EGOS paper, Montreal 2013, Nicolaj Tofte Brenneche, phd student, Copenhagen Business School, ntb.lpf@cbs.dk

Entrepreneurial agency-in-progress. A performative approach to studying processes of systemic innovation in the energy sector

The ongoing efforts to transform energy systems towards becoming environmentally sustainable provide a rich empirical source for cases of organizational creativity in the form of collective entrepreneurship, co-creation and collaborative innovation. In this paper, I will briefly introduce the challenge of organizing knowledge production in context of open-ended energy system transitions and argue, on the ground of a critical reading of established innovation management research, that a processual approach is needed in order to analyze how system transition processes are pursued through an entrepreneurial form of collective agency-in-progress through e.g. partnership arrangements. I will put particular emphasis on presenting a methodology for doing innovation process research performatively which I have developed during the course of my ph.d. research where I have participated in a European strategic partnership since 2009. Considering this partnership as a case of relational entrepreneurship within the organization of energy research, the methodological discussion puts focus on how to study this performatively – that is, how to not only theorize and study relational entrepreneurship as a practice of others, but to perform relational entrepreneurship through a research practice. The paper comprise an introduction and then a excerpt from my methodology chapter from my ph.d. thesis which I am close to finalizing.

Systemic innovation in the energy sector
Long term energy system transition agendas remain a high priority in industrialized as well as emerging industrial economies. The costs and complexities of transforming established energy system infrastructures are however vast (Hughes 1983, Geels 2005) and contingent upon political, technological and economical dynamics that no single actor can orchestrate. When long term system transition scenarios are constructed, as for example in the case of the Danish energy policy planning towards 2030 (Government of Denmark 2011), the projected future energy systems often neglect the process challenges facing entrepreneurs and innovators involved in the making of future energy systems. We may construct an

image of a movement from a current system state A to a future system state B but it remains that when the topology of energy systems is opened up (which is the case in sustainability transition scenarios), we face an inherently open-ended process of system transition where socio-technical assemblages can no longer be taken for granted but have to be organized and re-assembled as part of overall system transition processes.

This means that *agency* in relation to organizing system transition processes becomes problematic. When transition processes cannot be governed remotely from one single point of power the constitution of agency becomes an organizationally creative act of entrepreneurship more than an act of centralized system change planning and execution. This is one of the fundamental challenges in relation to organizing systemic innovation: Given that agency is systemically intertwined (economically, scientifically, technically, or otherwise) with established energy systems, the transition of energy systems necessitates a transformation of agency and actor-constellations as an inherent aspect of systemic innovation. *Relational entrepreneurship* is therefore a strong characteristic of changing energy systems.

The agency problem in innovation research
In established innovation management research, the constitution of collective agency is usually not treated as a key question. Quite the contrary, the normal approach in innovation management research is to take agency in relation to innovation more or less for granted. We find this in the case of innovation systems research (Lundvall 1992, Freeman 1995, Lundvall 2007) where the concept of innovation system is used as a framework for distinguishing between actors (e.g. universities, firms, public sector agencies etc.) and assign these – in accordance with the constructed system concept – with a certain role or function in "the innovation system" (see e.g. Bergek, Jacobsson, Hekkert and Smith 2010 for an example hereof). The innovation systems literature points repeatedly at how innovation should be understood as a systemically complex and emergent process of interaction. Agency is therefore not treated as a simple cause-effect phenomenon, but it is nevertheless pre-determined in the analytical construct of the innovation systems approach

and therefore not problematized as such. It is rather taken for granted that actors have agency and that the problem is to manage this effectively in accordance with some innovation management scheme (of which there are many).

The problem of agency constitution per se is not formulated in innovation management research and this has consequences for the nature of the analysis conducted where for example power relations and the politics of innovation are only rarely treated as a core part of how innovation unfolds. This is surprising given the inherent political nature of innovation where rivalizing virtualities are contested, negotiated and actualized with multiple social consequences. In a context where system transition processes challenge agency widely in the energy sector and within energy technology research and innovation, the tradition in innovation management research to avoid or otherwise neglect the political nature of innovation processes becomes a problematic limitation.

In another corner of the innovation research field we find an emerging clustering of contributions devoted to system transition studies with an emphasis on the so-called sustainability transitions such as in the energy sector (Markard, Raven and Truffer 2012, Geels 2005). Here we find an attempt to use historical case studies of system transition processes as an empirical point of departure for constructing transition process models of various kinds that frame system transitions as evolutionary with "regimes of selection" and the interaction hereof with systemically "unfit" developments or "niches" (Geels 2005) that are pregnant with future system solutions. This literature expresses the complexity of system transtion processes by constructing concepts such as multi-level governance and metaphors such as landscapes, regimes and niches. The purpose is to construct a holistic approach to analyzing complex system transition processes that situates individual actors in a wider system transition context. The problem is here that while the system transition studies have accomplished to retrospectively construct overview models of system transition processes, it is not clear how *ongoing* processes of agency-making unfold. Since we do not yet know how future energy systems are assembled and since this open-endedness is a inescapable condition for those involved in these processes, it is of limited

value to use historical cases as an empirical ground for constructing agency models for ongoing processes (Akrich, Callon and Latour 2002).

In other words, the complexity of organizing innovation in context of open-ended energy systems transition is not only a challenge for those directly involved in these processes, but also those studying systemic innovation. In particular, understanding system transition entrepreneurship as relational and in-progress is a key challenge for innovation research. A challenge which established innovation studies has only very limited resources for facing.

A process perspective on agency-making in context of open-ended system transition
As an alternative to established innovation management research, we might pursue a processual approach to studying systemic innovation and how collective agency is made to endure in context of open-ended system transtion scenarios. For example, by drawing on Gregory Bateson's systemic perspective on the intertwinedness of culture and nature (Bateson 2002) we may begin to understand agency-in-progress as a process of making and stabilizing new actor-constellations (Latour and Woolgar 1994) that challenges established "systems of presuppositions" (Bateson 2002) or what Isabelle Stengers (1997) and Deleuze & Guattari (2002) refers to as "assemblages". Center-staging the in-progress status of agency allows us to consider how agency becomes entrepreneurial more than managerial in relation to organizing systemic innovation and how agency remains something that has to be recurrently constituted in processes of e.g. collaborative innovation organized in partnerships.

