing companies) are co-operatives. They are owned and supervised by dairy farmers. These dairy factories have a tradition of collaboration, born out of necessity: milk needs to be processed rapidly or it will spoil, so neighbouring factories need to step in in case of malfunctions.

Currently, the majority of the Dutch citizens and the government have a positive view of the Dutch dairy sector, seeing it as a non-intensive agricultural sub-sector (Onwezen et al., 2013). Probably, the relatively low numbers of cows on each dairy farm (average of 90 cows per farm in 2013; Pronk et al., 2014) – in comparison with other types of livestock farms in the Netherlands, such as pigs and chickens – and grazing the cows outside in the pastures, still common practice in the Netherlands, have both contributed to this image. NGOs value grazing in particular, as it is associated with natural animal behaviour and the Dutch public appreciates the image of cows in the field (Driessen, 2014).

However, because of some recent developments several incumbents in the Dutch dairy sector feared that the relatively non-intensive and animal-friendly image of Dutch dairy farms would be threatened. First, the amount of cows per farm had increased while the number of dairy farmers had dropped and it was feared that more cows would be held in the Netherlands due to changes in European law (Reijs et al., 2013). Second, the milk production per cow increased every year. Finally, ten

Table 1
Sustainability goals formulated by the Sustainable Dairy Chain.

Dairy industry and dairy farmers strive with the Sustainable Dairy Chain for a Dutch dairy sector that is future-proof and responsible. This is a sector:	
<ul style="list-style-type: none"> – where we work safely and with pleasure; – where a good income is being earned; – that produces high quality nutrition; – where we deal respectfully with animals and environment; – that has societal support 	
The Dutch Sustainable Dairy Chain has set the following targets for 2020 to ensure a future-proof and responsible dairy sector:	
Climate neutral development	20% less greenhouse gasses and climate neutral growth 16% production of sustainable energy 2% energy efficiency per year
Continuous improvement of animal welfare & animal health	Responsible use of antibiotics Extension of average cow lifespan with 6 months Continuous improvement of the animal welfare score
Maintain grazing	Maintain at least the 2012 level of outdoor grazing
Maintain biodiversity & the environment	100% responsible soy Within environmental preconditions for phosphate and ammoniac No net loss of biodiversity

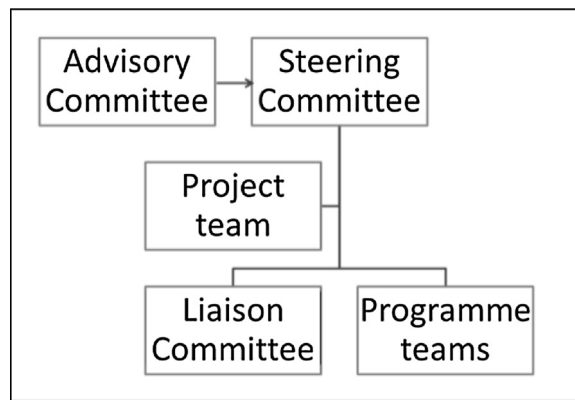


Fig. 2. Organisational structure of Sustainable Dairy Chain in 2015.

years ago the EU decided to abolish the milk quota system in 2015, which was expected to result in an increase of the Dutch stock of cattle (Reijs et al., 2013) and a possible increase of polluting emissions.

Many stakeholders such as NGOs, political parties, government, and also dairy incumbents such as dairy farmers, dairy advisors and dairy factories signaled that actions had to be taken to counteract possible negative side-effects. Several innovation initiatives appeared to develop a future-proof and responsible sector. Examples are Courage, Sustainable Dairy Chain and Action Agenda Sustainable Livestock (in Dutch: 'Uitvoeringsagenda Duurzame Veehouderij').

3.1.2. The sustainable dairy chain initiative

The Sustainable Dairy Chain was initiated in 2008, by the Dutch Dairy Association NZO – representing 13 dairy factories that process 98% of Dutch milk – and the Federation of Agriculture and Horticulture LTO – representing 70% of the dairy farmers – with the aim to improve the sustainability performance of the Dutch dairy sector. The Sustainable Dairy Chain website states that its partners “work together towards a dairy sector that is future-proof and responsible.” (<http://www.duurzamezuivelketen.nl/en/vision>). Table 1 provides an overview of the goals that Sustainable Dairy Chain wants to achieve by 2020 and Fig. 2 shows the organisational structure of Sustainable Dairy Chain.

