

The REGINN experiment

A deliberative retrospection of a Norwegian regional innovation programme¹

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1 Introduction

In 1997 the Research Council of Norway was commissioned by the Government to launch REGINN, a REGional INNovation program. The general idea was to stimulate innovation activities in enterprises, and to encourage regional R&D institutions to co-operate in networks with other actors “in the regional and national system of innovation”. A call for proposals was announced. Step by step eighteen regional projects were selected and eventually granted financial support. All of them comprised regional and local authorities, business networks and R&D institutions. The end of 2001 completed the programme.

REGINN has not been evaluated *ex post*. However, it has been firmly managed by a “central project leader” (Rangnes) and closely followed by a “process adviser” (Uhlin). Annual reports have been compiled, conferences have been organised, seminars about various topics have been carried through, and, above all, a continuous dialogue has been accomplished between the central project leader, the process adviser and the regional project leaders and their steering groups. What is more, in the light of the theoretical concepts “behind” the programme various empirical data from both specific projects and the programme as such have been continuously analysed by REGINN’s process adviser in co-operation with the central as well as the regional project leaders. This work has yielded a series of papers and articles that have been presented at various international research conferences and then fed back into the different levels of the REGINN-programme (e.g. Uhlin 1999, 2000, Uhlin, Rangnes & Synnevåg 2000, Uhlin & Johansen 2001, Uhlin & Løvland 2001, Uhlin 2002). All of this comes close to a formative evaluation.

When REGINN was launched, however, the under-secretary of state for regional and labour market affairs publicly emphasised that the programme “ought to be understood as an experiment”. It was never specified, though, what the experiment really was about, or what kind of experiment the ministry had in mind. Also, there was no method enjoined or indicated for the experiment as such. And, of course, for both practical and ethical reasons it was obvious for all parties involved that one cannot “experiment” with businesses and regions in a strict and scientifically “hard” meaning of the word. There was, nevertheless, a strong sense of experimentation when REGINN started, a sense of testing something new. By 1997 the EU, the OECD and a growing number of national governments had enthusiastically agreed with ideas about both innovation systems and clusters. From 1994 to 1996 researchers from the Norwegian STEP-group (Studies in Technology, innovation and Economic Policy) carried through a project for the (then) Ministry for Local government and Labour market about regional innovation systems. The project resulted in a book that was published in 1997 (Isaksen 1997). The obvious focus for The REGINN experiment, then, was of course these new ideas. That is, although the concept of experiment in connection with the REGINN programme was used with some urgency it was to be understood in a metaphorical and “soft” way.

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2 The object of our deliberative retrospection

From the beginning it was more or less taken for granted by the REGINN programme committee that the results of the experiment, positive or negative, should emerge on the project level, i.e. in and between the involved firms, R&D-institutions, regional authorities, municipalities and other actors engaged on the regional and local level. When we realised this taken-for-granted attitude it was easy to see that the programme in fact encompassed not one but three societal levels: beside the project level there were also the programme level and the policy level. The programme level included the programme committee, the programme coordinator, the central project leader, and the process adviser. The policy level encompassed the higher echelons of the Research Council plus politicians and civil servants in the involved ministries (Industry and Commerce, Education and Research, and Local government and Regional development²).

It was *the policy level*, however, and especially the (then) Ministry of Local government and Labour market that in the first hand wanted an experiment with the new ideas about regional innovation systems. Hence, it is this set of new ideas that is our “research object”. More exactly, there are four concepts embedded in these ideas that have emerged as the true objects, namely the concepts of system, learning, trust and governance. That is, it is the idea of successful innovation systems, in which interactive learning is supposed to be the pivotal process, and in which shared, mutual or social trust is considered to be the necessary “lubrication”, that unavoidably evokes the question if such systems are possible to design, implement and control. And if so: How?

There is, however, no such thing in nature as a “regional innovation system”. The concept is socially defined *and* produced. Had nature produced it there would be no problem to conduct straightforward experiments, at least in principle. But since it is socially produced it is constitutive to the social phenomena that define it. In other words, the concept of innovation is self-referential. That is, it refers back to and includes the inventors of the concept. It also encompasses people who want to use it. This further means, that the actors on the policy level “excluded” themselves from the new ideas when they just asked for results on the project level. Another way to express this is that the concept of innovation systems presumes interactive learning not only horizontally but also vertically; *ministries and research councils are by definition included in the innovation system*. Now, this line of reasoning rises some questions about inconsistencies between the espoused theories of the actors involved especially on the policy level, and, on the other hand, the demonstrated theories-in-use of these actors. We will return to these inconsistencies at the end of this paper.

So, actors on both programme and policy level had to face a new kind of complexity, both theoretically and in practice, when they started the REGINN programme. The challenge was to adapt planning-, implementation- and governance techniques to a new perception of reality. And again: It was *the policy level* that in the first hand wanted an experiment with the new ideas about regional innovation systems. Hence, we will in the first hand direct our retrospective deliberations to the actors on this level, and we will focus on three main questions: (a) Why is it that there have been inconsistencies on the policy level between espoused theories and theories-in-use? (b) Why is it that especially actors on the policy level have refrained from interactive learning? (c) What might the consequences be were the actors on this level to include themselves into the innovation system?

3 Outline of the chapter

We will continue with (4) a short presentation of our methodological points of departure, and then (5) briefly present the REGINN programme and its context. In the principal part of the

² The latter ministry changed name in 2000 to “The Ministry for Local government and Regional development”.

paper we will then elaborate on the four concepts that have been espoused as constituting the theoretical base for the system of innovation approach, and thus for the REGINN-experiment. The first concept is (6) ‘system’ as in “innovation system”. The second concept is (7) ‘learning’ as in “interactive learning” and “learning economy”. The third is (8) ‘trust’ as in for instance “social trust” and “shared trust”. The fourth concept is (9) ‘governance’ as in “governance networks” and “governance complexity of the second order”. In the final part of the paper (10) we will account for the REGINN experience and try to answer the aforementioned three questions. There is also a brief (11) Epilogue.

4 Methodological points of departure

In this chapter we will use two compatible and complementary methodological approaches of which one is known as critical realism and the other as systems theory. We have discussed the former approach at length in another context within the REGINN programme (Uhlin & Løvland 2001). When it comes to our other approach we are especially concerned with complexity in social systems. We have discussed these concepts at length as well (Uhlin, Rangnes & Synnevåg 2000; Uhlin & Johansen 2001). Therefore, in this paragraph, and for reasons that will become apparent, we restrain ourselves to a few additional remarks.

It is of course impossible to ignore systems theory in a discussion about innovation systems. In the literature of institutional economics it is rather common, though, to regard the concept of ‘system’ in a generally applicable way, roughly meaning “many entities that belong together”. The alternative seems to be to regard ‘systems’ with connotations to technical feedback mechanisms, and so forth. However, we do not use the concept of system in a general way but in a specific. On the other hand, we are not referring to technical systems but to *social* systems. Such systems are about people in firms, in R&D institutions, in ministries, etc., people who are actively and dynamically coping with socially defined and produced abstractions, like for instance “regional innovation systems”. This is also the reason why we are operating with two compatible and complementary methodologies: systems theory and critical realism.

Because, although the research objects within the social sciences are socially produced critical realism nevertheless argues that social structures are real when they are reproduced or transformed by people who act in accordance with their abstractions and concepts. Also, social structures put people in situations, but people react to these situations in unexpected and often innovative ways. It is these situations that constitute the “mechanism” (used as a metaphor) that is the connecting link between structure and agent (Bhaskar 1979; Collier 1994). That is, although there is no such thing in nature as a “regional innovation system” it is obvious that this concept *has become real* because it is reproduced and transformed by people.

However, there is a general kind of criticism regarding systems theory that ignores an important aspect of systems theory, an aspect that is at the centre of our attention. Gustavsen, Finne & Oscarsson (2001), for instance, discuss the concept of innovation systems and argue that it is “important to enter some reservations about the notion of ‘system’”. If the concept of system is taken to mean connectedness in a broad sense they can agree with the idea of innovation systems. But if one moves beyond this

...to search for general patterns of optimality, identifiable in the kind of ‘systems language’ that gained popularity in the 1940s, ‘50s and ‘60s, often relying on mechanical or biological analogies (some contributions in Edquist 1997, for example, follow this pattern) there is a need to tread with caution (ibid:13).

We agree with this criticism and have also criticised Edquist’s poor conception of ‘systems’ (Uhlin 2000). But the general scepticism of Gustavsen *et al* against the concept of system as such nevertheless goes beside the target. “The kind of ‘systems language’ that gained popularity in the 1940s, ‘50s and ‘60s” has to be treated with caution, they say. But much has hap-

pened within systems theory since the '60s. As a reminder: Systems theory has a history of about 60 years. Today one talks about the "older" systems theory from the '40s, '50s and '60s which encompasses von Bertalanffy's general systems theory, the cybernetics of Wiener and Ashby, the information theory of Shannon, the computer design of Turing and von Neuman, and so on. This was about complicated but nevertheless basically linear systems and the key concepts were information and feedback. Then came the "younger" systems theory from the '70s and onwards with von Foerster's "order from noise", the cognitive biology of Maturana and Varela, the dissipative structures of Prigogine, the social systems of Luhmann, and so on. This was about non-linear and therefore *complex systems*, and the key concepts were, and still are, complexity, self-organisation, emergence, and learning (Uhlen 2000). What is more, this younger systems theory has since the '70s heavily influenced other disciplines such as sociology, history and political science (e.g. Kiel & Elliot 1997). We use the notion of complexity theory as a synonym to the notion of (the younger) systems theory.

It is apparent, though, that researchers within the systems of innovation approaches have not yet come to grips with complexity theory. This judgement goes as well for researchers interested in clusters. We will soon come back to this. On the other hand, in the related discussions about "triple helix" (e.g. Leydesdorff & van den Besselaar 1994) and "the new production of knowledge" (e.g. Nowotny *et al* 2001) one takes, as we do, complexity theory as a methodological point of departure.

5 A brief outline of the REGINN programme

So, the objective of the REGINN programme, which was to "stimulate and start innovation activities among the participating firms", ought to be perceived as an experiment with a new kind of strategy within the regional policies of the Norwegian government. There were two sub-goals: (a) "To strengthen the [...] co-operation between regional R&D systems and clusters of firms", and (b) "To contribute [...] so that the regional R&D-systems more frequently will network with other actors in the regional and national innovation system". The basic theoretical platform of the programme was explicitly said to be the systems of innovation framework in general and the regional innovation framework in particular.

When the programme was terminated at the end of 2001 it had encompassed eighteen regional projects, each one with its own profile. The denominator was that each project was organised as a partnership between (1) the regional government, (2) the regional R&D system, and (3) a regional bloc of firms, for instance within electronics industry, seafood industry, tourism, etc. The Research Council thus originally invited the regional governments (Fylken) to submit proposals "for regional innovation projects".