The performative aspect of how I approach the study of systemic innovation is a key element in my research interest and in the argument for taking an alternative approach to innovation research. This means, following Law and Urry (2004) and Steyaert (2011, 2012) that I consider innovation and organization research as performative and experimental more than interpretative and observing. As part of my phd research I have participated in a European strategic partnership among universities and research laboratories called "SEEIT" (an acronym for Sustainable Energy Education, Innovation and Technology) since its

formation in 2009. The participation in SEEIT forms the empirical basis for my analysis of entrepreneurial agency-in-progress. SEEIT is an example of the ongoing efforts in the field of energy technology research to search for ways of organizing collaboration more effectively towards systemic innovation objectives. In the remaining parts of this paper, I will devote my attention to the question of how to study ongoing processes of organizing systemic innovation performatively. I will use my own research process as a point of departure.

Studying processes of systemic innovation performatively

When social scientists study innovation, the point of view is typically one of distant observation, measurement and interpretation. This has to do with a certain understanding of scientific objectivity (Haraway 1988, Law and Urry 2004), but also a certain social science habitus that helps organize an asymmetrical relationship between the researcher and the empirical field where the researcher is the one who does conceptual and analytical work, and where "the empirical" is constructed as more or less passively available for this work of the researcher. The empirical world is rendered object for the gaze of the researcher according to methodological regulations agreed upon among researchers in their respective academic fields. This means that "practice" or "the empirical" is not afforded a capacity to generate own concepts in relation to itself and its evolvement – this is the domain of the one who studies the practice according to principles which are foreign to the practices under investigation. As we saw in the previous chapter, this is also a predominant feature of innovation management research where assumptions regarding the nature of agency in relation to innovation processes are introduced at the level of theory and used to construct ideal models such as innovation systems which are then used as a device for analyzing vast fields of knowledge creation, commercialization and policy making processes. As pointed to in chapter 2, this creates an asymmetrical relation between knowledge production practices in innovation management research and the practices involved in innovation in the making.

Following Haraway, when conduting research into innovation, we thus face a basic choice between, on the one hand, reproducing a research practice that constructs for itself a transcendent point of view above and beyond the empirical field it inquires or, on the other hand, engaging in an alternative innovation research practice that avoids constructing imaginary points of view situating itself in the midst of the practices it aspire to make rational knowledges about. This represents an inversion of traditional objectivity criteria that also resonates with the aim of doing innovation process research performatively (Steyaert 2012, Law and Urry 2004). Thus, rather than organizing innovation research by means of detachment from innovation processes in time and space, the approach offered here will open up for an innovation research method that engages in ongoing processes, and takes on the risk of experimentation and probing open-ended processes which practioners involved in innovation face all the time. A risk-sharing with the field, in the field. From a more traditional method point of view, it is risky to get "too close" or get wrapped up in practice. This means that method gets distorted and the research process cannot be managed properly. Instead of seeing the entanglement with a practice as a risk in itself, the argument pursued here is that innovation process research should engage in and with the field so as to share the risks those involved in innovation processes manage in their practices. This opens up for new relations between innovation research and practices of innovation and allows for an emphasis on performative approaches and conceptual in(ter)ventions (Steyaert 2011, Deleuze and Guattari 1994) as well as for practice to gain effect on the research process.

The alternative approach to doing innovation research has developed during the course of the research process leading up to this dissertation. The method, therefore, was not a pre-conceived design that was subsequently implemented more or less frictionless in the research journey. Rather, the method approach developed as a process of research-field interaction where I as a researcher did not detach myself from the field of inquiry but pursued my research through establishing collaborative relationships in the field itself.

The idea has been to conduct innovation process research by situating myself in the midst of ongoing efforts to organize innovation in context of open-ended system transition

objectives and from there add to the practices unfolding as a means to produce new insights into the systemic nature of innovation processes. As I will elaborate below, this implies that the empirical research process has taken me through various experiences with the practice of creating and coordinating the SEEIT partnership, of pursuing cross-disciplinary research activities in-between technology and innovation research fields of expertise, and of bridging between very different institutions of knowledge production (in this case a business school and technical universities). The process has taken me through different kinds of EU funding applications, of multiple workshops and steering group meetings, through high-intensity collaborations as well as fragmented and frustrated efforts to make the partnership effective. In many ways, therefore, the research process has co-evolved with the SEEIT partnership and the research methodology has therefore matured during the course of participating in making SEEIT work.

The research process at a glance

Entering a European landscape of strategic partnering and innovation politics
The research journey leading to this dissertation began in the Summer of 2009 when I as a CBS research assistant joined the DTU-based coordination team that was set up to drive the process of creating a European partnership delivering a KIC proposal for the newly established EIT. In the following sections, I will draw a picture of the research journey I have gone through. The picture will not include all details but will seek to provide the reader with an overview of the research process and its entanglement with the partnering process shaping SEEIT. The research process overview also serves as a stepping stone for entering a methodological elaboration of the research practice which evolved during the course of the research journey. As mentioned above, this journey was not designed as a distanced study of the practice of others. Rather, the research process was driven by a search for ways of establishing a productive partnering practice – a search which was not merely my own, but a shared process among the SEEIT partners and the coordination team in particular.

At the outset of the process, my involvement in the SEEIT partnership was not conceived by me as a process of doing research. I considered it more as an involvement that could provide access to an "actual" case study of e.g. how energy engineers work and how they organize towards accomplishing innovations. In other words, a rather traditional way of staging social science studying organizational practices. However, this view changed as the partnership process continued and I began to realize that the SEEIT partnering process in itself and my involvement in it might be considered as an instance of systemic innovation – and possibly an interesting one as well. Finding myself in the midst of a partnering process with key actors involved from the European energy research scene opened up for thinking differently about the means and ends of doing innovation research. This was however not the starting point of the process.