The objective of Sustainable Dairy Chain is to improve performance on four dimensions: climate; animal welfare; grazing; and biodiversity and environment, thereby countering recent developments that could result in unwanted dairy farming. The changes that Sustainable Dairy Chain pursues are not radical in the sense that they directly affect the core business activities of the dairy sector or fundamentally challenge existing operating procedures. However, the proposed changes go beyond incremental innovation as they affect almost all Dutch dairy farmers (around 17,000 farms) and require choices to be made that change their current practices, habits, relations and their institutional embedding. Moreover, not only farmers and milk processing companies need to change patterns of thinking, acting and relating but the whole network of surrounding actors and institutions, i.e. feed suppliers, veterinarians, banks, accountants, schools, data-suppliers, technology-developers (De Lauwere et al., 2015). The initiative may hence contribute to a transition towards sustainable agriculture. Although it is

yet impossible to assess whether the efforts of the Dutch dairy sector and other stakeholders will result in a more sustainable dairy sector as the process of change is still ongoing, it is an interesting case to investigate the role of incumbents in the transformation partway (Geels and Schot, 2007).

In the framework of the Sustainable Dairy Chain the associated dairy factories take concrete actions related to these goals. For example, each dairy factory is responsible for the development and implementation of sustainability programmes. These programmes include, among others, financially rewarding farmers who practice grazing, and offering trainings, workshops and tool to educate farmers on alternatives that contribute to sustainable development (Duurzame Zuivelketen, 2014).

Fig. 2 shows the overall organisational structure of Sustainable Dairy Chain in 2015. The steering committee primarily discusses and decides upon strategic matters and consists of nine representatives of NZO and LTO. An advisory committee consisting of sixteen representatives from the government, business, civil-society organisations and the scientific community meets about twice a year to provide feedback to the steering committee. The liaison committee, consisting of sustainability managers of the associated dairy factories, co-ordinates the implementation of the Sustainability Dairy Chain and focuses on tactical and operational issues. A project team of two people links the steering and liaison committees and supports all steps in the name of the initiative as a whole. Furthermore, four programme teams with twelve people in total are responsible for the development of solutions and actions that sustainability managers can implement to effectively work on realising progress on the four sustainability goals.

3.2. Data collection and analysis

The liaison committee, in which twenty innovating incumbents meet around six times a year, is the core focus of this research. For the purpose of the study, this is the most interesting group to investigate, because most of the members are sustainability managers, who play a central role in achieving actual change in their home organisation and hence were expected to be confronted with tensions located on all three predetermined boundaries as presented above. To answer the research question about the tensions among incumbents emerging and addressed in conversations, we analysed the communication during the four liaison committee meetings that took place during the research period. Additional data, stemming from twelve interviews with participants of Sustainable Dairy Chain, five observed steering committee meetings, three attended seminars, as well as some written documentation (press releases and agenda items), were used to understand the context of the communication in the liaison committee.

The meetings of the liaison committee are a “natural setting” in which innovating incumbents communicated about progress and issues regarding their efforts of achieving sectoral change. The first author of this article was engaged with the initiative through her work as an applied researcher and agreed with the participants to observe the liaison meetings and to record the audio to be able to study the working approach of the initiative in detail. Initial analysis of the precise conversations that took place during the liaison meetings showed that they contained communicative interaction between the participants about boundary tensions as described in Section 2. One of the meetings was fully transcribed (i.e. verbatim) and the three other meetings were transcribed in less detail (not transcribing all utterances). During the analysis, we used both the original audio recording and transcripts. This enabled interpretation not only of the content of the conversation – based on the transcripts – but also the form, as the recordings also include inflexion, tone, pauses, etc.