A programme committee appointed by the Research Council supervised the REGINN-programme, and some other programmes as well. The programme co-ordinator had the task to co-ordinate REGINN with other related programmes. Furthermore, the central project leader was responsible for the management of the REGINN programme on a daily basis. He was externally hired just for this assignment. The external process advisor had a function that could be described as a mix of process consultant, action researcher and evaluator. The central project leader and the process advisor spent a fair amount of time visiting the regional projects. Regional project leaders, in turn, had to report to regional steering groups. Twice a year the regional project managers were assembled for joint discussions. Also twice a year seminars were organised with participants from the regional projects as well as from universities, industry and government.

Roughly 350 enterprises have been involved in the programme, of which about 100 have been formally contracted partners. Of the 19 regional authorities in Norway 11 have been involved as contracted partners in the programme.

However, when the REGINN-experiment started there were no clear criteria what should be a typical REGINN-project. After a while, though, and especially in connection with the call-process, a set of criteria was elaborated. Thus, a proper REGINN-project should concern itself with a common interest for many enterprises within a business branch or local milieu. There should be a project plan with concrete objectives. The project should engage R&D institutions, and so forth.

That is, at hindsight it is easy to see that when the programme started there was not much of theoretical understanding regarding what a regional innovation system ought to look like, or if it at all was possible to design, plan, implement and manage such a system through a governmental programme. This indistinct and experimental situation also reflected itself in the amount of money the Government was prepared to put into the programme, i.e. 38 million NOK (about 4.75 million Euro).

In March 2000, i.e. two years after the first regional projects were off the ground and almost two years before the programme was planned to terminate, a “Think Tank-conference” about REGINN was carried through. The objective was to draw some intermediate conclusions of the experiment and to sketch out some ideas about relevant politics for the future. It was obvious that the policy level did not have the patience to wait much longer for some positive results from the experiment. The chairman of the programme committee started the conference with an introduction that sheds some interesting light on the situation. He emphasised that the idea of the program from the start was to “test the idea of systemic innovation”. He also emphasised “innovation as an interactive social process in which dialogue and learning is the most important activity”. In policy terms this meant, he underlined, a shift of focus from bilateral to multilateral relations, from business branches to “clusters and systems”, from knowledge transfer to “learning by interacting” and “learning regions”. The foremost problem that the conference had to tackle, however, was “to move from metaphor to reality”.³

The outcome of the conference was in no way clear-cut. In fact, it ended in some confusion. We think it is fair to say, though, that it was “a confusion on a higher level”. That is, all the theoretical concepts frequently used in the systems of innovation and cluster approaches had step by step become a little more intelligible as the programme advanced and empirical data from the projects were matched to intermediate theoretical advancements. This is not to say that the experiment at this stage begun to show some distinct results. No, but it was by now nevertheless obvious that the main problem to tackle was encapsulated in the phrase “to move from metaphor to reality”. That is, it was by now clear to us that the systems of innovation and cluster approaches offered interesting models *of* regional economic development, but what REGINN was aiming at was to test models *for* such development.

This insight led us to concentrate on what we by now perceived as the four cornerstones in not only the systems of innovation approaches but also the cluster approach, i.e. the concepts of system, learning, trust and governance. Our method to set about these concepts could be described with a military metaphor: “a double envelopment operation”. On the one flank we intensified our discussions with the regional projects. Not with all of them, though, a few of them completely failed to come off the ground. With all the other we have had rewarding discussions. In fact, some of these projects offered extremely important experiences and insights. On the other flank we also intensified our analyses of the theoretical platform for the REGINN experiment. We started with what at that time seemed to us to be the determining concept, namely learning as in “interactive learning” and “learning regions”. We gradually realised, though, that we should have started with the concept of ‘systems’.

³ Think Tank 1/2000 – REGINN. Lyseby konferansesenter, 28 mars 2000. This paragraph is based on our personal notes from participating in the conference. The citations are from a handout of Conrad Krohn’s overhead-slides, which he used for his introductory speech.

6 Systems

General characteristics

Our point of departure is, then, that the REGINN projects, as well as the programme as such, have to be perceived as complex social systems. Our so far broad hypothesis is that the target to develop these systems into innovation systems presumes insights into some general particularities of complex social systems. The idea of this section is to give a sketch of these particularities.

Luhmann (1979, 1988, 1995) thus argues, that complexity in social systems basically is about shortage of information; a complex system can never see itself or its environment. However, a social system has capacity to organise itself so that it becomes less complex than its surroundings. Without this ability to organise asymmetry and differences relatively the environment there would be no discrete entities but just chaos. That is, the problem is that there is *neither* an Archimedian point outside the complexity of the society from which for instance science can see and understand this complexity in its entirety, *nor* is it possible for this complexity in its entirety to be represented within science (or in any other of society's subsystems). This means that the complexity of the society cannot be observed unless it is done as a reduction. Thus, every attempt to formulate a theory of complexity is about reduction, which means that the theory unavoidably has to be self-referential. Luhmann therefore sees complexity theory as a theory that *simulates* complexity in order to explain complexity. And the way to do this is to create a flexible network of concepts that can be combined in many different ways and thus used in order to describe diversities of social phenomena. This, of course, is a true linguistic approach, which we will come back to in our discussion of the concept of trust.

Hence, the systems of innovation approach is of course also a reduction of complexity, i.e. a reduction in order for us as observers to be able to observe the economic complexity of society. But what is more, this approach also simulates complexity in order to explain complexity. The question we have had to ask ourselves as observers of the REGINN experiment is if this simulation model is satisfactory or not from a policy level perspective. Now, we have already been able to demonstrate three things about this innovation model. First, economists and geographers in general are not in tune with the younger systems theory. Second, the kind of system-model that innovation economists and geographers are pondering on is self-referential. Third, their model is a model *of*, it is not a model *for*.

So, what other characteristics of complex social systems are important to focus? We argue that Bhaskar's (1975, 1979) conception of three domains of reality is another and complementary way to understand complex systems. There exists a reality, "the domain of the real", independently of our concepts and knowledge about it. This domain, he says, is essentially not reachable for observation. If it were, i.e. if for instance tacit knowledge in regional innovation systems was totally observable, there would be no other need for science than mere gathering of facts. However, this non-observable reality contains "mechanisms" that, although we cannot observe them, *cause* things to happen in a domain of the world that *is* reachable for observation (Collier 1994). Because, beside the "domain of the real" there are also the "domain of the factual", where things happen whether we can experience it or not, and the "domain of the empirical", where we empirically can experience the world. Thus, within the natural sciences experimentation is the *necessary* method in the domain of the empirical in order to investigate about non-observable phenomena (for instance sub-nuclear) in the domain of the factual, and in order to understand the mechanisms in the domain of the real. Scientific work, Bhaskar argues, is to investigate and identify the relations or non-relations between what we experience, what actually happens, and the underlying mechanisms that produce events in the world.

A consequence of this mode of thinking is that it is not enough to observe the empirically perceptible social world when it comes to complex social systems. In order to "reach" the

domains of the factual and the real within the REGINN programme we have had to work with transfactual argumentation and abductive and retroductive inferences. That is, we have had to ask what structures and processes make certain phenomena in the domain of the empirical, e.g. a regional innovation system, at all possible. This is the approach we have taken when we have made in-depth studies of some of the REGINN-projects, e.g. the phenomena of trust in the Stavanger project (Uhlen 2002) and governance in the Båtsfjord project (Uhlen & Løvland 2001).

Furthermore, technical systems can be designed. And the function of such systems can not only be understood by an external agent, but it can also be explained, in detail as well as a whole. The causality of a technical system (although it can be very complicated) is always computable. A social system, on the other hand, is always complex. Thus, in the following we use the concepts of complex and social systems as synonyms. What is more, a social system, and just in order to emphasise a few well-known characteristics, also consists of a large number of elements, but these elements are actors who interact in a dynamic way. A social system changes with time, and, thus, it has always a history. These interactions do not have to be physical, they can also be thought of as transference of information. Any element in the system therefore influences and is influenced by many other elements, i.e. the interactions are non-linear. What is more, in non-linear systems small causes can have large effects, and vice versa. That is, there are positive (enhancing, ampliative) as well as negative (detracting, inhibiting) feedback-loops in the interactions. Thus, social and thus complex systems operate far from equilibrium and they are open, i.e. they interact with their environment. As a consequence it is often difficult to define the borders of a complex system (Cilliers 1997).

In spite of this openness it is nevertheless meaningful also to regard a complex system as closed. There is no contradiction in perceiving a system as both open and closed (Luhmann 1995, Segal 1986). A social system is surely open to all sorts of exogenous influences. The system closure, on the other hand, refers to the self-referential properties of a social system. For instance, the way people in our interviews perceive their REGINN project, and the way they talk about the project and understand it, necessarily includes themselves as members of and actors in the project/system. This is of major importance when it comes to exploring the concept of trust. Self-reference is of course also the case when *we* talk about the programme, for instance in this chapter.

However, complex social systems have two specific capabilities that are of particular importance in this context, namely representation and self-organisation. Representation has to do with the necessity for the system to store information for future use concerning the environment. Self-organisation has to do with the need of the system (in its relation to the external environment) to develop and change its internal structure without the *a priori* necessity of an external designer. Hence, it is easy to see that representation has to do with learning, and that self-organisation has to do with the crucial question whether it is possible or not to design, implement, manage, evaluate, change and develop innovation systems. We will return to self-organisation when we will discuss governance.

A few more words, though, about representation. Within complexity theory, and especially when it comes to its applications within the social sciences, a thought-style related to critical realism has gained ground the last few years. One argues for “distributed representation” (Gibbons *et al* 1994; Amin & Hausner 1997; Cilliers 1997). That is, the elements of the system have no representational meaning by themselves, but only in terms of patterns or relationships with many other elements. Such distributed representation is best realised in ‘connectionist (or neural) networks as opposed to rule-based symbol systems (such as artificial intelligence) where an external agent has set the rules. According to the connectionist model a complex system will develop an internal structure, based only on the local information avail-

able at each neurone or node. “This development of structure can also be called ‘learning’” (Cilliers 1997).

Systemic aspects of regional and local innovation systems

However, we are in the first place interested in the systemic aspects of regional and local innovation systems. The differences between national and regional innovation systems must not be exaggerated, but there are some aspects that have to be observed. Asheim & Isaksen (1997) thus emphasise the differences between two kinds of regional innovation systems. On the one hand there are innovation systems that are regionalised national innovation systems. Such systems are parts of the national production structure as well as the national institutional infrastructure, but they are localised in particular regions. These systems are functionally integrated into, or are like, national innovation systems “based on a linear innovation model”. On the other hand, there are innovation systems that are constituted of parts of production structures and institutional structures, which are territorially integrated and firmly established in a particular region. Such innovation systems, Asheim & Isaksen argue, are “based on an interactive innovation model”.

