TRANSFORUM
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Sustainable and Informed Entrepreneurship

TransForum
Louis Pasteurlaan 6
2719 EE Zoetermeer
Postbus 80
2700 AB Zoetermeer
079-3470910
www.transforum.nl

Layout Drupsteen + Straathof
Druk drukkerij A2
Foto Imagro Images

The Organisation of Innovation and Transition

WORKING PAPERS NO 2

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Introduction

The Netherlands traditionally has a strong agro-food sector. The post-war development of knowledge was directed towards high-productivity agriculture. While this approach was very successful, it has now become apparent that there is a drawback to this success. Specialization not only leads to economic profit, but also to environmental pressures and encroachment on public spaces. The agro-food sector is running into ecological and social barriers. There is a clear need for a more sustainable development in the sector, that gives attention to not only 'prosperity', but also to 'planet' and 'people'.

TransForum was created to address this challenge. The needed development calls for innovations and new insights. Therefore, TransForum has a double goal: to demonstrate, together with entrepreneurs that there are viable new pathways, and to prove, together with knowledge institutions, that the needed knowledge can be delivered.

We try to deliver these results in a combination of a practice program and a scientific program. The programs are meant to deal with three main obstacles in a route towards sustainable development in agriculture. First, there is a tendency to only search for new potential within your own sector (in business) or discipline (in science). Second, there is a strong bias on the function of agriculture in relation to regional development, blocking new combinations of functions. Third, in almost all explorations the value added is supposed to be in the primary production of the chain. Possibilities further in the chain are overlooked, and 'knowledge about primary production' is not seen as an asset. We try to tackle these obstacles by creating consortia of people from business, knowledge institutions, (local) authorities and societal organizations.

The scientific program is meant to address knowledge questions that arise from the practice projects. To that end a division into five sub themes is developed that reflect different aspects of the innovation process. These themes are: (1) Images of sustainability, (2) Inventions for a sustainable agriculture (3) Organization of Innovation and Transition (4) Mobilization of Sustainable Consumption and (5) Design of an Innovation-Enhancing Environment.

This publication contains a number of commissioned position papers that were helpful to focus the scientific program. However, we feel that the content of these papers deserves broader attention. We hope that after reading them, you will agree.

Henk van Latesteijn
General Manager TransForum

The Organisation of Innovation and Transition

Prof. H. Mommaas
University of Tilburg

Introduction

This set of papers has been written in preparation of a sub theme of the scientific programme of TransForum. The scientific sub theme is: The Organisation of Innovation and Transition. The theme is aimed at researching the organisational and institutional conditions favourably for the coming about and the generalisation of innovations and transitions in agricultural production and regional development. These conditions concern both the capabilities and motivations of individual entrepreneurs, new innovative models for the collaboration between firms, more motivating and mobilising ways of monitoring sustainability effects, new ways of organising public-private coalitions, and new models to link together more effectively private business and the sustainable development of regions.

Although the five papers presented here stem from different disciplinary, theoretical and methodological backgrounds, they have a striking thing in common. All five seek a way out of the lock-in situation that agricultural and rural development processes seem to be faced with in a rapidly globalising and network based environment. On one hand business, policy and regional contexts have become much more complex, dynamic and multi-actor. This asks for a more active, iterative, and flexible involvement with the environment. On the other hand, established structures, either in the sphere of the organisation of the agricultural sector, the way monitoring systems are organised, spatial planning procedures, or state-market relationships, seem to capture developments in a stifling path-dependency.

Common in the papers is a search for a way out of this situation by suggesting a more actor-based organisation of institutions, aimed at freeing and mobilising the innovative and alliance building capacities of firms, NGO's and groups of consumers.

Together, the papers present the beginning contours of a promising research programme aimed at exploring structures and institutions, enabling firms, state-bureaucracies and groups of consumers to play their role in the transition towards a more sustainable agribusiness and regional development.

Vital coalitions

The urban regime theory as theoretical framework for analysing public-private partnerships and (self-)governance in rural regions

Ina Horlings, Pieter Tops, Julien van Ostaaijen and Eefke Cornelissen[1]

With thanks to dr. J. van Tatenhove (UvA), dr. L. Knippenberg (KUN), dr. G. Verbong (TUE) and prof. Dr. H. Mommaas (Telos/UvT) who gave valuable comments and contributions on earlier versions of this paper.