When I joined the SEEIT KIC coordination team in June 2009, I knew very close to nothing about energy technologies, energy (research) policies or the emerging landscape of European strategic alliances within energy technology research. One of the first of many unfamiliar references I encountered during the first meeting at DTU was the "SET plan goals" which was mentioned repeatedly as a primary point of reference for defining the scope and purpose of the KIC proposal. The making of the KIC proposal was a challenging task that was not like a usual EU research project. The KIC proposal was to comprise two main components: A proposal for how to scope and organize an innovation-centered, European-wide partnership ecology that would increase significantly the capacity to coordinate and cooperate at a European level, and a signed consortium agreement among the partner institutions. This was to be completed during approximately three Summer vacation months. I became part of the coordination team because the coordinator, Jørgen Kjems, had invited professor Mette Mønsted at CBS to participate in making the proposal which was to focus on organizing partners towards generating innovation and therefore not a proposal describing technical problems and solution approaches. Mette Mønsted pulled me into the process and I subsequently spend most of my Summer that year in the interim KIC coordination office at DTU together with the coordinator Jørgen Kjems and the international alliances officer Maria Skou.

My role during this time was to act as a kind of secretary to the coordinator. Assisting the coordinator meant to help draft sections for the KIC proposal, to write up agendas for and minutes from the weekly partnership telephone conferences, to help organize the partnership workshops, to communicate with partners and to participate in writing up the final proposal. This last function illustrates my role at this stage quite well. The final proposal was written in a highly intense process of drafting, iterating, re-drafting and negotiating sentences with partners. In the very final stage I took care of managing the constant flow of fragments of inputs from partners into the proposal document. In this process I experienced the negotiated crafting of a strategically important proposal supposed to assemble a heterogeneous set of partners in a shared framework without compromising the strategic integrity of the individual partner.

The KIC proposal was prestigeous and highly political in the European scene of energy technology research and innovation. In this context the coordination function was not about dictating or otherwise take a partial interest in the matter and hand, but to help actualize an effective gathering that balanced between promoting innovation (that which is not yet actualized and integrated in established systems) and reflecting past accomplishments according to the varied interests of the constitutive partners. In this context, the key contribution from the coordination team was to constantly look for and place itself in the virtual "plots of land" that no single partner would effectively territorialize on its own – a certain cartographic performance of drawing up problems and issues at hand in such a way that only a collective effort would actualize solutions effectively. Had the coordination team pursued its tasks by taking a certain position it would loose its coordination capacity and create fragmentation problems.

The SEEIT KIC process in 2009 thus constituted a particular passage for me into the empirical field of European strategic partnering which became formative for the subsequent research journey. In particular, it positioned me in the midst of a partnering process that challenged traditional ways of practicing innovation and organization research. It left no

convenient outside for me to position myself in as a means to "merely" observe and analyze the practice of others. Rather, the partnering process and the evolvement of my research process became intertwined as I strived to find ways of participating that would actually add to the process of partnering and organizing collaboration activities. The role as an organizer and as a researhcer thus became coupled from the outset. After the formative KIC phase, this coupling continued making the process of partnering and the process of researching closely connected. There was a very clear sense of "we are in this, together" in the KIC experience and the subsequent pursuit of making the partnership perform. A move into an observing and interpretative position was simply not an option that made sense and this confronted me with a challenge that lead me into questioning and experimenting with the practice and performativity of innovation research.

The co-evolvement of the partnering process and the research practice

After the rejection of the SEEIT KIC proposal from the EIT board in December 2009[1], my role changed from being closely entangled with the coordination team to being a participant from CBS in the partnership. The connection to the coordination efforts did not dissolve, but due to the rejection and the consequent change of intensity in the partnering process, the coordination team effort did no longer require the same investments. Also, my work situation changed from being a research assistant to being a ph.d. student with 3 years of funding from DTU and CBS – a direct result of my involvement in the KIC process.

From early 2010 onwards, I continued to work with partners, particularly at DTU, to help make the SEEIT partnership turn productive. It was during this process that I started realizing how the SEEIT process in itself could be considered as an interesting instance of organizing processes of systemic innovation. This perspective developed over time as the collaboration process went through various attempts to make the partnership perform at a project level. For example, during 2010 and 2011 I was deeply involved in an attempt to

---

[1] SEEIT was established in 2009 as a consortium proposing a so-called Knowledge and Innovation Community (KIC) within sustainable energy to the European Institute of Innovation and Technology (EIT). SEEIT got all the way to the final round of selection but lost to its main competitor "InnoEnergy".

establish a joint ph.d. school (under the EU Erasmus Mundus Joint Doctoral programme) across partner institutions that would link research training in the field of energy efficiency of buildings with training in innovation management and entrepreneurship. This proved to be a highly complex maneuvre which did not succeed but helped me further understand the organizational practices and difficulties involved in making a strategic partnership perform in-between a virtual transition process and well-established systems of knowledge production at partner level as well as in the EU funding systems targeted by SEEIT. Through this collaboration process, where I acted as the coordinator, I got first hand experiences with the challenge of translating between a partnership horizon seeking to pull partners together, and the multiple horizons of the individual partners including their respective institutional constraints and strategic priorities.

During the period of 2010-2011, I participated in almost all partnership workshops and steering group meetings. Each partner took turn in organizing workshops and steering group meetings: Solar energy workshops in Trondheim and Freiburg, Wind energy workshops in Copenhagen and Delft, Bio-energy in Helsinki, energy systems in Munich, and energy efficiency in Rome and Copenhagen. These workshops were set up with the purpose of identifying and initiating joint applications for research and education programmes in the EU funding systems. The workshops performed differently and provided me with an opportunity to understand how different technology fields are staged in terms of how problems and approaches are constructed and pursued by researchers and in funding bodies.

During the same period, the partnering process went through different attempts to make its gatherings turn productive and my participation and research process evolved together with these efforts. Thus, up until the workshop and steering group meeting in Rome, April 2011, the workshops had mainly gathered researchers from university and research center partners with an established expertise in the technology area adressed in the workshops. Thus, the workshops sustained a technology-centered point of departure for identifying and mobilizing participants. With some exceptions, only limited efforts were made to design the

actual workshop activity in a way that would support the objective of gathering and composing new collaborative ties. This meant that several workshops suffered from fragmentation. This was particularly clear during the Rome workshop on buildings' energy efficiency which was a tour de force in detailed reports on past research projects and highly incremental project proposals. The fragmentation frustrations were increasing as it became clear that the partnership coordinators had made researchers from across Europe travel to a research laboratory outside Rome (housing on of ENEA's energy research labs) only to endure a serial monologue of presentations with no connective power. The Rome workshop was a low-point in creating the partnership, but it also ignited a frustration which was part of a subsequent momentum during the following workshop activities in Munich, October 2011, and Copenhagen, March 2012. Thus, in order to sustain a sense of meaningfulness, one of the conclusions at the Rome workshop was to organize a follow-up event parallel to the Munich workshop on modelling energy systems. This turned out to be productive in an unanticipated way because only one researcher from the Rome workshop bothered to go to Munich and ended up joining the systems modelling workshop with the result of an identification of a promising gap between systems analysis and buildings energy efficiency. In this way the frustration in Rome helped pave the way for an unexpected and productive gathering in Munich.