From the transcripts and audio recordings of the four liaison committee meetings we first identified the instances in which tensions were addressed. Tensions were identified in case of utterances about (a) inconsistencies between the initiative’s ambitions; (b) disagreements and/or frustrations among participants in a meeting, and (c) the use of rhetoric, utterances and/or tone that suggest the existence of tension.

Next, we analysed whether these tensions concerned any of the following predetermined boundaries: (a) between a liaison committee member and the sustainable dairy chain initiative; (b) between a liaison committee member and the dairy factory the speaker represents; and (c) between the liaison committee members that represent a dairy factory (see Fig. 1). We did not take into account tensions that concerned the boundary between the liaison committee and other entities such as the other committees of Sustainable Dairy Chain, farmers and NGOs as these were not present during the liaison committee meetings so we were not able to see their interaction.

Subsequent, we identified the conversational *episode* in which the tension occurred. Episodes were identified as a part of a meeting in which the participants communicated about the specific tensions and in several occasions corresponded to a prepared item on the agenda of the meeting. An episode starts when a new topic is contributed to the conversation, proceeds with the ensuing discussion and ends with the closing of the topic. For each episode it was assessed whether the innovating incumbents collectively discussed the related tension as: (a) a structural problem, also during the closure of the episode; (b) a structural problem during the conversation but as an operational/temporatu problem during the closure of the episode and (c) as a temporary or operational problem.

Subsequently, we analysed the turns in the communicative interaction that took place during these episodes. The qualitative coding system software ATLAS-Ti was used to code the empirical data in an inductive way (Coffey and Atkinson, 1996). We specifically looked at how tensions directly or indirectly were revealed in the communication, how people responded to the tensions and how the communication on the tension ended. The goal of the analysis was to identify structurally different communicative patterns of revealing tensions and dealing with them subsequently. We found three generic patterns and as a check, each episode was carefully compared to the three generic patterns.

Table 2
Overview of identified conversation on tensions at boundaries.

Interaction patterns	Topic of conversation	Boundary ¹	Example	Communicate tension as structural
Voicing concerns	Communication activities of firms A	a		–
	Communication activities of firms B	a		–
	Energy saving dairy farms		2	Yes
	Potential growth sector			Yes
	Regional consultants	b		Yes in conversation/not in closure
Questioning as starting point	Solar panels	a	1	Yes in conversation/not in closure
	Changing grazing publication date	a		–
	Definition of partial grazing	a		Yes
	Planned sustainability programmes		3	No
	Workshop at dairy factory A	b		No
Questioning as response	Workshop at dairy factory B	b	4	No
	Alternative assessment tool	a		Yes
	Digital stable	a		Yes
	Environmental assessment tool	a	5	Yes in conversation/not in closure
	Management of change		6	No
	Progress sustainability programme			Yes

(a) Boundary between Sustainable Dairy Chain and dairy factories, (b) boundary between dairy factory and its representative in the committee, and (c) boundary between dairy factories affiliated to Sustainable Dairy Chain.

Finally, the results of this study were presented and discussed with members of the liaison committee to verify our interpretations and discuss implications. Moreover, four bilateral conversations took place with the project coordinator to further discuss, interpret and review the results.

4. Results

Analysis of four liaison committee meetings reveal 16 occurrences of conversations in which tensions on the predefined boundaries came to the fore (see Table 2). Most tensions concern observations that additional actions are necessary to achieve the goals due to unexpected developments, new issues emerging or because it is more difficult to achieve the goals than anticipated. Detailed examples of conversations with tensions are described below.

When reviewing these specific conversations we see that most (i.e. eight) concerned tensions on the boundary between the innovating incumbent and the overall initiative (see Fig. 1, boundary a). In five instances it is unclear to which specific boundary the addressed tension related, due to the vagueness of speaking which leaves room for multiple interpretations (see example 2 below) or because the tension appears to span multiple boundaries (see example 3 below). In three instances the tension concerned the boundary between the innovating incumbent and his or her employer. Furthermore, in none of the conversations that clearly focused on the boundaries between the (innovating) incumbents came to the fore (for clarification see Fig. 1, boundary c). Table 2 provides an overview and shows which boundary was addressed in the 16 observed occurrences.