Position paper Research project TransForum, Theme: 'Organisation of innovation and transition' [2]. Type of knowledge: Social/societal. Strategy: Clusters & Regional development.

1 Dr. ing. L.G. Horlings: Telos, Brabant centre for sustainable development, Tilburg and University of Tilburg. Prof. dr. P.E.W.M. Tops, J.J.C. van Ostaaijen en E.M.H. Cornelissen: School of Politics and Government, University of Tilburg (www.uvt.nl)

2 A shorter version of this position paper was delivered and discussed during the congress of the European Society of Rural Sociologists (ESRS) in August 2005.

1. Introduction

Dutch rural areas are in transition. Specific landscapes, characteristic land-uses and their particular flora and fauna are disappearing (RIVM, 2002). Many social actors search for space in the 'differentiated' countryside (Murdoch a.o., 2003). Rural areas transform from predominantly production-oriented zones into consumption oriented ones (VROM-Council, 2004, p. 227), whereas the rural economy transforms from an agricultural oriented activity into a broader and more differentiated one.
Agricultural developments are still insufficiently tuned to societal demands. New relations between agriculture and society, between cities and rural areas and between producers and consumers should be established (RLG, 2004). New actors like business and urban actors enter the rural arena, bringing their own views, goals and interests.
Environmental, social and regulatory problems are closely interrelated, and bring about a process of rural transition. The increase of scale of different rural functions (agriculture, water, housing, and infrastructure) creates an erosion of regional boundaries. The spatial planning therefore faces difficulties to fulfil its integrating function. Traditional regional planning procedures can offer only part of a solution to this challenge. The complex rural issues are difficult to manage by the current institutes. An even more complicating factor is the intertwining of rural and urban development. Urban influence reaches further than the city itself. The house market is regionalized and the spatial pattern of recreational activities is less dependent of urban boundaries. At the same time we see in 'rural-urban regions', the development of urban activities in rural areas such as industrial agricultural businesses, entertainment complexes and large business sites. With rural-urban regions we mean rural regions under the influence of cities, which cover large parts of the Netherlands [3].

The main problem in rural-urban areas is how transition processes can be stimulated contributing to sustainable development? We focus in this paper on the question if (urban) regime theory can offer a theoretical framework for analysing this problem. We will describe this from a governmental and sociological point of view.

Sustainable development we define here as finding a balance between the economical, social-cultural en ecological stock (Telos, 2002). There is not one road to sustainable rural development. Different scenarios reflect different discourses and problem definitions. They require also different relations between actors involved in rural issues. We distinguish three main scenarios:

3 Examples are 'the Green Forest' in Brabant between the cities den Bosch, Eindhoven en Tilburg, Waterland near Amsterdam, and Heuvelland near the 'tripool' Maastricht, Heerlen en Sittard-Geleen.

1) *A development towards an ongoing decoupling of agricultural production and the environment.* The relation between farms and their surrounding disintegrates, also in a physical sense. In land reform projects physical conditions like water systems are changed to meet the demands of modern agriculture. In the reconstruction areas farms will be relocated from the communities and near nature areas, towards so called 'development areas'. Intensive agricultural businesses will become more concentrated on industrial sites. This can be described as a process of 'de-ruralisation', or decoupling between agriculture production and the spatial rural context. Van der Ploeg (1992) describes the 'decoupling' of agricultural production from local resources. In the future an ongoing process of decoupling is expected in the form of clustering of intensive farming on industrial sites and new designs of agro-industrial production.

2) *The broadening of agriculture and rural development with new functions like nature- and landscape-care, tourism, health- and water-care.* The goal is to maintain the valuable agricultural landscapes, preserving values like quietness and openness. European rural policy resulting in instruments like 'regional development plans', INTERREG en LEADER+, focus mainly on this perspective;

3) *A more urban network approach that defines rural landscapes as spaces of consumption, paying attention to societal demands, designing new concepts based on rural-urban relations and non-agricultural entrepreneurship.* In this view new actors enter the rural policy arena (VROM-Council, 2004).