We very much doubt the meaningfulness of perceiving any innovation system as a linear system. That is, innovation systems, whether they are international, national, regionalised national, regional, sectoral or local, are certainly complex systems, and thus examples of non-linear systems. This is a matter of perspective. The closer one looks the more of complexity one will see. Our inquiry into the local innovation system of Båtsfjord (Uhlin & Løvland 2001), and especially into the governance aspects of this system, shows with ample clarity that even local innovation systems are extremely complex, i.e. non-linear.

But what, then, characterises “an interactive innovation model”? The simple answer, as we see it, is that such a model is also in the first place a reduction of a non-linear reality. So, are there any merits to Asheim’s & Isaksen’s distinction if both types of regional innovation systems are non-linear? As we see it they righteously emphasise the different levels of social integration. The first type of regional innovation system is in the first hand socially integrated on the national level, whilst the second type in the first hand is integrated on the regional (or the local) level. That is, this is not just about different geographical scales, but also about different government levels, different cultural perspectives, and so on. But above all, this is about different systems levels, i.e. different non-linear systems levels. We will come back to this in our discussion of governance complexity of the second order.

Triple helix as system

The complexity that the Triple Helix model (e.g. Etzkowitz & Leydesdorff 1997) indicates build upon some specific assumptions that definitively has to do with complexity theory. One is that the triple helix by nature is unstable; “it remains an emerging construct on top of the underlying communications”, and “this complex system continuously reorganizes itself with reference to its past”. The triple helix thus emerges from tri-lateral arrangements in favour of further development possibilities. But these emerging possibilities are by definition not given. The institutional basis of the system is thought of as a kind of laboratory for testing mutual expectations.

The relevance of the triple helix approach for the REGINN programme has mainly been of pedagogical and rhetorical nature. As we have reported elsewhere (Uhlin *et al* 2000; Uhlin 2002) the concept of innovation systems has not been easy to convey to the different projects within the REGINN programme. It has caused more confusion than understanding. The triple helix metaphor, on the other hand, has created a most valuable sense of understanding. Having said that, we immediately want to emphasise that this sense of understanding obviously has been related to a description of the functioning of an ideal innovation system. It has not

had the power to be used as a strategic metaphor, i.e. *for* the design and implementation of such a system. However, there is another angle to it, and it has to do with trust, to which we soon will come back.

Public inquiry into the concept of innovation systems

Against this background it is not insignificant to observe that the concept of innovation systems in recent years has got a kind of “official” evaluation and acceptance in many countries, Norway inclusive. For instance, a public committee in Norway has paid much attention to the concept of innovation systems in a white book (NOU 2000:7). To us it is of particular interest to observe to which extent this official acceptance of the innovation system approach really is systemic.

The committee immediately emphasises that their point of departure is the repudiation of the “linear innovation model”. Instead innovation is perceived “as a radical, collective, cumulative and uncertain process”. From these premises the committee argues that it is possible to draw six general conclusions. First, innovation is not something that occurs within a small group of high-tech industries but has a broad impact and “happens” across nations, technologies industries, etc. Second, “innovation is based on co-operation and interactive learning”. Third, “innovation is very unpredictable”. One will never know what will be the result of innovations. Forth, “clusters are important and reflect national and regional patterns for industrial and technological specialisation”. Fifth, “innovation is systems dependent”. The committee emphasises that it is general societal factors that shape the behaviour of the industry, such as “the socio-cultural context, institutional and organisational conditions, systems of regulations, infrastructure, the process that create and diffuse scientific knowledge, and so on.” The policy implication of this systems dependency, the committee says, is that “one has to evaluate the specific characteristics, structures and dynamics of the system”. Sixth, “the scientific and technological interaction is strong.” This statement does not contradict the denial of linear innovation processes, but just underlines the empirical fact that science “remains a central element in the industrial knowledge bases across the economy” (NOU 2000:7: 44-47).

We will just point at some aspects of these conclusions that are of particular interest for our analysis of the REGINN programme. First, they shed some new light on the REGINN experiment. That is, three years after the programme started, and the same year as the REGINN think-tank conference was held, the notion of innovation systems had obviously become what Nowotny *et al* (2001) has called “a hype”. And not only in Norway. In Sweden, for instance, The Swedish Agency for Innovation Systems (VINNOVA) was launched that year. Second, it is obvious that the committee had difficulties to give concrete, straightforward, and action oriented recommendations. When they say that the policy implication of this systems dependency is that “one has to evaluate the specific characteristics, structures and dynamics of the system” it is not just a complex recommendation, but from a policy perspective, it got to be perceived as ambiguous, if not outright frustrating. Third, there is also a tension within the committee’s six points between, on the one hand, what is said about the uncertainty and unpredictability of innovation systems and, on the other, the political “need” to develop and govern such systems. Thus, and again, we will come back to this in our discussion about the concept of governance. Finally, the committee’s premises and conclusions are obviously the espoused theories, the “official wisdom”. And once again, what is of particular importance for us is to check these theories against the theories-in-action of all the actors on the project level, the programme level and the policy level respectively.

Deliberative conclusions

It is not sufficient to talk about “systems” in generic and non-specific terms. Complex social systems, including innovation systems, have specific characteristics. Above all, there is no

point outside a complex social system from which one can see and understand this complexity in its entirety. But neither is it possible for the entire system to be represented in its entirety within any element of the system, e.g. a leadership team or a controller-function. This means, that no one in a complex social system, e.g. a regional innovation system, has the authority or the capacity to plan, lead, control or evaluate the system, at least not in a conventional way. This also means, that a complex social system cannot be observed unless this is done as a reduction. Thus, every attempt to formulate a “theory” of complexity, e.g. of an innovation system, is about reduction, which unavoidably means (a) that this “theory” has to be self-referential, and (b) that the decisive point about this “theory” will always be if it is trustworthy or not, i.e. this is not about science, but about rhetoric.

Furthermore, a complex social system “consists” of a large number of actors that interact in a dynamic way and which therefore always have a history. Any element in the system influences and is influenced by many other elements, i.e. the interactions are non-linear. Complex social systems have two specific capabilities that are of particular importance: representation and self-organisation. Representation has to do with the necessity for the system to store information for future use concerning the environment, i.e. this has to do with learning. Self-organisation has to do with the need of the system (in its relation to the external environment) to develop and change its internal structure without the *a priori* necessity of an external designer, i.e. this has to do with governance. Hence, social and thus complex systems, also innovation systems, are obviously governed by complex resources.

7 Learning

At the centre of the system of innovation approaches there are two hypotheses. First, knowledge is the most fundamental resource in the modern economy and, accordingly, learning is the most important process. Second, learning is, basically, an interactive process, i.e. learning is a social process which can not be properly understood unless one pays regard to its institutional and cultural context (Lundvall 1992).

In this section we will focus on four aspects of these hypotheses: (a) The origin of the idea of interactive learning; (b) The present day status of the concept of learning within the innovation and cluster approaches; (c) The line of thinking that is called “the new production of knowledge”; (d) The REGINN experience about interactive learning.

The origin of the idea of interactive learning⁴

What above all distinguishes innovation economists from the hitherto hegemonic neo-classical economists is their emphasis on learning. In fact, learning in its institutional and cultural production-distribution-consumption context is their unit of analysis. The fact that people do and use things together, i.e. that they interact, is considered to be a learning process as important for the society, and thus to the economy in general, as the learning processes which are organised in the public educational system (higher education and R&D inclusive). Thus, the key concept is interactive learning, especially between firms and between firms and their customers.

We think it is fair to say, however, that these ideas ought to be seen more as an institutional inspired criticism of the central neo-classical first principles than it is a fully developed theoretical framework in its own right. Though, we agree with much of this criticism. Nevertheless, when one looks closer at this particular innovation concept of interactive learning (there

⁴ This and the next paragraph basically build on Uhlin, Å., (2000); ”The Concept of Learning within the Systems of Innovation Approaches”. *Concepts and Transformation*, No 3, p 15-51, 2000.

are others) one notices some serious methodological problems. Lundvall, for instance, states that

...standard economic theory and policy have become increasingly inadequate because of the fact that we have entered a new phase of economic development which I will refer to as *the learning economy*. It is reflected in a crisis of economic theory where more and more observed empirical patterns appear under the label of paradoxes - what they show goes against what standard economic theory predicts. It is also reflected in a crisis for economic policy where increasingly those responsible are giving up their ambitions to solve the most serious socio-economic problems ... (Lundvall 1996)⁵

What Lundvall and other innovation economists want us to believe is that once we accept the idea that the economy basically is a learning process the paradoxes will vanish and the most serious economic problems will be solved. From a methodological point of view, however, this is exactly what Abramowitz, Solow and other neo-classical economists did forty years ago. They realised it was not enough to understand economic growth as a function of labour and capital. They started to suspect there was “a mystical residual” and eventually hit upon the idea that it was possible to account for most of the strange anomalies if they brought the factor of knowledge into the equation. And this is exactly what the innovation economists also are doing when they dissolve the new paradoxes by bringing learning into the picture.

Well, it may be asked, isn't this perfectly acceptable from a methodological point of view? Of course it is – as long as we accept that the idea of interactive learning is but an abductively inferred hypothesis. That is, we are facing the paradoxical and problematic situation C; If A, then the paradoxes dissolve and situation C becomes coherent; Inference: A is *probably* true.

The more profound signification of this is that there is no way to *prove* (in a scientific meaning of the word) that learning is “the most important process ...”, etc. We have to be satisfied with this hypothesis as a trustworthy story. We have also to accept that we cannot prove - that *no one* can prove - that there has or has not been interactive learning within for instance the REGINN programme. We can just tell what we hope is trustworthy stories of what we interpret as learning, or non-learning. We will come back to other aspects of this in the next section (8) about trust.

In summation, from a methodological and rhetorical point of view Lundvall and other innovation economists have “replaced” knowledge with learning in a mode of thinking about economic growth that since the mid-60s has been sincerely believed, and thus of course favoured, not only by innovation economists but also by many politicians, planners, analysts, administrators and journalists. However, the concept of interactive learning in this context is as much a black box for the innovation economists as the concept of knowledge hitherto has been to the neo-classical. Hence, learning economy understood as a theoretical framework is far from being a nomological proposition. It is, obviously and at best, to be perceived what William James long ago called a “living hypothesis”, a belief worth while to explore and develop – and to criticise.

Collective and expansive learning and local capabilities

Because, there are scores of well known problems with the concept of learning. For instance: Which one comes first, knowledge as structure or learning as process? Do the individuals learn first and the collective later, or is it the other way around? And so on. The fundamental problem with the idea of interactive learning in systems of innovation, however, is about expansive and collective learning. Expansive learning is about “learning the new” in comparison to “learning the given”. That is, the problem about expansive learning is that there are no teachers. Teachers are occupied teaching the already given. Learning the new is about thread-

⁵ The paradoxes Lundvall refers to are the Leontief-paradox, the Kaldor-paradox and the Solow-paradox.

ing into virtually unknown territory, where no one has been before, where there are no concepts and words for the new, and where there is “no ladder to climb”. Add to this that the learning of the new is done by a collective, say a region and we think this is what a regional innovation system really is or ought to be about. That is, this is about the ability of a complex social system to develop a more complex system than itself. The idea of innovation systems is arguably about such abilities, i.e. about the capability to simultaneously expansive and collective learning.