Until the Munich workshop, my mode of participation had concentrated on the ph.d. school proposal and on participating in the various workshops listening to the ways in which the various technology areas were discussed and approached by mainly energy technology experts. At the Munich workshop this changed as I gave my first partnership presentation on "The dynamics of systemic innovation" . I will elaborate how this presentation performed and how it constitutes an example of an experimental and performative practice of doing innovation research. For now it suffices to point out that this changed and re-intensified the relationship between the partnering process and my research process. From being slightly 'lost' after the KIC phase and a crashed attempt to form a European ph.d. school conceived in the residual whirlwind effect of the KIC process in 2009, the partnering process including my participation herein, regained a momentum, which I

helped co-produce through my presentation and participation in organizing the Copenhagen 2012 workshop which explored the gap identified in Munich. My participation in Munich was the first time I contributed as a researcher to the process and thus a key event in the research process which I shall elaborate further below. The shift of mode of participation intensified the research process and was the key event that lead me to establish an analytical approach with cartography as the main concept. The process of participating was therefore also a process of becoming researcher and of establishing an analytical framework that would both enable me to do a process analysis and enable me to further refine my mode of participation.

Sum-up of initial process overview

The brief process overview above indicates how the collective process of partnering and my research process co-evolved. As the partnering process went through different phases it offered me different opportunities for participating. And as I participated, my practice of doing research became increasingly mature as a performative practice where I strived to add to the process of partnering by means of participating with process-generating input, as I will elaborate more detailed below. The overview thus decribes a process characterized by a researcher-field relationship of a different kind than what we often see in organization and innovation management research. The relationship was not constructed by stepping outside, but by exploring and experimenting with establishing productive relations between the partnering process and my research practice. In this way, the partnering process brought me along its streams and movements and from this process evolved a participatory and performative innovation research practice. In other words, the research process shared the risks of and efforts made in the partnership and positioned itself along side, and symmetrically with the partnering process as opposed to the more conventional position of innovation management research working with data material from a distance in time and space. This gave me a unique opportunity to inquire how coordination and organization creation unfold in context of highly complex system transition objectives and how innovation research may add to such practices by means of participatory and performative modes of knowledge creation.

Doing innovation research performatively

In Law and Urry (2004) we find an argument for a social science research agenda that assumes its responsibilities as a knowledge production that not only speaks *about* social worlds but participates in *enacting* and thus adding to social worlds. *"(W)e argue that social inquiry and its methods are productive: they (help to)* make *social realities and social worlds. They do not simply describe the world as it is, but also enact it."* (Law and Urry 2004: 390-391). This, they argue, is true not only for a social inquiry that explicitly thinks its own practice as a performative one, but certainly also for inquiries that would not think along such terms. Economics for example would be one such example of a discipline that by means of its measurements and calculation technologies actively construct worlds rather than merely providing descriptive tools for worlds 'out there' (Callon 1998, Hacking 1999, Mackenzie 2006). Another example closer to the topics adressed here, would be the field of innovation systems research which has succesfully influenced how policy makers diagnose and approach problems related to supporting innovation in society (Lundvall 2007, Carlsson, Elg and Jacobsson 2010, Martin 2012).

Law and Urry (2004) point to the need for thinking and practicing social science as a performative, or enactive, mode of knowledge production in order to discuss and draw implications from the fact that we as social science researchers are not detached from the worlds we inquire but indeed participate actively in making them over time: *"(W)hat of research methods? Our argument is that they are* performative. *By this we mean that they have effects; they make differences; they enact realities; and they can help to bring into being what they also discover."* (Law and Urry 2004: 392-393). They point to several ways in which methods help produce realities. One is the "weak" version of methods having *effects* on the world. The more "strong" claim is that social science methods *produce* the worlds they inquire: "*The move here is to say that* reality is a relational effect. *It is produced and stabilized in interaction that is simultaneously material and social. (…) (W)e*

are not *saying that reality is arbitrary. The argument is neither relativist nor realist. Instead, it is that the real is produced in thoroughly non-arbitrary ways, in dense and extended sets of relations. It is produced with considerable effort, and it is much easier to produce some realities than others. In sum, we are saying that the world we know in social science is both real and it is produced."* (Law and Urry 2004: 395-396).

Thus, doing research performatively does not imply that anything goes. Not any social inquiry has the power of producing worlds. To write an alternative story on innovation does not necessarily produce an alternative set of practices shared by communities involved in making future energy systems. Rather, it means that social science may work towards realizing certain worlds rather than others – and that it matters how social science operate, by means of which methods and theories. Not only in context of highly specialized debates within social science in journal articles but in the worlds social science inquire. For example the worlds of energy technology research and innovation. It thus matters in a literal sense how innovation research stages itself as a practice of knowledge production. It matters how innovation processes are rendering object for inquiry. And it matters how innovation research contributes specifically to stabilizing approaches to governing and managing innovation in practice. To paraphrase Haraway (1988) we need to take seriously that there is no such thing as innocent innovation research regardless of the methodological distancing maneuvres we might agree upon in academia. Thus, innovation research and the models, concepts and theories it produces are mobilized in practices of governing, promoting, and otherwise shaping innovation processes and participates therefore in multiple ways in the process of actualizing certain realities while excluding others. This is how innovation research and its products help realize worlds. And this is why innovation research will benefit strongly from not only thinking critically about its own role in making innovation happen, but also inquiring new methods for doing innovation research performatively so as to openly and directly engage in innovations in the making.

Law and Urry discuss the implications of such a performative methodological stance: Along with the argumentation by Donna Haraway (1988) they argue that one fundamental

implication is that social science methods move from questions regarding epistemology (what can we know about reality) towards questions regarding ontology: *"It is a shift that moves us from a single world to the idea that the world is multiply produced in diverse and contested social and material relations. The implication is that there is no single "world""* (Law and Urry 2004: 397). Where many social science methods tend to imply a single euclidian world 'out there' available for us and our methods, the argument here is rather that no such single world exist but that multiple worlds are enacted and that it matters which worlds we (implicitly or explicitly) enact as we do our inquiries.