Further analysis of the 16 occurrences in which tensions were revealed shows that liaison committee members used different strategies to communicatively address tensions during meetings and that this seems to influence the discussion that follows. We found three types of communicative patterns in which tensions were addressed and discussed and labelled them as *voicing concerns*, *questioning as starting point* and *questioning as response*.

In the following, we clarify the three communicative patterns (Sections 4.1–4.3). For each pattern, we discuss the general interaction and describe two examples in terms of the communicative interaction, the specific boundary at stake and its perceived character structural or temporary/operational. Further reflections on these results are given in Section 4.4.

4.1. Voicing concerns

In the first pattern tensions are revealed when a person *voices a concern*. Such episodes either began directly with someone voicing of a concern (see example 1) or with some discussion on the related topic after which the concern was voiced (see example 2). In response, the participants of the meeting acknowledged the voiced concern by backing it up or by being silent, as such implying consent. Also, participants formulated possible solutions which were usually non-specific and rather broad. All the voicing concern episodes were officially closed by the chair who either summed up the final conclusion or proposed a procedural step with regard to the voiced concern, after which the meeting proceeded with the next agenda topic.

We present two examples that both concern the issue that the adoption of sustainability measures by dairy farmers is proceeding slower than anticipated by the processing companies.

4.1.1. Example 1

At the final any-other-business item on the agenda, one of the liaison committee members – a sustainability manager – raised the following issue: “How do we ensure that dairy farmers start to buy things like solar (PV) panels. We tried everything

but it is very difficult to achieve actual investment by farmers". This speaking turn is closed by a cry from the heart: "I don't see it anymore. I am done puzzling". People respond to the voiced concern by discussing the topic of solar (PV) panels and why people are hesitant to invest in them (i.e., uncertainty regarding the profitability and quality of the products that are available on the market). One committee member notes that the Federation of Agriculture and Horticulture (in Dutch LTO) organised a collective bulk-buying of PV to assist farmers in purchasing high quality PV for a reasonable price. After some further discussion, the chair checks whether the sustainability member who initially voiced the concern is satisfied with the answers or if there are other issues that need to be discussed. The speaker confirms that enough information was gained and the topic is closed.

In this example, the tension is addressed that for certain sustainability goals current interventions by sustainability managers are insufficient for achieving actual behavioural change of dairy farmers. Such behavioural change was deemed necessary to achieve the goals of Sustainable Dairy Chain. As such, the tension concerns the boundary between the practice of the sustainability manager and the ambitions of Sustainable Dairy Chain. The communication started with addressing a structural problem. However, rather than discussing the overall topic of how to work towards behavioural change of dairy farmers, or, even more fundamental, whether the operational model of sustainable dairy chain is sufficiently effective, people responded by discussing the issue of 'solar panels'. These operational rather than structural solutions were proposed when the discussion was closed.

4.1.2. Example 1

An invited speaker gives a presentation on the topic of energy consumption in the dairy sector. After the presentation, the committee members discuss this topic. One member notes that some dairy farmers (i.e., a small group) are intrinsically motivated to reduce energy consumption and are making quite some progress, but that the remainder of the dairy farmers seem to ignore the issue. Another member reacts to this concern saying that "energy consumption on the farm is the domain of the dairy farmer and that 'we' are not going to interfere". Other members join the discussion and back up the general concern and discuss difficulties of stimulating energy saving. Among others, one member notes that recent machinery, considered valuable for dairy farmers – such as milking robots – increases energy consumption. Furthermore, members discuss ways for dealing with the issue, such as showing farmers the financial benefits of reducing their energy consumption. The proposed actions, however, are not concrete. After a while the chair closes the topic by thanking the presenter and summing up that the input was valuable and concludes that the worries about energy consumption remain.