Now, these problems are not overly discussed within the innovation and cluster literature. This is the more astonishing since there is a lively discussion about these problems in other disciplines. In socio-psychology, for instance, one is explicitly occupied with questions about interactive learning in complex social systems, e.g. “communities of practice” (Lave & Wenger 1991). Another field where this question is at the centre of interest is the discipline of developmental work research. Within these research fields and traditions collective and expansive learning is approached from a systemic and socio-linguistic perspective in general (e.g. Dewey [1916] 1966; Vygotsky [1930] 1978; Bakhtin 1982; Bateson 1987; Burke & Porter 1997; Cilliers 1998) and from a methodological collectivistic and cultural-historical perspective in particular (e.g. Engeström 1987; Sutter 2002).

What is more, Uhlin (1996) and Nooteboom (1999) have both remarked that the concept of interactive learning as it is analysed within the systems of innovation approach is of the first order. The capability of a system to learn how to learn, i.e. of the second order, has hitherto not been discussed within this approach. Though there seems to be a change under way. In the summation from the Danish so called DISCO-project Lundvall (1999) touches on the concept of double loop learning. And he rightly adds that there is still a considerable gap between, on the one hand, the huge interest that is bestowed knowledge and learning, and, on the other, “the conceptual progress that is made within this field”.

Furthermore, the concept of cluster has now and then appeared in this text. At the start of the REGINN programme it was more or less used as a synonym to the concept of innovation system. But there are differences. Focus in the latter concept is on the region as an economic-administrative entity, whilst a cluster in the first hand is seen from a geographical and thus spatial perspective. The concept of *regional* innovation systems has thus become a common field of interest for both economists and economist-geographers.

However, whilst the former are more interested in learning as a generic phenomenon in the economy the latter are interested in why and how “local knowledge” is developed between local enterprises. The key-phrases of this spatial perspective are “proximity matters” and “localised capabilities”. Maskell *et al* (1998), who arguably so far have done the most extensive work about learning within this approach, propose that there are four basic and place-bound capabilities: physical infrastructure, natural resources, institutional heritage, and knowledge and skill. We are particularly interested in their argumentation about the two latter capabilities.

They argue that firms are dependent on the local context and its specific institutions in order to maintain and develop their competitiveness. However, in many cases the local capabilities have become “ubiquitous”, i.e. the unique capabilities that once gave the place its competitive edge have become common knowledge. In spite of this, Maskell *et al* argue, it is nevertheless a fact that localised capabilities in many cases have been astonishingly stable over long periods of time. The explanation to this is that such places have a capacity to learn and create new knowledge, i.e. to innovate. And this, in turn, is achieved because the industrial actors in such places build “trust-like relations”.

The point in their argumentation is that there is interaction between the firms and the place, i.e. between the individual actors and the local institutional heritage. It is in this very interaction that “localised learning” is developed. The implicit idea is that the actors in the system

stepwise learn to trust not only each other, but they learn to trust trust as an institution. And the more mutual trust and institutional trust the more localised learning. This is of course an example of what we have called double loop learning, or learning of the second order. This is also an example (though not expressed by Maskell *et al*) of expansive and collective learning.

There are, however, some problems with this argumentation. It is easy to agree with the notion that individual actors might see the rational in, for instance, sharing their own knowledge with other actors in order to get knowledge in return. It is also easy to agree with the notion that this has to do with trust; there is no guarantee that you will have knowledge in return once you have given your own knowledge away, you simply have to trust “the other”. What is more, if there is a positive result of your risk-taking all actors involved have certainly learned something important, i.e. that it might be rewarding to trust each other. At best this might as well be a self-propelling process; the more you trust me, the more I trust you. However, how is this achieved at the organisational level, and at the societal level? Are expansive, i.e. innovative, learning processes on these levels also self-organising? But Maskell *et al* argue throughout about “building networks” and “built trust”. We are deeply suspicious to the idea that it is possible to design strategies on aggregated levels in order to build learning networks based on trust. We will discuss this more in detail in the next section (8) about trust.

*The new production of knowledge*⁶

When discussing collective and expansive learning it is not possible to bypass the debate initiated by Gibbons *et al* in their 1994 book *The New Production of Knowledge*. There is no point, however, in repeating all the well known arguments about Mode 1 and Mode 2, but we will focus on some aspects brought forward in their sequel from 2001, i.e. *Re-Thinking Science* by Nowotny *et al*, which have a clear bearing on the REGINN experiment.

Nowotny *et al* argue that the emergence of more open systems of knowledge production (Mode-2 Science) and the growth of complexity and uncertainty in society (Mode-2 Society) are phenomena linked in a co-evolutionary process. Science and society have “invaded the others domain, and the lines demarcating the one from the other have all but disappeared”. They call this process “contextualization” and, they argue, it moves science beyond merely reliable knowledge to the production of “socially more robust knowledge”.

Nowotny *et al* use ‘innovation’ as a metaphor in order to encapsulate the Mode-2 Society. The modern research enterprise, they say, has become “a gigantic and unique kind of innovation machine”. And industry has been forced by the dynamics of international competition “to carry the innovation process into the heartland of knowledge production itself”. Moreover, they argue that research councils have become key institutions, linking the academic community to the research interests of government and industry. But directed programmes, they say, and we have to ask if the REGINN programme is indirectly attributed, are unable to articulate “the full complexity of the social contextualization characteristic of Mode-2 knowledge.” In such programmes one wrongly assumes, Nowotny *et al* lay down, “that the link between research and innovation is direct”. But they also argue that

Amid all the turbulence unleashed at present, [innovation] is viewed as the crucial process for propelling a country, an industry, a company, a laboratory, a research field, a university or a national science system from its present state into the future. Indeed, without innovation there may not be a future (ibid:67).

Nowotny *et al* also argue that research now is more valued than science. This preference for research produces more and more uncertainty, more complexity and more risk-taking. Un-

⁶ This paragraph builds on Uhlin, Å. & Johansen R.; (2001); “Innovation and the post-academic condition. The case of Vestfold University College and the ”Electronic Coast” project.” Paper presented at the 2nd Research Conference on University and Society Co-operation (HSS 01), Halmstad University, Sweden May 9-11, 2001.

certainties come with innovation. They further argue that “innovation can be regarded as an experimental process for reducing uncertainty to risk”. That is, this is a virtuous circle – innovations-uncertainties-innovations. Coping with uncertainties calls for new social – and not only scientific and technical – innovations to enable individuals and groups to cope with ever encroaching uncertainties. Thus, they talk about “innovation as the centrepiece of a new contract between science and society”.

Yes, we think it is possible to say that Nowotny *et al* not only observe an “unrestrained belief in innovation” with an “urgent, even quasi-moral, stridency” but that they themselves see innovation as a metaphorical power – a “centrepiece of a new contract”, “the crucial process for propelling a country, a region”, etc. - in the “Mode 2 Society”. Innovation to them is obviously a meta-metaphor for numerous other metaphors used in a Luhmannian way to try to depict what is really impossible to exactly define, namely a dynamic, non-linear and thus complex social system. Nevertheless they try to define innovation, at least in a way. “Innovation”, they say,

... is not a random process; it is shaped by history and institutions and nurtured (or the reverse) by a wide range of societal, cultural, political and economic arrangements. In this cross-cutting combination of investment strategies, of scientific and technological talent and skills, tax incentives, government regulation (or de-regulation), company start-ups (and failures) and the dynamics of innovation process itself, the contextualization of scientific knowledge production thrives (ibid:69).

That is, this is obviously not a clear-cut definition of innovation as collective and expansive learning. It should perhaps rather be judged as a narrative and a piece of rhetoric. We will soon discuss if this is bad or good, a weakness in the argumentation, or perhaps a strength.

The REGINN experience about learning

Now, it is important to realise the difference between (a) learning, and (b) learning about learning. Learning is assumed to be the most important process in regional innovation systems. However, REGINN *as an experiment* really was not “just” about learning but the ultimate objective was learning about (interactive) learning. In this paragraph we will therefore deal with what we have learnt about learning. And again, there is a theoretical perspective as well as an empirical.

To start with the theoretical perspective, then, there is comparatively not that much to learn about learning in the literature about innovation systems and clusters. Compared to what is discussed about learning in other disciplines the innovation and cluster literature is still only in the very first phase. For instance, the “Mode 2 literature” is evidently far more advanced in its systemic conception of collective and expansive learning.

That is, it is by now apparent that the concept of interactive learning is system dependent. The key to understand the concept of interactive learning is to be found in the younger systems theory, and especially in complexity theory. This becomes even clearer when one confronts the concept of innovation, which rightly ought to be defined as “distributed collective and expansive learning”. What is more, we think it is by now manifest, i.e. we have *learned*, that systemic learning is closely connected with the concepts of trust and governance.

The empirical perspective on learning about learning in the REGINN experiment might best be demonstrated through a story from one of the seminars with the project leaders. The discussion was about the interactions of the four basic concepts in the projects, i.e. system, learning, trust and governance. Someone said that he used to see these concepts together with all the physical, social and mental elements in “his” project as the musicians in an orchestra. And he was the conductor. The thing was to bring all the concepts and elements together in the same place, to make them start at the same time, and to play the same symphony in tune and in the right tempo.

Another project leader said that although he very much liked this music metaphor it was surely not like conducting a symphony. Because there was no score telling the musicians exactly what and how to play. No, it was more like a jam session. There were musicians coming and going, i.e. over time there were very different mixtures of musicians and instruments. Every piece started with a well known theme. Yes, but no one knew for sure how this theme was going to develop once they started to play, which improvisations might be innovated, what solos would be created, how the piece would end, and so forth. All of this was very complex and difficult to explain in rational terms, but the sound of it was marvellous, and it was great fun. And, for sure, there was no conductor, but the music was created “between” the musicians. And above all, the music was new, it was innovative, no one had ever heard it before. It was not played according to an old score.

The jam session metaphor was immediately appreciated. All the participants in the seminar elaborated on it and developed it in comparison not only with the symphony, but also with folk music, swing, military bands playing marches, and so forth. But the jam session metaphor was the best. The seminar in it self developed like a jam session and resulted in a situation that could be best described as “situated learning about learning”.

8 Trust

In this section we will discuss the concept of trust with direct reference to one of the projects in the REGINN portfolio, the so-called Food and Gas Project.⁷ This project was launched in Stavanger, on the Norwegian West Coast, which since the early 1970s is the centre of the Norwegian oil and gas industry. However, it is “common knowledge” all over Norway that within a generation or two the income from this industry will decrease dramatically. The heart of this REGINN project, therefore, was to take the first step into the new and fast growing seafood industry by using warm seawater, which is a by-product from the process of refining crude gas, in order to mass-cultivate algae and scallop-fry. The unparalleled export success since the 1960s for cultivated, or “farmed”, Norwegian salmon was a prototype. Besides, Stavanger once was an international centre in the canning industry, especially concerning sardines, and the county of Rogaland, where Stavanger is situated, is in general historically renowned as a “food-county”.