The performative stance in relation of social science method implies rather that we should pursue methods that actively admits to their performativity and make constructive use of the tools this opens for in relation to knowledge production and strategies for doing empirical research. As Haraway (1988) points to, such an approach implies that we reject traditional versions of producing objective knowledge (by means of detaching ourselfes and using euclidian single-world-methods) in favor of methods taking partiality and situatedness as a point of departure for knowledge production, *"not partiality for its own sake but, rather, for the sake of the connections and unexpected openings situated knowledges make possible. Situated knowledges are about communities, not about isolated individuals. The only way to find a larger vision is to be somewhere in particular"* (Haraway 1988: 589-590).

The line of thinking provided by Law and Urry and Haraway offers a methodological frame for a performative innovation research practice. In context of this dissertation, the performative approach has evolved as a performative study of cartographies at work in the organization of the SEEIT partnership. The "discovery" of cartography as a key concept was an outcome of my first attempt to establish an analytical stance in relation to the problem of organizing energy research towards open-ended system transition objectives – an analytical move made not together with other innovation researchers sharing my concepts and theories, but together with other SEEIT participants at the Munich workshop in October 2011. The contribution, however, was not only a presentation of an analysis

already performed, but a performance in itself. Thus the contribution was intended to speak about the problem of organizing energy research, but in a way that would also add to the process of partnering in SEEIT. In the following, I will try to elaborate this by reflecting on what I did as a process of studying cartographic operations performatively.

A Tactics of Doing Research Performatively: Conceptual in(ter)ventions

In Steyaert (2012) we find a call for a stronger emphasis on experimentation as a practice of "stepping aside", referring to Michel Serres (1995), who *"urges us to leave home or well-known territories, concepts and habits, to engage with other sounds and intensities and to go for the deep waters."* (Steyaert 2012: 157). The research process I have gone through has been more a process of stepping aside than a process of defining and pursuing a specific methodological road map. This implies that there has been an element of experimentation involved in my research process – not in the sense of setting up an experiment for or with others, but in the sense of "leaving home" and establish relations with a field of practice different from my own familiar ways of knowing, communicating and participating. In particular, the experimental element in my research process has evolved as a process of searching for ways of establishing a cooperative relation in context of the SEEIT partnership in a way that avoided convenient distribution of roles based on a functional division of labour between technical knowledge and social science based knowledge. This is particularly important because it has to do with challenging the normal ways in which knowledge production organizes itself according to fields of expertise. Challenging and experimenting with alternative ways of organizing knowledge cooperations is therefore a central aspect of a performative innovation process research practice. I shall elaborate some examples of this further below.

Steyaert (2012) suggests us to invent new research practices that are entrepreneurial and performative and thus to engage in empirical research and theorizing practices that are alternative to traditional modes of knowledge creation in social science. He makes a plea

for embracing experimental ways of researching through, for example, creating series as a means to multiply and add to the world rather than creating representations of the world. *"Multiplying (…) consists of creating a series. This is a Deleuzian tactic of conceptualizing the creation of a series – and, and, and – based on increasing the (number of) connections."* (Steyaert 2012: 164). The "Deleuzian tactic" relates to the understanding of philosophy as the practice of inventing concepts promoted by Gilles Deleuze and Felix Guattari (1994). Concepts are not merely related to a practice of thought and analysis, but also socially productive. In this sense concepts perform cartographically in processes of organzing by condensing certain relations while shadowing others. Deleuze and Guattari consider concepts to be "fragmentary wholes" that totalize their components but remain permeable and connective. This means that concepts are never entirely closed nor rigidly defined in their structure and production of taxonomies and other forms of performative sedimentations, but may enter into new connections which transform them and which transform their productivity, i.e., how concepts help arrange practices such as organizing cooperation in energy research. Concepts, therefore, afford us with what Deleuze and Guattari refer to as an advantageous place for experimentation to begin (Deleuze and Guattari 2002: 161) and an entry-point for intervening in cartographies at work in the field.

In "What is philosophy?", Deleuze and Guattari distinguishes between philosophical concepts and scientific functives. Concepts are the domain, they argue, of philosophy, whereas functives belong to science as the practice of ordering the relationship between the unknown and known state of affairs (Deleuze and Guattari 1994: 117pp). The key difference between concepts and functives, and therefore between philosophy and science, is that philosophy invents concepts by experimenting with opening concepts towards their chaotic outside whereas science is devoted to translating chaos, or the radical unknowns, into functions that relate to known state of affairs where we have orderly means of arranging knowledge according to given systems of coordinates. By distinguishing between philosophy and science in this way, there is a tendency in Deleuze and Guattari's thinking towards setting up a division of labour between the two that affords no or only very limited experimental capacity to science. This aspect of their argumentation is contested by

influencal readers of Deleuze such as Isabelle Stengers (Stengers 1997, 2010) and Manuel Delanda (2004) pointing to how practices in science may involve a highly advanced engagement with experimentation that goes far beyond being the administrators of the problematic linkages between known state of affairs and the virtual unknowns which threaten (how we know) what we know. The risk of positioning philosophy as the exclusive practice which creates concepts is that we loose sight of the conceptual creativity involved in other practices such as the construction of organizational solutions to system transition processes.

Therefore, rather than defining philosophy as *the* practice of concept creation, conceptual creativity is here taken to be more widely distributed across practices, including those related to scientific and technological knowledge production. In this way, conceptual work is not exclusively afforded me as an analyst, but something that goes on in the practices I inquire – maybe not in the form of philosophical concept creation, but in the form of totalizing heterogeneous components as a means to e.g. enact coordination in practice. This flattening out of conceptual creativity also means that conceptual material can travel back and forth between me as an analyst and the empirical field I inquire (for an elaborate investigation of such lateral relations, see Gorm Hansen 2011). Indeed, it makes it possible to put a special focus on the conceptual work carried out in the empirical field as a means to inquire its' way of producing organization and coordiation and as a means to intervene performatively in how concepts organize in the field, e.g. in the process of partnering in SEEIT.