In the example, a tension between the goal of 2% energy efficiency increase per year and a large group of dairy farmers ignoring this issue is discussed. The first speaker revealed the tension after mentioning a positive development – namely that several farmers are individually working on the energy goals of Sustainable Dairy Chain. The tension is voiced when another participant states that the dairy sector will not interfere (i.e. "we are not going to interfere"). This remark reveals the internal boundary tension between the goals that the Sustainable Dairy Chain has set and the actions that incumbents take to achieve behaviour change of farmers. In addition, from the above quote it remains unclear to whom precisely the word 'we' refers. It could refer to the dairy factory the liaison committee member represents, the liaison committee, or the dairy sector as a whole. This unclarity is not resolved in the discussion and as such it is unclear which boundary the tension concerns. In this example, the committee members discussed the tension as a structural one, also during the closure of the discussion. Furthermore, at the subsequent liaison committee meeting, another speaker is invited who presents a tool that dairy farmers can use to monitor their energy consumption, as such furthering the discussion on the topic.

4.2. Questioning as starting point

The second pattern in which tensions come to the fore and are dealt with starts with a question, hence the name *questioning as starting point*. In this pattern, tensions were revealed on topics that had been on the agenda for some time already, and for which the dairy factories had already taken actions. An episode started by a project coordinator or chair asking a question to all participants of the meeting and informing about the ideas, proposals and practices of the other liaison committee members and the organisations that they represent. In several ways tensions at boundaries were addressed in the responses of the liaison committee members: over the course of several question-response iterations (see example 3) or directly in the first response (see example 4). In general, many participants of the meeting joined the conversation since the question was posed to various people. In three cases all participants engaged. There were however, few responses to the input of others as everyone shared information on their own practice. In this pattern, episodes closed in different ways. Twice the conversation drifted into another direction and three times the chair summed-up the actions to be taken regarding the tension and introduced a new topic on the agenda.

Below we present two examples. Example 3 concerns questioning whether the actions that the participating companies take are sufficient for achieving the goals. Example 4 illustrates tensions related to awareness about the sustainability goals at the home organisations of the innovating incumbents.

4.2.1. Example 3

During one of the meetings, the chair introduces the general affairs agenda item 'overview sustainability programmes of dairy factories'. The chair notes that some dairy factories are further along the way than others and proceeds by asking each sustainability manager to share their sustainability programme for the coming year. Having heard the responses, the chair

begins asking follow-up questions, one of which concerns the extent to which the dairy factories reward dairy farmers for grazing. As the sustainability managers all give their various answers to this question, it turns out that the dairy factories differ quite a bit in the degree to which they stimulate grazing. When all sustainability managers have shared their intended programme for 2014, the conversation leads to two other points that the project coordinators want to explore with the sustainability managers. After these two points are discussed the chair officially closes the topic by introducing the next point on the agenda of the meeting.

This was coded as an tension on the predetermined boundaries because factories with higher incentives or rewards might be better equipped for reaching the goal of maintaining the 2012 level of outdoor grazing than dairy factories with lower incentives. From the conversation it is unclear at which boundary the tension concerns—it seems as if it spans multiple boundaries, since it concerns both the boundary between Sustainable Dairy Chain and dairy factories, and the boundary between the dairy factories (see boundary *a* and *c* in Fig. 1 on page 3). It might even be that for some the tension resides on the boundary between the dairy factory and its representative in the liaison committee (see boundary *b* in Fig. 1 on page 3). Moreover, the existence of the discrepancy between the activities of dairy factories is not explicitly discussed, therefore the interaction does not result in communicating structural elements underlying the tension. Despite this absence, the liaison committee members do collectively explore the tension by providing information on current affairs.

4.2.2. Example 4

During a meeting the project coordinator asks if the sustainability managers can share their experiences with a workshop they had recently. In response a sustainability manager tells that they conducted a workshop with several employees of the dairy factory and social scientists to discuss possible ways to strengthen their sustainability programme, and that the workshop was very valuable and that it was nice that, for a change, an outsider (i.e. one of the social scientists) explained the reasoning and implications of the sustainable dairy chain initiative. Another speaker says that they have planned a similar workshop, closing the conversation topic.

Although it is not explicitly said—from this text we can deduce the existence of a tension between a liaison committee member and the people at the dairy factory at which s/he works. This tension is not further discussed, probably because the emphasis of the shared information is not on this tension but on the positive progress that they had made. As such, the tension is not discussed as a structural one.