However, the project soon unveiled itself as incomprehensible complex as to the amount of participants, their differences in origin, size, competence, financial capability, etc. No one inside or outside the project had full information about the entire project. No single partner was in a position to instruct the others or to take the lead. Nevertheless, this project organised and managed itself in a most successful way. And what is more, at an early stage the systemic properties of the project also showed qualities that undoubtedly had to do with trust, in one way or the other.

It is well known, though, that stable systems of user governance, which are built on strong trust, credible commitments and provision of institutions can achieve what we witnessed in Stavanger. However, these systems are normally limited to small ecosystems, mono-cultural use and socially homogenous stake-holders (Ostrom 1990; Jessop 1997), i.e. characteristics that did not correspond to those of the Food and Gas Project.

In this section we will discuss (1) the general function of trust, (2) the literature about trust, (3) trust in the concept of regional innovation system, and (4) trust in the Food and Gas Pro-

⁷ Uhlin, Å. (2002); “Trust in regional innovation systems. The case of ‘The Food and Gas Project’ in Stavanger, Norway”. Paper to be presented at the 4th Triple Helix Conference, November 6th-9th 2002, Copenhagen, Denmark – Lund, Sweden.

ject. We end the section with (5) a discussion about our hypothesis that the success of this project at the first hand be due to a conception of trust that we call “distributed social trust”.

The function of trust

The social function of trust, as it is generally discussed in the scientific literature – including the innovation and cluster literature -, is to reduce the complexity of the unknown future. This is Niklas Luhmann’s *dictum* that he discusses over and over again (e.g. Luhmann 1979, 1988, 1995). This is also the explicit Luhmannian notion in much of the sociologically oriented literature about trust. Implicitly it is as well the basic notion within many other scientific fields where the concept of trust is discussed. However, and to be more accurate, it is not this function of trust as reduction of complexity as such that is discussed in the scientific literature, but *what* we trust. As for this “what we trust” there are three general notions: (a) Trust in institutions; (b) Trust in the other; and (c) Trust in narratives.

It is necessary to emphasise, though, that these three notions must not be understood as alternative *strategies* to reduce complexity. On the contrary, we understand these three notions as philosophically and scientifically idealised *aspects* of trust. That is, in “the real world” these three aspects are not only compatible but also interwoven first-order aspects of the second-order phenomenon of ‘trust’. The functions of these idealised aspects respectively are to help us to see more clearly both the problems with trust and the necessities and opportunities.

What is more, our object of investigation in this section is ‘trust in regional innovation systems’, but this object can be analysed in at least four different ways:

- 1 As an investigation about how the concept of trust is used specifically in the literature about systems of innovation and clusters;
- 2 As a study of the many different concepts of trust that have been discussed in the scientific literature in general since the early 1970s;
- 3 As an inquiry into what kind of trust the Research Council of Norway has bestowed the concept of regional innovation systems;
- 4 As we think the phenomenon of trust has unveiled itself in a particular regional innovation system, i.e. the Food and Gas Project.

Taken together with what we have said above about the three different aspects of trust these four categories give us a kind of matrix that we can use in order to organise our observations, deliberations and conclusions.

The literature about trust

Hence, it is obvious that *trust in institutions* is a major theme in the general scientific literature about trust (e.g. Pagden 1988, Putnam 1993; Fukuyama 1995). In the innovation- and cluster literature (e.g. Storper & Walker 1989; Maskell *et al* 1998; Chiarvesio & Micelli 2001; Malmberg & Maskell 2001) the notions of “shared trust” and “mutual trust” obviously also belong to this category, i.e. trust in institutions. A general observation is, however, that the notion of trust in institutions is much more superficial in the latter kind of literature.

This observation about a qualitative difference between the two kinds of literature regarding *trust in institutions* is even more obvious when it comes to the concept of *trust in the other*. This is also a major theme in the general “trust-literature” (e.g. Luhmann 1979, 1988; Hart 1988; Seligman 1997; Greif 1998; Sztompka 1999). In the innovation- and cluster literature, on the other hand, this aspect of trust is a mere suggestion. And, as we have already observed, Maskell *et al* (1998) argue that “built trust”, which in effect is described as *trust in the other*, is just “trust-like”, i.e. it is not about trust at all. Though, we are neither offered any explanation why it is not trust, nor what it is that is just “like” trust.

Furthermore, whereas there is a lively discussion about *trust in narratives* (e.g. Perelman & Olbrechts-Tyteca 1969; Gadamer 1989; Earl & Cvetkotvich 1995; Rosengren 1998) virtually nothing is said about this aspect of trust in the innovation- and cluster literature. On the other hand, it is obvious that for instance Maskell *et al* (1998) are not alien to the *usage* of rhetorical figures like metonymy and metaphors in their own quest to find a better understanding of the qualities of regional innovation systems and clusters. Their concept of ‘built trust’, for instance, has of course to be understood as a metaphor for a quality of some sort.

In summation: Trust is a much-discussed concept in the philosophical and especially the sociological literature. The results of this discussion are not yet very much used in the innovation- and cluster-literature. So far focus in this latter literature is on *trust in institutions*, to some little degree on *trust in the other*, whilst *trust in narratives* seem to be unknown territory.

Trust in the concept of regional innovation system

Since the mid-1990s governmental trust in the concepts of regional innovation systems and clusters has been considerable, to say the least. The coming into being of the REGINN-programme in Norway, the VINNOVA agency in Sweden, and the DISKO-project in Denmark are proofs enough. We argue, however, that this kind of trust has to be understood as *trust in institutions*, in the first hand trust in the institution of science and research, and especially in the science of economics. That is, actors on the national policy level, both politicians and civil servants, have put their confidence in the new ideas of institutional and geographical economics that began to emerge in the late 1980s (Nilsson & Uhlin 2002). Yes, *confidence* in new ideas, but *trust in the institution* of science and research that has “produced” these new ideas.

Furthermore, we argue that *trust in the other’s* strong ethical values is not to be put at the forefront when we are examining governmental trust in the concept of regional innovation systems and clusters. That is, trust in the strong values of the individual researcher has probably not much to do with trust in the concept of, for instance, ‘cluster’. On the other hand the *ethos* of science and research in general is still a strong institution in the Western industrialised societies. We argue that politicians and civil servants on the national level in the first hand have trust in this *ethos* as an *institution*, not primarily in the individual researchers and scientists.

However, this trust in the institution of science and research obviously corresponds with *trust in narratives*. That is, trust in the concept of regional innovation systems and clusters is as much trust in the narratives of scientists and researchers about “built trust”, “shared trust”, “transmutations”, “interactive learning”, and so forth, as it is trust in the institutions of science and research. We argue that institutional economists and economy-geographers tell stories about something they call regional innovation systems and clusters, stories that obviously are trustworthy in the eyes of the policymakers on the national level. Because, there *are* of course no regional innovation systems and clusters besides as narratives and abstractions.

And once again, we are not ironical about this. We are not critical either, at least in principal. In cases like this rhetoric is unavoidable and often both useful and “right”. What could be criticised, though, is that economists and geographers have not overly interested themselves in what have been said and written about concepts like trust, learning, system and governance in other disciplines than their own. On the other hand, and to be fair, philosophers, sociologists, political scientists, historians and other knowledgeable actors regarding these concepts have obviously either been unaware of the discussion about innovation systems and clusters, or have they for some reason been reluctant to enter it. The result is, however, that what reaches the national policy level about trust and learning in regional innovation systems and clusters, is not necessarily the most interesting and deliberate notions.

Trust in the Food and Gas Project

In The Food and Gas Project we have identified five “objects of trust”: First, trust in the local history and in Rogaland as a “food county”. Second, trust in the success story about the Norwegian aquaculture industry. Third, trust in the knowledge and R&D capacities developed in and around this industry. Fourth, trust within the steering-group of the Food and Gas Project. Fifth, trust in the triple-helix concept.

Now, since we accept that the basic function of trust is to reduce the complexity of the unknown future, we also have to accept Luhmann’s (1988) observation that familiarity and trust are complementary ways of absorbing complexity, and that they are linked to one another in the same way that the past and the future are linked. Hence, it is obvious that the history of the Stavanger area as a regional innovation system in the canning industry from the early 1900s to at least World War II is linked to the present attitude of trustfulness insofar as the future is concerned. This of course is about *trust in institutions*, i.e., and more specifically, trust in the history of Stavanger as the “Canning Capital”. Trust in Rogaland as a food county is of the same kind, as is the success of the Norwegian aquaculture industry. Trust in the knowledge and R&D capacities developed in and around this industry, however, are of a slightly different kind. This is also about history, but it is above all about trust in the institution of science. This also fits with the rhetoric developed since the early 1980s about the success story of the fish farming industry, “the knowledge society”, and so forth. That is, this is also about *trust in narratives*.

The growth of mutual trust within the steering-group of the Food and Gas Project is obviously about *trust in the other*. The blend of institutions and narratives referred within the steering-group has to be understood as a self-referential system. Every narrative told by you and me about our trust in common institutions and narratives is about you and myself. That is, if you and I through this storytelling come to understand that we share the same kind of values, the same kind of non-trivial and strong ethical codex, and the same kind of familiarity, i.e. a familiarity that builds on a collective historical consciousness, well then, of course we trust each other.

This line of reasoning connects to what we have described above and to what we think is the most remarkable occurrence about trust and distrust in the Food and Gas Project. That is, that people within the project had difficulties to trust the concept of regional innovation systems, but that they immediately took the concept of triple helix to their hearts. Our interpretation of what happened is the following. What so far had been perceived as an unfathomable mass of entities and interests within a concept called ‘regional innovation systems’ emerged as something comprehensible and trustworthy when we presented it as a different narrative, i.e. the “story” about triple-helix. Thus, a piece of rhetoric that on our behalf was more or less unaware seems to have created trust not only in the necessity but also in the *possibility* of a regional university-industry-government co-operation for the future. So, was it this “story” that was trustworthy, or was it the storyteller? That is, was it *trust in narratives*, or *trust in the other*? Or was this just another example of *trust in institutions*, i.e. trust in the storyteller as a researcher and representative for the Research Council of Norway? Or was it trust in the institutions of industry, university and government? We do not know. Our line of argumentation is that in “the real world” these three kinds of ideal-types – trust in institutions, in the other, and in narratives – are systemically inseparable. That is, all three aspects of trust are necessary for trust to occur.

In summation: It is easy to see that the innovation- and cluster literature has not much to offer in order for us to understand the phenomenon of trust within the project. Furthermore, it is perfectly clear that trust in institutions is important on the national as well as on the regional level, and especially trust in the institution of science and research. Trust in the institution of

regional history and regional historical prototypes, however, is extremely important on the regional level but is more or less neglected on the national. Lastly, the obvious governmental trust in the story of regional innovation systems and clusters is met with distrust on the regional level. The triple-helix story turned out to be the more trustworthy narrative on this operational level.