By drawing upon Deleuze and Guattari's understanding of what a concept is, it is possible to develop an innovation research practice which situates itself in the midst of knowledge creation and organization practices inquiring their means of conceptual work and forge linkages between these practice and alternative ways of conceptualizing key problems within the field. Concepts, therefore, provide an entry point for a situated, performative innovation research practice that not only commits to studying and mapping the practice of others' but engages in actively adding to the practices it inquires. If we consider concepts as

"fragmentary wholes" which help arrange coordinates in practices of organizing cooperation across heterogeneous actors and knowledges, we may, by exploring and intervening in such concepts help bring new practices of organization into motion and thus help create alternative ways of joint movement in practices where establishing coordination for joint movement is a key aspect of realizing processes of systemic innovation.

This understanding of concepts as socially productive connects directly to the broader notion of cartographic operations in which conceptual work is an important ingredient. Thus, when a field such as sustainable energy research invests in concepts like "smart grids" or "smart cities" they are engaging, I will argue, in a process of concept creation which is not only discursive but also performative in relation to opening up a field of research and innovation investments that distributes vast resources and help organize a broad range of actors in new cooperation and actor compositions. *The production of concepts is therefore also a production of cartographies which help potentialize a yet unknown field of knowledge creation and innovation.* The potentialization is socially productive in the sense that it helps mobilize and organize actors in strategic cooperations and partnerships, road mapping processes, and similar activities where energy transition agendas are translated and negotiated in practice.

In the following, I will provide an example of how I have engaged in a performative and experimental process in context of the SEEIT partnership. I do not consider the process I went through as ideal or optimal in any way. The attempts I have made to develop a research practice which operates by stepping aside, away from convenient roles and ways of establishing cooperative relationships and enacting social science knowledge, constitute therefore not a final but an open-ended example of how we might pursue innovation process research performatively. The example I will focus on is my participation in the Munich workshop in October 2011 and a subsequent process of organizing a follow-up workshop in Copenhagen in March 2012. These steps in my involvement in SEEIT came to be decisive for the overall research process because it was during these events that I came to understand the partnership and the field in which it operates as a cartographic process.

Methodological reflections on performing cartographic in(ter)ventions

After the frustrations in Rome in April 2011, the Munich workshop was a turning point in the partnership process and in my own research process. After having participated at several workshops without an input of my own, the Munich workshop was the first time I was on the presentation list. This transition intensified my own learning process towards becoming researcher with a contribution of my own to the shared problems faced in the partnership. A key matter of concern was how I could add to the process of partnering by means of a presentation without escaping into convenient ways of staging social science either as a distant research practice or an instrumental staging suggesting ways of identifying and solving "social problems" related to transforming energy systems? The way I approached this was to focus on problematizing the relation between long term changes of energy systems and the organizational challenges these changes open up for in the present, for example in the ongoing organization of knowledge production and innovation in energy research.

Seen in retrospect, the presentation I gave helped intensify the partnering process by drawing a line in-between a key energy systems analysis concept (topology) and the organization of knowledge and innovation in energy research. Topology and topological diagrams belong to the normal ways of thinking about and representing energy system structures in energy research. Topological maps depicting future energy systems are for example often used to visualize future energy solutions and how they assemble a variety of energy technologies and systems. The concept of topology is also important because the way it is used as a means to think about and represent the structure of energy systems is part of how energy system transitions are problematized in the field, and thus how cartographies of future energy systems help perform processes of energy system transitions. Topology is a key cartographic element in the systemically embedded distinctions between which problems to center-stage and which to exclude. As a cartographically important

concept, topology thus offers an advantageous point of in(ter)vention which I tried to use as a point of departure for my contribution at the Munich workshop.

The workshop was organized by the Institute for Energy Economy and Applied Techology at the Technical University of Munich. The workshop was intended to fall into two parts – one part focusing on the economic and technical modelling of the dynamics of energy systems and the second part focusing on energy efficiency as a follow-up on the previous SEEIT workshop in Rome, April 2011. My own presentation was devoted to neither of these topics, but was placed in the category of economic modelling of energy systems. The pre-design of the workshop was therefore not about problematizing the relationship between energy system topologies in transition and the organization of knowledge production, but this was my take on contributing to supporting a process of discussion and cooperation. The presentation I delivered was not normal compared to the many other presentations I had witnessed in the partnership. In many cases, a presentation focuses on showing research results from some technical research project and maybe include a "prospects for further research" exit. In most cases, these presentations would not include a more broad attempt to diagnose energy transition challenges, but would focus on quite specific research projects and results with technological problem-statements and approaches as the dominant form of knowledge.

By making a series of connections, I tried to establish a diagnostical map that might help intensify the process of cooperation by drawing up the line of a problem without giving a solution, but rather keep it open-ended and permeable to others.
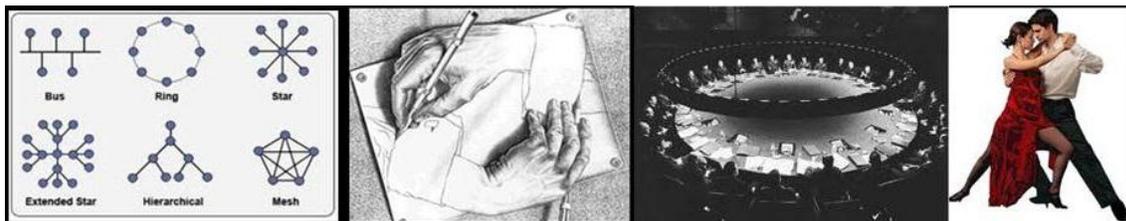
A series: Topology/interdependency/war room/dancing

One sample of the series made in the presentation links topology with two different movement images of transition process organization: The centralized war room (taken from

Dr. Strangelove by Stanley Kubrick) and dancing – two images of organization process with relevance for the energy field, where "war room" images of transition organization remains a strong ingredient nurtured for example by system modelling tools that allows for very detailed technical and economic modelling which – ideally – should inform e.g. politicians when making reforms of energy policies. From an organizational point of view, the energy system modelling theme therefore invites to be problematized (not negated) so as to refrain from implicitly reproducing images of organization that only puts emphasis on building and qualifying decision-making capacities in relation to energy system transitions. As an alternative, the dancing image provides a stronger focus on the relational and processual dynamics of organization with its emphasis on a process of continuous creation of a space for joint movement.