4.3. Questioning as response

In the third pattern a person shares an idea, proposal or practice, to which other participants respond by asking questions which reveal a tension, hence the name *questioning as response*. This pattern started by a participant of the liaison committee proposing something and someone else asking critical questions. In two of the five occurrences the critique was articulated over several question–response iterations. Quickly after this articulation, the chair sought a compromise between the questioning and answering person, thereby closing the episode. In two cases the other participants engaged marginally in the discussion that takes place and in three cases the other participants were silent.

Below we present two examples of raising a concern whether a proposed action is achievable and valuable.

4.3.1. Example 5

In one exemplary episode, a member informs the liaison committee about a new environmental assessment tool that dairy farmers can use to assess their phosphate emissions. During the speaking turn it becomes clear that the core firms in the dairy sector want to unroll this tool throughout the entire dairy sector. One of the sustainability managers starts to pose several critical questions such as: “*What benefits do dairy farmers get with this tool?*” After some discussion the person with the critical questions states: “*I have problems with [implementing] this.*” Another member responds directly with: “*But not with exploring it?*” which is answered by: “*No, not to explore it, no.*” Then these two members calmly exchange their views on the possible advantages and disadvantages after which the chair closes the topic and notes that the topic will be discussed further in the coming weeks.

The tension of this example is that a representative of a dairy factory questions the desirability of a specific intervention that the other members of Sustainable Dairy Chain want to carry out. As such the tension concerns the boundary between the representative’s organisation and the Sustainable Dairy Chain. Initially the existence of a tension is implied by asking critical questions. Eventually the tension is expressed clearly as a structural problem. Another member responds by suggesting a compromise which turns the tension addressed into an operational problem at the closure of the discussion.

4.3.2. Example 6

During his/her presentation on managing innovation processes, an expert states that it would be a good idea for the dairy factories to use a mix of communication techniques to reach dairy farmers. One of the sustainability managers immediately responds with: “*Is it even realistic? Such a range of tools for a small-size dairy factory?*” The presenter reacts by saying that the ambitions of the dairy sector indeed require investments and the presentation is continued, thereby closing the episode. The tension in this case is the discrepancy between the ideal working conditions for the liaison committee members and their practice.

The tension was identified as an internal boundary tension since it concerns the initiative and its participants but from the conversation it is unclear precisely at which boundary the tension resides. Also the issue was not further discussed. This lack of communication on the structural aspects of the tension did not mean that no actions were taken to structurally address the tension. It turns out that the liaison committee member who posed the questions picked up the advice of the innovation expert as this sustainability manager developed a mix of tools that are offered to dairy farmers.

4.4. Tensions revealed and dealt with

With the three interaction patterns described in the sections above, the participants of the system innovation initiative in the dairy sector, communicatively revealed and dealt with tensions related to their change ambition. The analysis shows that in two patterns the tensions were addressed indirectly. 'Questioning as starting point' and 'questioning as response' revealed tensions on topics that had been on the agenda for some time already, and for which the firms had already taken actions. This is not the case in 'voicing concerns', which can be seen as a more open way of addressing tensions. In this pattern, the revealed tensions related to new actions.

The revealed tensions were dealt with in different ways. 'Questioning as starting point' ended in a conversation drifting away or a conclusion by the chair on follow-up actions, in 'questioning as response' a compromise was sought by the chair and the 'voicing concerns' tended to end in an agreement among the participants on next steps while in two occasions the topic was closed because a final conclusion was reached, after which the chair moved to the next agenda item.

Table 2 shows for all instances if the innovating incumbents collectively discussed the related tension as a temporary or operational problem or as structural problem and if structural, whether this was still acknowledged in the closing of the issue. This was analysed for thirteen of the sixteen instances in which tensions came to the fore. (Three instances concerned internal project management issues and therefore fall out of the scope of the analysis.) In six of the thirteen instances the structural character of the tensions was not only acknowledged in the communication, but also addressed as such in the closing of the discussion. In three instances, we see that structural elements were discussed, but operational solutions were proposed in the closing of the discussion (examples 1 and 5 in the results section illustrate this phenomenon). And in the final four instances the tension was not problematized as being structural (examples 3, 4 and 6 in the results section illustrate this phenomenon).