Distributed social trust

We will finally put the concept of trust into a full systemic perspective. Hence, we have already referred to Bhaskar's three domains. Scientific work, Bhaskar argues, is to investigate and identify the relations or non-relations between what we experience in the domain of the empirical, what actually happens in the domain of the factual, and what is possible to transfactorially infer about the underlying mechanisms in the domain of the real that produce events in the world. We argue that this is a meaningful way to fathom the phenomenon of trust, because it is always distributed over these three domains.

That is, trust does not appear to us just because we observe the empirical world; to believe that would be to commit what Bhaskar calls "the epistemic fallacy". This is about causation. The "mechanisms" of the phenomena in the domain of the real cause events to happen in the domains of the factual and the empirical. But causes are there not only in relation to effects. They are there also as *capacities* or *tendencies*, which exist even when they are not redeemed. The causal mechanism is there not only when A causes B, but also when A does *not* cause B (Danermark *et al*, 1997). That is, causal laws cannot be regarded as universally and empirically established regularities, "rather they must be analysed as tendencies" (Bhaskar 1975). This observation is of course extremely important when it comes to the policy-question whether it is possible or not to evoke trust in, let say, a potential regional innovation system. Are there capacities or tendencies for trust in the innovation-system-to-be?

Statements about capacities or tendencies have to be *transfactual*, i.e. they have to be about objects that act independently from the effects and separated from the actual events. It is not enough to know that B follows A. We have to establish how this is done, what the process is like where A produces B (if there is a causal relation). When we want to identify the generative mechanisms that make events in the empirical domain possible we have to ask transfactual questions in order to look beyond what is actually happening. So, we might for instance ask: What would be the true nature of a regional innovation system that makes observable trust possible as an obvious element of such a system?

This question obviously has to do with social structures and people and their actions in order to reduce the complexity of the future. In the Food and Gas Project a close and living contact with the local and regional history seems to be an indispensable factor in a trust-generating mechanism, and so forth. Thus, social structures give possibilities but also limitations for actions, whilst actions underpin or change structures. This is also about emergence; the social structure already exists *before* those actions are performed that reproduce or transform the structure. That is, the modification of the structure occurs *after* the actions of the agents.

Hence, the social interaction is conditioned by the structure, but it is *not governed* by it. People are not puppets in the strings of social structures. No, people have capacities of their own that cannot be reduced to structural capacities. It is true that social structures put people in situations, but people react to these situations in unexpected and often innovative ways. However, "it is these situations that constitute the mechanism that is the connecting link between structure and agent" (Danermark *et al* 1997:104; our translation). What is more, it is the social interaction that contains the only effective causes of social life; it is only people that can think and act. Social structures do not have such powers. Hence, the effects of the social structures are distributed, but it is people that distribute the effects. However, emergent pow-

ers within structures are not realised unless people relieve them in their projects. On the other hand, projects are not created out of the blue but are formulated in relation to existing social structures, i.e. according to these structures or in opposition to them.

So, in relation to what social structures in the domains of the real and the factual do we have to understand the emergence of trust in the domain of the empirical of the Food and Gas Project? It is possible, we think, to give a rather straightforward answer: A living history regarding food-production, powerful prototypes, first-rate R&D capacities, a more suitable theoretical narrative in the triple-helix model than in the regional innovation model, and last but not least, present people prepared to act.

9 Governance

Theoreticians concerned with complex social systems over all argue that processes in such systems are not possible to govern, at least not in the absolute and rational meaning of the word. Though, they admit that it is possible to influence complex systems. But, as the Norwegian committee (NOU 2000:7) emphasised, the problem with such influence is that one can never be certain about the effects of one's influences.

We will, however, first discuss some ideas about policies and governance presented within (1) the systems of innovation approaches and (2) the cluster approach. Then we will compare these ideas with some recent ideas within sociology and political science about the concepts of (3) interactive governance and governance networks. This section will be ended with (4) some reflections about the REGINN experiences of governance on the project level, the programme level and the policy level respectively, and (5) some conclusions.

Governance and the systems of innovation approaches

Already in the early 1990s Danish economists (Lundvall *et al* 1992) suggested that the Government in a learning economy should play a "didactic role" in the national innovation system. Dalum *et al* (1992) specified this role to (a) investments in the educational system and measurements in order for the continuous renewal of this system. They also recommended that the Government should consider what social institutions should characterise this system, and therefore in the long run the entire society. Furthermore they recommended that (b) the educational system should develop norms that rather reward collective results than individual. Also, (c) the educational strategies and organisations should be designed (!) so that people as well as firms would be able to increase their abilities to learn. Lastly, (d) the communication process between the public R&D system and the enterprises ought to be facilitated in order to accelerate learning and speed up the innovation processes.

These policy recommendations are obviously on a very high level of abstraction. They also build on the premise that it *is* possible to "design" and implement strategies for increased learning in the economy. However, seven years later somewhat different strains were expressed among innovation economists. Lundvall thus argues in his summary of the Danish DISKO-project that "we do not think it is our task as researchers to design detailed policy recommendations" (1999:201). He emphasises, however, that there are some general principles that are important to keep in mind. First, he repeats his *dictum* from 1992, i.e. that learning is the most important process in a modern economy. Second, and this is new, he lies down that it is particularly difficult to govern a learning economy characterised by complexity and rapid change. However, and contrary to this insight, he suggests scores of policy implications, because innovation policies, he argues, inflict the whole spectrum of what a Government policy wise has to bother about. But more important than anything else it is to

... initiate new ways of thinking about pedagogic and interactions between schools, teachers, parents, public authorities, enterprises and researchers. Such changes can not be centrally dictated. They presume that the actors who will do the job in the new structures will play the leading roles in the change process. A formal logic of economy that from the outside tries to extort the change will most probably cement old structures. Simplified incentive structures with focus on individual wage rises will in the best case do no harm, because this is about promoting an organisational renewal that of necessity is a collective process (Lundvall 1999:205; our translation from Danish).

It is obvious that Lundvall now has adopted a kind of complexity perspective, although it is not altogether transparent. What is clear, though, is that he argues that it is the entire system, as a collective, that in effect has the lead-role.

We think it is reasonable to understand the rapprochement of Lundvall and other innovation economists to complexity theory as part of a new and wider mode of thinking. The triple helix conception and the “new production of knowledge”-thinking respectively has not passed unnoticed. What is more, the discourse within the social sciences on the whole has taken on a complexity theoretical stance. The recent international attention bestowed on Castell’s (1996-98) work on the complexity of the “information age” is but one example. That is, it is probably fair to understand Lundvall’s recommendation to attach a co-ordination centre for innovations systems to the Prime Minister’s office as something more than just a conventional gesture; “co-ordination” has after all for decades been the number one quick-fix concept. However, such a centre, and of course the entire Government, would rather be seen as an integrated part of the innovation system and encompassed by the idea of interactive, expansive and collective learning. That is, the Government would have to function on a meta-pedagogical level (Uhlen 1996).

Governance and the cluster approach

Danish economists like Lundvall and Dalum, and other innovation economists like Freeman, Nelson, Edquist, Soete and Dosi are in the first hand interested in national innovation systems. Geographers, however, like for instance Asheim, Eskelinen, Isaksen, Maskell and Malmberg are more interested in territorially defined entities such as clusters, regional innovation systems, industrial agglomerations, and so forth. Nevertheless, and in the words of Malmberg & Maskell (2001) they too argue that “it is not possible to infer any simple policy recommendations from the adopted theoretical standpoint”. Though, the geographers have another kind of argument than for instance Lundvall’s general reference to complexity. Hence, in order to formulate and implement a strategy in this field they argue that it would be necessary to codify local competence. But codified competence opens up for imitation, which in turn results in “ubification” (Maskell *et al* 1998). And they unfold the argument like this:

The idea that a sufficiently far-sighted policy could first identify and then (re)create competence that is unique, precious and difficult to imitate is wrong. Could it succeed in one region, it would in principle be possible to do it in all regions, i.e. the unique local competence would be transformed into a ubiquity and lose its specific value (Malmberg & Maskell 2001:20; our translation from Swedish).

That is, it would be unwise to recreate local unique competence and thus make it ubiquitous. The competitive edge would be lost.

We do not agree with this argument. It presumes that all places in spite of their respectively uniqueness nevertheless are alike in one respect, namely that it is possible to identify and (re)create their unique competence. But it is not. Unique competence is unique. That is, it is possible to identify it to a certain degree, especially if one manages to come close enough, but for historical (e.g. Pollard 1981; Wicken 1997) and theoretical-philosophical reasons (e.g. Berlin 1990; Raz 1988) it is *not* possible to recreate unique competence. However, this impossibility *as such* is no hindrance for a Government to formulate and implement a strategy,

which focus on local knowledge and learning. On the contrary, it could be argued that every Government has an obligation to instigate such strategies in spite of the fact that there are no *guarantees* as to their effects. The role of the Government, then, is of course not to identify and then recreate competence that is unique but to develop a deeper understanding and knowledge of the phenomenon as such. To possess such understanding is knowledge of the second order. It presumes first-hand and practical experiences about places with unique local competence. But above all it presumes insights into the didactic demands on especially the policy- and programme levels respectively in order to cope with a national (or regional) asset consisting of numerous places of which each one has a unique competence that is impossible to recreate.⁸

That is, we argue that Malmberg & Maskell (2001) focus the wrong problem. The real problem is not ubiquification but to shift from a general support policy to (and to use their own words) a “place specific policy” for “co-operation, dynamism and learning”, and furthermore, to shift from a role where the Government (whether on the national, regional or local level) has an agenda of its own, to a role as “facilitator in a self-organizing system of innovation”. Thus, what Malmberg, Maskell and many other cluster economist and geographers have overlooked is that an unconditional prerequisite for such a policy is a profound understanding about interactive governance in complex social systems.

Interactive governance and governance networks

The concept of ‘governance’ is highly topical and there are many and diverse answers to the question “How to bring about governance?” However, the question has recently been reformulated (e.g. Mayntz 1993; Jessop 1997, 1999): Is it at all possible, as a matter of principle as well as practice, to govern *complex* social systems? The background to this new question is of course the controversial application of complexity theory to structures and dynamics of social systems (e.g. Kiel & Elliot 1997). By now, though, there should be no doubt whatsoever about the complexity of innovation systems and clusters. Hence, we argue that there is a strong relationship between functional innovation systems and clusters on the one hand and governance systems on the other.

So, given that complex social systems are self-constituting, self-organising, and self-reproducing these properties certainly make such systems resistant to top-down management and to direct intervention from outside. And Jessop asserts, “[t]hey nonetheless co-exist and co-evolve in complex ways with other systems with which they are reciprocally interdependent. This poses in turn major problems regarding possible external steering (governing, guiding, managing) and/or strategic co-ordination” (Jessop 1999:7).