Modelling as a good point of intervention. Presentation would probably not have worked in the same way during other workshops.

So, what happened when I did this presentation at the workshop? Certainly, it was a strange feeling to take the podium with a presentation I knew to be quite different than the standard research presentation. Indeed, I felt sick all morning and re-made my whole presentation replacing text with images in a panik attack just before the beginning of the workshops. The audience was a mixture of researchers working with modelling energy systems from a technological and economics point of view. Presenting them with an image of tango did not exactly make me feel at ease with the situation. However, the presentation stirred very positive reactions, particularly from those among the participants who were frustrated about what they perceived to be over-simplifying economics-based modelling of energy markets which, as they clearly expressed during the workshop, was incapable of grasping the complexity of future energy systems. The presentation thus resonated strongly with the views shared by several of the workshop participants and thus helped potentialize or intensify the workshop. But as already mentioned, this did not happen through a clear problem-solution way of staging the presentation. Rather, it was an attempt to withdraw a

problem from a solution focus and thus interfere with normal ways of presenting and arguing in the field as I had come to know it through SEEIT.

In retrospect, it is clear that the experience in Munich was a turning point in my own research process and decisive for turning my attention to the organizing role of cartographies of knowledge production at work in the field. The reason for this is probably that the workshop was composed in a way that highlighted a cartographic drama between technical and economics-based methods of modelling energy systems. The drama ignited when an economist during this presentation remarked how "we only need you engineers to invent some nice, big batteries to storage all the wind energy, then we can make new energy systems work". This was too much for the engineers. Not only did they disagree. In the break after the presentation one of them explained to me how sustainable energy systems would have to incorporate a variety of energy dynamics (in the production as well as consumption of energy) and how new market solutions were needed to support this. His frustration in relation to the economist's remark was that "economists don't understand dynamics – they can only hand one namely that between an aggregated supply and aggregrated demand!".

The point here is that the workshop comprised fundamentally different energy transition cartographies and a illustrates the frustration and drama emerging when diverging cartographies intersect. In this context, it was interesting to see how a problematization that did not imply a stabilization of an energy transition cartography but kept the problematic state of organizing knowledge production alive turned out to be socially productive in the workshop. As if it offered an open-ended space for a diagnostical and critical debate and subsequent cooperation process to unfold. The experience of clashing cartographies and how an act of problematization (constructing an open-ended map) turned the workshop process from being frustrated to becoming still more affirmative and socially productive. The presentation I gave was not the sole reason for this turn to take place. But it was clearly part of this process, illustrated also by the use of the image of complementarity (see above) which was copied and used in a presentation the day after.

EGOS paper, Montreal 2013, Nicolaj Tofte Brenneche, phd student, Copenhagen Business School, ntb.lpf@cbs.dk

The outcome of the Munich workshop was a decision to arrange a new workshop that should explore the opening that had emerged in-between energy systems modelling and buildings' energy efficiency. CBS and the Technical University of Denmark co-organized the workshop (again, a new development in the workshop approach) which turned out to be very productive and mobilized the largest level of interest since the intense days of the KIC application process in 2009. The Copenhagen workshop in March 2012 was also cartographically intensive and the outcome was the formation of cross-disciplinary group that submitted a joint research proposal (FP7) later the same year.

Cartography and the intensification of cartographies thus came to be a central point of inquiry into how a strategic partnership evolved in its pursuit of new solutions to coordinating and stimulating cooperation within sustainable energy research and education. The catalyzation of this approach was a specific experience with the organizing effects of cartographies – their social productivity and their power to disintegrate and produce fragmentation. As a research practice, the cartographic approach opens up for an innovation and organization research practice which is performative and participatory. The cartographic approach as a form of in(ter)vention (Deleuze and Guattari 2002, Steyaert 2011) suggests a research practice which not only theorizes process from afar, but establishes itself in the midst of ongoing processes of organizing and problematizes solution fixations in the field in order to help intensify a joint space for cooperation rather than repeating cartographically problem-solution conventions which tend to reproduce fragmentation. It is also a way to connect directly with a process at hand rather than merely participating by means to drawing yet another map of a world 'out there' or a 'system transition in the future'. A cartographic in(ter)vention problematizes and thus intensifies the relation between a shared problem and the potential shared process leading towards finding solutions for the problem. This is an alternative to suggesting e.g. a new approach to organizing innovation or how solve a certain energy storage problem etc. The cartographic in(ter)vention does not satisfy the need for solutions, but helps potentialize a cooperative process here and now. In this sense, the cartographic in(ter)vention invents a space for joint

movement by means of intervening in established ways of staging problems so as to foreground certain solutions. It adds to the problem-posing capacity of innovation and organization research – not only as an intellectual practice of posing problems, but as a means to participate, add to and inquire actual processes of organizing.

This cartographic approach thus became my version of "stepping aside" into unfamiliar grounds and my version of sharing the risks at work in the field of inquiry rather than distancing myself as someone studying the practice of others. This represents a clear alternative to established method practices in innovation research and certain also larger parts of organization studies. I find the cartographic approach, and its emphasis on adding to processes, to be of particular relevance for advancing process studies in organization research. As Steyaert (2012) points to, there is a tendency within this field to stay with the comfort zone of studying processes from afar now using process philosophy as a source of conceptual development. This risk here is that process studies remain an intellectual battleground repeating, to put it boldly, the heideggerian battle with Kant in *Sein und Zeit*, without connecting with ongoing processes of organizing in practice. This would be a big drawback for this stream of organization research.

Sum-up

Relating to the topic of "relational entrepreneurship" of the EGOS process stream in which this paper has been placed, I find it interesting to consider the practice of studying relational entrepreneurship performatively using for example the cartographic approach introduced here. This would imply a research practice that helps generate relational entrepreneurship by not only analyzing from afar but also engaging in actual processes. In the case of the SEEIT partnership, relational entrepreneurship is a clear feature and a constitutive problem for the partnership. We might say that the partnership itself should be understood as relational entrepreneurship. Certainly, the motor of the partnership is the capacity of partners and the coordinators to create a joint space for movement where each partner sustains and strengthens its own relative autonomy while supporting and strengthening the

automony of others in the partnership. This comes very close to the concept of "reciprocal capture" by Stengers (2010). She points at how the organization of science and in particular the evolvement of novelty happens through processes of linking actors in relations of reciprocal capture where the heterogeneity of actors is sustained in a mutually supportive, cooperative relationship. The SEEIT partnership is a process of searching for such relations to mature and as such it is a case of relational entrepreneurship where the entrepreneurial capacity of one depends upon entering relations of reciprocal capture without regressing to subordinating the cooperative setting to one unifying principle of orgainzation.