These results suggest that innovation initiatives create a setting for addressing tensions that emerge in sector transformations. In addition, they show that core staff members of innovation initiatives, such as the project coordinator and the chair, play an important role in starting conversations (in 'questioning as starting point') that allow tensions to reveal and in further exploring and dealing with these tensions. This links up to the finding that tensions on the boundary between the innovating incumbent and overall initiative were most frequently addressed in the meetings. A few tensions related to the boundary between representative and constituency were also addressed, but as already noted the tensions at the boundaries between the innovating incumbents were not discussed at all. Tensions among incumbents were however addressed during the many other interactions taking place between the members of the Sustainable Dairy Chain and liaison committee members. The interviews and discussion of the results with the project coordinator indicate that especially the communication in smaller settings, such as one-on-one conversations, were used to effectively address and deal with all types of tensions that come to the fore in sectoral change endeavours of incumbents, including tensions at the boundaries between the organisations. Frequent informal and formal communication in diverse settings and bilateral contacts hence seem important for addressing and dealing with boundary tensions in collaborative system innovation initiatives of incumbents.

5. Conclusion and discussion

In the current transition science literature, incumbents are regularly portrayed as actors who resist change, while there are also some studies on their contribution to sustainability transitions. In this paper, we zoomed in on their role in a transformation pathway, portrayed as a pathway in which incumbents gradually transform a sector as a response to pressure due to unsustainable developments (Geels and Schot, 2007). Because current studies of innovating incumbents tend to overlook interactions between various innovating incumbents in collaborative transition efforts, we investigated how innovating incumbents in their communication address and deal with tensions that are intrinsic to any system innovation endeavour.

The study shows that innovating incumbents have several effective communicative strategies to address and deal with such tensions, namely voicing concerns, questioning as starting point and questioning as response. Sometimes tensions were openly discussed, sometimes they were merely indirectly addressed. Observations of indirectly addressed tensions are in line with the notion that people find it difficult to address tensions, presumably to avoid conflict (Ångman, 2013; Kouévi et al., submitted). We can add to this understanding that the three interaction patterns in formal meetings allow innovating incumbents to address and sometimes deal with tensions while keeping intact the commitment towards the innovation initiative and the collaborative working relationships. Moreover, the revealing of the tensions in some cases also provided the opportunity to question more foundational regime elements that hinder transformative change. This study illustrates that people who do not work in one of the companies, but have an important formal position in the initiative, such as in our case the project coordinator, could play an important role in addressing and dealing with the related tensions. Our study highlights that facilitation by a more independent actor is important to achieve effective communication and thereby

collaboration between innovating incumbents. So in addition to outside pressure, inside facilitation is essential for effective transformation pathways.

Based on the framework of the boundaries at which tensions among innovating incumbents are expected to emerge in any system innovation initiative, we observed that tensions addressed involved two of the three types of boundaries: between representatives and initiative; and between representative and constituency. This suggests that the existence of the innovation initiative creates a setting in which at least some tensions at boundaries, which are an intrinsic feature of system innovations, can be discussed among innovating incumbents. As such this study lends credence to the hypothesis that creating a discursive space for change is essential for re-ordering social relationships which again is crucial in sustainability transitions (Elzen et al., 2012; Leeuwis and Aarts, 2011).

Tensions on the boundaries between the innovating incumbents were avoided in the formal committee meetings. The additional interviews indicate, that communication in other settings, such as bilateral conversations, may provide a more conducive environment for addressing and dealing tensions at these boundaries. Informal meetings can hence be seen as an important strategy for making progress when pursuing sectoral change with innovating incumbents.

The research presented in this article is based on a case in which innovating incumbents work on sector transformation to improve the sustainability performance by involving diverse actors from the sector. Such an approach differs from pathways starting with the development of radical novelties by outsiders or hybrid actors in niches facing resistance from incumbents. It would hence be interesting to explore the relation between networks that develop novelties and networks that work on sector transformation and to investigate their relationship and whether it is symbiotic. Research addressing this topic would further our understanding on the role of incumbents in sustainability transitions.

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