He suggests, though, that a social order is both contingent and consciously designed. This is a “mechanism” that has four consequences. First, participants of social systems reduce the complexity of the systems into models of reality (cp. Luhman 1995). Second, capacity for dynamic social learning is developed in such systems (cp. Engeström 1987; Cilliers 1998; Uhlin 2000). Third, in such systems there is a continuous development of methods for co-ordination of actions across social borders, between different systems of meaning and interests, and so on (cp. Ostrom 1990). Fourth, there is established both a common ‘Weltbild’ for individual actions, and a system for meta-governance in order to stabilise the orientation, expectations and norms of action for the key actors (cp. Stone 1998).

⁸ This kind of second order knowledge is for instance most clearly stated by Niccoló Machiavelli in *The Discourses* (1998). In Book III, section 39, he says: “It also enables one who has familiarized himself with one district, to grasp with ease the details of any new region. For all countries and all their parts have about them a certain uniformity, so that from the knowledge of one it is easy to pass the knowledge of another; whereas he who has not acquired a good experience of any one, can with difficulty acquire a knowledge of another, and cannot acquire it all unless he is there for a long time.”

Jessop's point, which is inspired by Stone's (1989) regime theory, is that a social order in a complex system is not just an unintentional result of human actions, but also, at least to a degree, a result of design. He calls it "interactive social design". It is developed simultaneously on three different levels where mutual social dependence occurs, namely (a) in interpersonal relations, (b) in inter-organisational relations, and (c) in relations between functionally differentiated institutional orders. Now, it is easy to see that points (a) and (b) have been approached within innovation systems- and cluster research. Point (c), though, is more or less left without notice within these fields. And although relations between functionally differentiated institutional orders are at the very centre of both the triple-helix and the "new production of knowledge" approaches it is apparent that the governance perspective is not overly discussed within those approaches either.

However, the points (a)-(c) are necessary but not sufficient conditions for interactive social design to occur. Orillard (1997) also suggests "strategic guidance" as a necessary condition. Though, Amin & Hausner (1997) underline that strategic guidance can only be created by creative agents with capability to co-ordinate institutional structures in spite of the fact that these structures are autonomous and functionally separated (point (c) above). By influencing the codes, norms and procedures of these structures some agents are nevertheless able to *facilitate* the self-organisation of the said structures at the same time as they secure the regulative function and development of the system.

Hence, this is not about management or leadership in any conventional meaning, i.e. leadership that builds on some sort of hierarchical structure or formal status. It is rather about complex social interaction understood as a capacity to co-ordinate multiple "governance networks" from inside the system and as a part of it. That is, "strategic guidance" is about not destroying such governance networks that display different sorts of rationality. The triple helix concept (Etzkowitz & Leydesdorff 1997) seems to be a good example of a concept that contains three different sorts of rationality (university-industry-government). Positively speaking strategic guidance thus is about the capability to influence two or more governance networks in order for them to overlap and complement each other in such a way that they can create the platform for a "governance complexity of the second order" (Jessop 1997).

Jessop also calls this kind of meta-governance "de-centred inter-systemic context steering" (from the German 'dezentrierte Kontextsteuerung'). This kind of "steering" involves efforts to steer the development of different systems by taking in account their own operating codes and rationalities and their various substantive, social, and spatio-temporal interdependencies. This is facilitated by promoting mutual understanding among different systems, negotiation, co-operation in shared projects, and what is called "negative co-ordination", which is understood as mutual respect for the operational codes of other systems and attempts to avoid negative impacts on these systems.

So, who is the agent that has to accomplish all this? Well, meta-governance should not be understood as the exclusive prerogative of the nation state, Jessop says. The state is no longer the sovereign authority. It becomes but one participant among others in the pluralistic guidance system and contributes its own distinctive resources to the negotiation process. In this perspective the role of the national government therefore is to fulfil (a) the national strategic function, (b) the function of the co-ordinator, (c) the function of the negotiator, (d) the function of the facilitator, and (e) the function to create consensus. To this Orillard (1997) adds (f) the function of creating "discourse institutions" or "supercoding institutions". That is, to supply the different agents with languages (definitions, categories, concepts, models, metaphors, etc) in order for them to communicate and reach agreements, understanding, etc. We argue that this, in a deeper sense, also has to do with trust and what we in that perspective has discussed as the "the new rhetoric".

The REGINN experience of governance on three levels

We will use Jessop's and Orillard's schema (points a–f) in order to discuss the REGINN experience of governance on, respectively, the project level, the programme level and the policy level. That is, we argue that meta-governance has to be carried out on all three levels. For instance, there is as well a meta perspective in a local innovation system.

In order to improve our understanding of the phenomenon of governance in innovation systems and clusters we carried through some studies on the project level. The most extensive one was about the local innovation system of Båtsfjord (Uhlin & Løvland 2001). Båtsfjord is a fishing village (and municipality) by the Barents Sea with approx. 2400 inhabitants and with an outstanding record of innovative capacity within businesses, social welfare policies, cultural activities, and so forth.

We found two prevalent and complementary governance regimes in Båtsfjord. One is an interactive governance regime, which indeed has to be understood as a governance complexity of the second order. The other regime is an almost palpable and even obtrusive trust regime. The leading industrialists and politicians in Båtsfjord, called "the Buyer's Group", has to be seen as an institution where every member, by virtue of the status as a member, has reciprocal obligations to one another and to the entire community. Furthermore, what we have observed in Båtsfjord is clearly a redistributive economic exchange system introduced and implemented by the Buyer's Group and institutionalised over the years in the entire community. That is, the innovation system of Båtsfjord has not been introduced and implemented by outsiders. It has emerged organically over the years. What is more, the social, governance and organisational principles prevailing in Båtsfjord seem to be homogenous and based on distributed socio-cultural structures, presumably much, much older than the particular post-WW II community that Båtsfjord is "on the surface". However, these structures obviously put people of Båtsfjord in situations, and people react to these situations not only in unexpected and often innovative ways, but also in trustful ways. It is obvious that the two Båtsfjord regimes that we have defined, i.e. the interactive governance regime and the obtrusive trust regime, blend together into a local innovative trust regime. Compared to Jessop's and Orillard's schema it is perfectly clear that the Buyer's Group of Båtsfjord fulfils all the functions of a meta-governance system. An obvious question is, however, if this is just possible due to the smallness and thus proximity of the Båtsfjord community.

Because, seen from the programme level the picture is more shattered. We have had the opportunity to study two other projects more in detail, i.e. the Food and Gas project (Uhlin 2002) and the Electronic Coast project (Uhlin & Johansen 2001). Compared to Båtsfjord both projects were carried out in places with much more people, more and bigger companies, R&D institutions, a more complicated public sector, and so forth. However, regardless of this it is obvious the Food and Gas project show the same meta-governance patterns that were so clearly displayed in Båtsfjord. That is, within what has to be described as an interactive governance regime different people from different governance networks in the Food and Gas project have also managed to fulfil all the functions in the schema. The study of the Electronic Coast project does not show an absolutely clear picture in this respect, but the pattern seems to be the same. What is more, some other REGINN-projects that were not studied in the same detail as the aforementioned also show the same pattern. On the other hand, in yet other projects it was as obvious that one failed to fulfil one or more of the functions in the schema.

However, there are also some lessons to be learned from the programme level. That is, it is possible to understand the programme as such as a potential innovation system. The Ministry and the Research Council after all wanted to experiment with some new ideas and the chairman of the programme board more or less asked for innovations in order for the programme "to move from metaphor to reality". So, how has the governance system of the REGINN pro-

gramme unfolded itself? Now, it is important to realise that the questions can be answered under two different sets of premises: (a) REGINN as an experiment with some new ideas, and (b) REGINN as eighteen projects in order to develop some hundred firms. That is, each one of the eighteen projects was about development, but the *programme* was about experimentation.

Hence, and about governance, the *co-ordination function* within the programme has been particularly strong as to this experimentation aspect. Conferences, seminars, regular meetings with the project-leaders, etc. have secured a well co-ordinated effort to experiment with new ideas, concepts, metaphors, ways to organise and evaluate processes, etc. The *functions of negotiation, facilitation, and creation of consensus* have also been carried out with some gusto. Good examples of how these functions have been performed on the programme level are discussed in our more detailed analyses of the Båtsfjord project (Uhlin & Løvland 2001)⁹, the Food and Gas project (Uhlin 2002)¹⁰, and the Electronic Coast project (Uhlin & Johansen 2001)¹¹. Finally, the *function of creating “discourse institutions”* has been particularly strong on the programme level. Good examples of this are found in our analyses of the concept of interactive learning (Uhlin 2000), the concept of complexity (Uhlin, Rangnes & Synnevåg 2001)¹² and the concept of trust (Uhlin 2002). Through these analyses and the preceding and following discussions new language and thereby a new understanding of systemic regional development has been implemented on the programme level.

However, there is another side of the coin. This seemingly successful appearance on the programme level has been limited to the field personnel, the programme co-ordinators in the Research Council and a handful members of the programme board with strong field connections of their own. That is, the policy level on and outside the board has not permitted themselves to be involved in these experiences, discussions and analyses. This is a negative outcome of the experiment. Because it was *the policy level* – in the first hand understood as the Ministry of Local government and Regional Development and the Ministry of Industry and Commerce - that wanted, and the top management of the Research Council that agreed to, an experiment with the new ideas about regional innovation systems.

Concluding reflections

We argue that the concept of governance in complex social systems has to be understood as both efforts to influence *and* efforts to cope with the emerging effects of one's own and other's efforts to influence. This is an ongoing process, and it is a collective learning process. But in order to influence and to cope with the emerging effects of all efforts to influence one has to acknowledge the significance of being a part of the system. This is not a new insight but rather old hat. What *ought* to be new from a policy perspective, though, is that no one will ever command all the parameters of an innovation system or a cluster. No one will ever be able to design, plan, create, implement and govern such a system from scratch. What also ought to be understood is that a place at or near what is still by many understood as “the top of the system”, i.e. the policy level, is not the best of places in order to comprehend complex social systems of the kind, in fact it rather seems to be the opposite.

On the other hand, in many cases efforts on the policy level to enhance regional innovation systems and clusters nevertheless seem to have resulted in relative success. For instance, some of the REGINN projects could without doubt be classified like that. However, when judging this we have to take two different strategies into consideration. The one is that some regional projects that are supported with national money have to be understood as ongoing projects.

⁹ Jarle Løvland was the project leader for the Båtsfjord project.

¹⁰ The paper about The Food and Gas project was written in close contact with Helge Bergslien who was the project leader and with Norvald Skretting who was chairman of the project committee.

¹¹ Ragnar Johansen was the project leader for the Electronic Coast project.

¹² Marit Synnevåg was the REGINN-programme co-ordinator within the Research Council.