This open-endedness of the partnership creates several cartographic tensions and intensifications – both in the form of rivalry and complementarity (Bateson 2002) and these tensions and intensifications prove to be socially productive in how they mobilize interest and help build a momentum in the partnership. Studying such processes entails, as suggested in this paper, a performative research practice that engages directly with such tensions and intensifcations through cartographic in(ter)ventions. This approach is not a method in a traditional sense, but an approach which "takes on the risk" of getting involved in ongoing and open-ended processes of organizing. Obviously, this is only a risk seen from a traditional method perspective. The real risk of a cartographic approach is to detach itself from the processes it aspires to intensify. As such, it shares risk with the field it inquires and might illustrate a way to not only conceive problems and analytical approaches to relational entrepreneurship but also *enact* relational entrepreneurship by means of a performative research practice.

References

Bateson, Gregory 2002, Mind and Nature – A Necessary Unity. Hampton Press and The
  Institute for Intercultural Studies, Cresskill, NJ.

Bergek, Anna, Staffan Jacobsson, Marko Hekkert and Keith Smith 2010: Functionality of
  innovation systems as a Rationale for and Guide to Innovation Policy. In Smits,
  Kuhlmann and Shapira 2010: The Theory and Practice of Innovation Policy – An
  International Research Handbook. Edward Elgar, Cheltenham, UK.

Deleuze, Gilles and Felix Guattari 1994: What is Philosphy? Verso, London and New
  York.

Deleuze, Gilles and Felix Guattari 2002: A Thousand Plateaus – Capitalism and
  Schizophrenia, Columbia University Press, New York.

Callon, Michel (ed.) 1998: The Laws of the Market. Blackwell, Oxford.

Carlsson, Elg and Jacobsson 2010: Reflections on the Co-evolution of Innovation Theory,
  Policy and Practice: The Emergence of the Swedish Agency for Innovation Systems,
  in Smits, Kuhlmann and Shapira (eds.) *The Theory and Practice of Innovation Policy -
  An International Research Handbook,* Edward Elgar, Cheltenham

Certeau, M.de. 1992, *The practice of everyday life,* University of California Press,
  Berkeley, Calif.

Delanda, Manuel 2004: Intensive Science and Virtual Philosophy. Continuum International
  Publishing Group, London.

Freeman, C. 1995, "The 'National System of Innovation' in historical perspective",
  Cambridge Journal of Economics, vol. 19, no. 1, pp. 5-24.

Geels, F.W. 2005, *Technological Transitions and System Innovations, A Co-evolutionary
  and Socio-technical Analysis,* Edward Elgar Publishing Ltd, Cheltenham.

Government of Denmark 2011: *Vores Energi*, Energistyrelsen, Copenhagen.

Hacking, Ian 1999: The Social Construction of What? Harward University Press,
  Cambridge.

Hansen, Birgitte Gorm 2011: Adapting in the Knowledge Economy. Lateral strategies for Scientists and those who study them. Copenhagen Business School phd series, Frederiksberg.

Haraway, Donna (1988): Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective. Feminist Studies, 14:3, 575-599

Hughes, T.P. 1983, *Networks of power, Electrification in Western society, 1880-1930,* The Johns Hopkins University Press, Baltimore, MD.

Klimakommission 2010, *Grøn energi - vejen mod et dansk energisystem uden fossile brændstoffer. Sammenfatning af Klimakommissionens overvejelser, resultater og anbefalinger. 28 September 2010.*, Klimakommissionen - The Danish Commission on Climate Change Policy, Copenhagen.

Latour, B. & Woolgar, S. 1986, *Laboratory Life: The Social Construction of Scientific Facts,* Princeton University Press, Princeton.

Latour, B. 1991, "Technology is society made durable" in *A Sociology of Monsters: Essays on Power, Technology and Domination*, ed. J. Law, Routledge, London.

Law, John and John Urry 2004: Enacting the social. Economy and Society, 33:3, 390-410

Law, J. & Mol, A. (eds) 2002, *Complexities, Social Studies of Knowledge Practices*, Duke University Press, Durham.

Lundvall, B. 1992, *National systems of innovation, toward a theory of innovation and interactive learning,* Pinter, London.

Lundvall, Bengt Åke 2007: National Innovation Systems – Analytical concept and Development Tool. Industry and Innovation, 14:1, 95-119.

MacKenzie, Donald 2006: An Engine, not a Camera: How Financial Models Shape Markets. MIT Press, Cambridge.

Markard, J., Raven, R. & Truffer, B. 2012, "Sustainability transition: An emerging field of research and its prospects", *Research Policy,* vol. 41, pp. 955-967.

Martin, Ben 2012: The evolution of science policy and innovation studies. Research Policy 41, 7, 1219-1239.

Rip, A. 2010, "Processes of Technological Innovation in Context - and their Modulation" in *Relational Practices, Participative Organizing. Advanced Series in Management.*,

eds. C. Steyaert & B. Van Looy, Emerald Group Publishing Ltd, London, pp. 199-217.

Stengers, Isabelle 1997: Power and Invention – Situating Science. University of Minnesota Press, Minneapolis.

Stengers, Isabelle 2010: Cosmopolitics I. University of Minnesota Press, Minneapolis.

Steyaert, Chris 2011: Entrepreneurship as in(ter)vention: Reconsidering the conceptual politics of method in entrepreneurship studies. Entrepreneurship and Regional Development: An International Journal, 23:1-2, 77-88

Steyaert, C. 2012, "Making the multiple: theorising processes of entrepreneurship and organisation" in *Handbook on Organisational Entrepreneurship*, ed. D. Hjorth, Edward Elgar, Cheltenham UK, pp. 151-168.

Weik, E. 2011, "In Deep Waters: process theory between Scylla and Charybdis", *Organization,* vol. 18, no. 5, pp. 655-672.