These projects build on cultural, social, financial, technical and business structures and processes that already existed when the national project money were added. These structures and processes have often done so for a long time, sometimes for hundred of years. The Food and Gas Project is a good example. The labels of “regional innovation system” or “cluster” have been glued to something already existing. The national policy in cases like this is to support an already documented ability for renewal. What is more, in this kind of strategy it is of course important to organise the selection process in such a way that a thorough enquiry of the antecedent of the proposed project is possible (Uhlin *et al* 2002).

Political ambitions, however, are often higher than “just” to build on already existing structures. That is, the ambition is to create what does not yet exist and projects are designed to achieve what is new in every aspect. If one succeeds the gains are big. The extension of Triangle Research Park in North Carolina is an example of this strategy (Nilsson 1998). The establishment of Soft Center in Sweden is another (Nilsson 2002). However, this is a strategy that causes radical changes in the regional and local economic and social structures. And what is more, in beforehand it is almost impossible to calculate the chances of success. That is, a strategy that builds on the idea to create something totally new that is arguably a complex social system is obviously a political lottery (Nilsson & Uhlin 2002).

10 The REGINN experience

In the beginning of this chapter we held out the prospect to answer three questions: (a) Why is it that espoused theories and theories-in-use on the policy level have been incongruent? (b) Why is it that especially actors on the policy level have refrained from interactive learning? (c) What might the consequences be were the actors on this level to include themselves into the innovation system?

Espoused theories and theories-in-use

In a classic study Argyris & Schön (1978) argue that when someone is asked how he would behave under certain circumstances the answer he usually gives is his espoused theory of action for that situation. This is the theory of action to which he gives allegiance, and which, upon request, he communicates to others. However, the theory that actually governs his actions is his theory-in-use, which may or may not be compatible with his espoused theory. The problem is that most people are unaware of their theories-in-use and how these theories help them to remain blind to the actual degree of their ineffectiveness. The reason for this is that the construction of theories-in-use is equivalent to the construction of reality. That is, to ask someone to change his theories-in-use is the same as asking him to change his worldview.

However, Argyris & Schön also argue that “there are practical, common-sense theories as well as academic or scientific theories. A theory is not necessarily accepted, good or true; it is only a set of interconnected propositions that have the same referent – the subject of the theory” (1978:4). They further argue that theories are vehicles for explanation, prediction or control. An explanatory theory explains events by setting forth propositions from which these events may be inferred. A predictive theory sets forth propositions from which inferences about future events may be made. A theory of control describes the conditions under which events of a certain kind may be made to occur. Now, this of course is a more elaborated categorisation than what we have so far presented, i.e. that there is a fundamental difference between models *of* and models *for*. However, if we apply these three kinds of theories and the idea about espoused theories and theories-in-use to our field of interest, i.e. to a governmental programme aiming at experiments with the idea of regional innovation systems, the following picture emerges:

The point of departure is our finding that the espoused theories on the policy level say that interactive learning is good, but theories-in-use on this level show that actors does not practice interactive learning. These two sets of theories are apparently not congruent. But what kind of theories are we talking about: explanatory, predictive or control theories? An informative hypothesis is that the innovation system framework as researchers have expressed it has to be understood as an explanatory theory, i.e. the framework explains events by setting forth propositions from which these events may be inferred. The most important proposition in this framework is about interactive learning. Given this proposition events are explained. This is, as we have argued above, an example of abductive reasoning. Now, the policy level has arguably “transformed” this explanatory theoretical framework into a predictive kind of framework. That is, propositions are set forth from which inferences about future events may be made, i.e. this is about straightforward deductive logic. General proposition: Interactive learning is the most important process in a modern economy; Specific proposition: We deploy REGINN in order to promote interactive learning; Inference: Economy will flourish. That is, the REGINN experiment was about testing the general proposition and try out some new ways to promote interactive learning

Our informative hypothesis further says, however, that theories-in-use on the policy level are control theories, i.e. they describe the conditions under which events of a certain kind may be made to occur. The desired events, again, are flourishing economy, but the necessary conditions *according to the theories-in-use* are not interactive learning but linear, top-down and hierarchical steering from a distance. Why is that?

Argyris & Schön (1978) argue that theories-in-use maintain a person’s field of constancy, e.g. they describe the techniques and strategies of design by which objective functions may be achieved and constancies maintained. But theories-in-use are also valued in their own right for the constancy of the world-picture they provide. The complexity of the world gives us more information than we can handle so we value a stable (and thus reduced) world-picture, being predictable and being able to predict. That is, we normally work at maintaining the constancy of our theories-in-use. However, this generates a special conflict:

When our theories-in-use prove ineffective in maintaining the constancy of our governing variables, we may find it necessary to change our theories-in-use. But we try to avoid such change because we wish to keep our theories-in-use constant. Forced to choose between getting what we want and maintaining second-order constancy, we may choose not to get what we want. (Argyris & Schön 1978:17)

In plain language: The actors on the policy level refrain from interactive learning in order to protect their worldview. Now, this is about learning, i.e. to learn new theories-in-use which may or may not be congruent with the espoused theory. Much has been said about such learning, also by us (e.g. Uhlin 1996, 2000) under the labels of “deutory learning”, “double loop learning”, “learning to learn”, “learning of the second order”, and so forth. We will not go further into that in this section. However, this is also about the problem of congruence as such. Argyris & Schön argue that an espoused theory that is congruent with an otherwise inadequate theory-in-use is less valuable than an adequate espoused theory that is incongruent with the inadequate theory-in-use, because the incongruence can then be discovered and provide a stimulus for change. That is, we are left with the proposition that we have a valuable incongruence at hand. We will soon come back to the question what might be the stimulus for change. But first some words about this incongruence.

We argue that although the theories-in-use on the policy level are inadequate it does not follow that the espoused theory is adequate. Two inadequate theories may be congruent or incongruent. The question about adequacy or not is always in relation to something, e.g. effectiveness or certain wanted effects. We therefore further argue that it is not only the theories-in-use that are inadequate compared to what is espoused about interactive learning, but also that

the espoused theories are inadequate compared to what ought to be demanded of a theoretical framework that the actors of the policy level have conceived as both an explanatory theory and a control theory. Our position is, that the systems of innovation approaches are still on a very early theoretical stage. That is not to say that we think these approaches are worthless, on the contrary. But much work remains to be done regarding the complexity angle, the learning and trust approach and, not the least, regarding the governance perspective.

Now this might be enough as answers to the two first questions: Why is it that there has been incongruency on the policy level between espoused theories and theories-in-use? And why is it that especially actors on the policy level have refrained from interactive learning? Remains the third question: What might the consequences be were the actors on this level to include themselves into the innovation system?

If it were otherwise

The concepts of “meta-governance”, “governance complexity of the second order”, “strategic guidance”, etc. are in a way de-humanising. Because it is *people* on the policy level, i.e. it is politicians and civil servants in ministries and parliaments together with top business leaders and some odd influential university professors, that has to do wise things *in spite of* the fact that neither they nor any other group of people will ever be able to create and master complex social systems.

How, then, will they ever be able to do that, i.e. wise things? Well, there is said to be people with an unusual “feeling” for societal complexity. They are said to possess “practical judgement”, “prudence”, or even “wisdom”. The Romans called it *senso communis*, i.e. not only a feeling for what is going on but also a true sense of what is good for the community. The concept of *senso communis* is of course the origin of the quality that we today have named common sense. Aristotle called this quality *fronesis* which he coupled to rhetoric and to the procedure of *topica*. This is the procedure whereby one may build conclusions from “probable” statements concerning any problem whatsoever, and whereby, when speaking in public, one may be protected against all self-contradiction. Though, rhetoric and *topica* is absolutely not about fraudulence and deception. It is about building conclusions, not in the first hand about the physical world, *but from close observation* of what is going on in people’s lives and in society.

This was very much in the line of thinking of Giambattista Vico, the Italian early 18th century philosopher and professor of rhetoric at the University of Naples. He refused to submit to the then new and much acclaimed Cartesian scientific mode of thinking. Instead he reread and reinterpreted Aristotle and came up with his *Scienza Nuova* [1745] (1994). No one read him though. However, much later Marx, Schumpeter, Joyce and many others started to pay attention. There is a central passage in one of Vico’s early lectures, central also because in this passage he says something important about reduction of complexity, where he wittingly clarifies the difference between abstract and scientific knowledge on the one hand, and prudence and common sense on the other:

The difference, therefore, between abstract knowledge and prudence is this: in science, the outstanding intellect is that which succeeds in reducing a large multitude of physical effects to a single cause; in the domain of prudence [i.e. *fronesis*], excellence is accorded to those who ferret out the greatest possible number of causes which may have produced a single event, and who are able to conjecture which of all these causes is the true one. (Vico 1709/1990:34).

This line of thinking has strong connotations to pragmatic philosophy as it was introduced by Peirce, James, Dewey, Mead and others, and as it has been further developed by present day philosophers like Rorty, Taylor, Putnam, Nussbaum and Bhaskar. It is a thought-style that prefers abductive and retroductive inferences to deductive and inductive because it not only

acknowledges that all knowledge is provisional but also that we are often forced to work with and trust informed and intuitive guesswork. That is, in many aspects of life there are no truths, just agonistic choices and risks that have to be faced. But some “men of action”, as Berlin (1998) calls them, have a “sense of reality”, i.e. they are able to conjecture which one of the complex causes that produced a particular event is the true one. And they have the ability to persuade other people that this particular reduction of complexity of theirs is as true as it is ever possible to state. That is, we trust them. This is what rhetoric, eloquence and topics are about.

Vico argued that this is what students ought to study in the first hand, science and logic should come later. This is also what for instance Nussbaum (1995) teaches her law students. What is more, this is also about the controversial debate over so-called “liberal education” (Kimball 1995). That is, this is about a struggle between two contending points of view regarding true knowledge– one rhetorical and the other philosophical – that have interacted, often controversially, from antiquity to the present (Rosengren 1998) and which is arguably over-bridged in the concept of the new rhetoric (Perleman & Olbrechts-Tyteca 1969).

Our point, then, is that were the actors on the policy level to include themselves into the innovation system they would have to (a) explore new models to reduce inconsistencies between their espoused theories and theories-in-use, (b) further develop their understanding of what in the long run might be developed into a more consistent theoretical framework of innovation systems, and (c) persuade other people that *their* particular reduction of complexity that they call “regional innovation systems” is as true as it is ever possible to state.

11 Epilogue

In the spring of 2002 the REGINN programme was accounted for at a conference with an abundance of policy-makers. In spite of our somewhat negative experiences so far regarding interacting with the policy level a substantial and positive interest was showed to our deliberations. It might even be said that there was something at the seminar that resembled interactive learning. What is more, we were soon invited as keynote speakers to yet another conference organised by the under-secretaries of state for some ten ministries. The topic of the conference was innovation and cluster policies.

However, more or less at the same time the Auditor General of Norway reported to the Research Council that the REGINN programme had failed to reach its objectives.

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