Transition in rural regions is not only complex because of differences between perspectives but also complicated in the current situation were the national government plays a less dominating role in regional rural planning and regional and local governments redefine their role and tasks.
Governments have, as a reaction to failing governmental legitimacy and effectiveness in the past, found new approaches based on the assumption that governmental professionals no longer have the means necessary to manage and control their surroundings on their own. They are becoming increasingly dependent of the knowledge and involvement that exists within society. Technical expertise is insufficient; social expertise is indispensable (Stoker, 2003).
This is what some have come to call the 'horizontalization' of public management, which has been the topic of much discussion over the last ten or fifteen years. This approach is very broad and encompasses a number of different lines of thought (Torfing, 2003). These are all based on the common proposition that the classic hierarchical model of public administration does not work well enough, and that a number of forms of "horizontal arrangements" have arisen in its place. Even though governments have always relied on other agencies to aid them in realising state objectives, the central role of 'the state' decreases (Jessop, 1997).

To function successfully, modern administration is dependent upon corresponding and adjusting to various social actors. "Governing becomes an interactive process because no single actor has the knowledge and resource capacity to tackle problems unilaterally" (Stoker, 1999: 3).

Concepts like network management, interactive decision-making, and co-production, all relate to this 'horizontalization'. They are manifestations of more fundamental changes in the relationship between government and citizens (Lovan, 2004). 'Governance' as an alternative to 'governing' consists of formal and informal regimes based on the interaction, partnership and cooperation between public and private actors, or the self-regulation of the latter (Rhodes, 1997). It has to do with a re-diminishing of the role of the state, with market forces taking over some functions and producing some goods and services previously seen as state prerogatives, and with a shared commitment to resources allocation and conflict resolution (Schmitter, 2002). Governance, it is often remarked, attempts to answer the problems of legitimacy, effectiveness and efficiency of traditional policy-making (Kooiman 2002, Schmitter, 2002). It implies working across boundaries, both within the public sector and between the public, private, and 'voluntary' sectors. It deals with strengthening interaction capabilities between government organizations and society.
The rise of governance is seen at the blurring of boundaries between and within public and private sectors. This is believed, according to Stoker (1998) to restructure collective action and to re-establish an order based on social cooperation, mutual interest and accommodation.
The changing (power) relations between state, market and civil society lead not only to new styles of governing, they 'solidify' also in new relations and arrangements.
This shift from government to governance is not a unilineair development. A plurality of forms of governance occurs, creating also tensions between traditional arrangements and innovative policy.

Examples of these new relations between state and civil society can be found in the context of rural regional policy. Main elements in the literature based on the shift from 'government to governance' in rural regions are: 1) involved actors and their coalitions 2) distribution of power and influence 3) attention for the 'rules of the game' 4) governance discourses (Boonstra & Frouws, 2004).

In rural regions we can identify different forms of formal and informal reflexive policy-making. We focus our attention in the next paragraphs (2 and 3) on an evaluation of:

- Interactive region-oriented policy, initiated from governments. Characteristic for this kind of network governance is the negotiation between public and private partners, the initiative of governments as starting point is and the formulation of regional visions and measures;
- Self-governance like covenants and regional agreements, based on more or less 'bottom-up' processes of regional self-regulating groups in the civil society who seek cooperation with governments. Characteristic is the focus on 'changing the rules of the game'.

The experiences will show that the current arrangements used in rural policy, strengthen governmental legitimacy but are insufficiently effective. The policy management gap on the regional level still exists. This can be explained by the way rural regimes are organised. We can make a distinction between 'defensive' regimes oriented towards 'business as usual' and 'development' regimes oriented towards innovative perspectives and new scenarios like the urban network approach. We will argue that the current defensive rural regimes predefine rural problems and structure policy decision networks (par. 5). Indications that these problems occur, we also see in empirical projects started within the research program TransForum [4]; local groups are hampered by bureaucratic procedures and governmental procedures.
Rural future scenario's, such as the urban network approach, however need new rural regimes that can offer a common base for cooperation in the form of new 'vital coalitions' between actors. Vital coalitions are relations between public and private partners that are energizing and productive and can create political power and 'capacity to act'. Vital coalitions can be seen as a concept on the project level, where regimes are a concept useful on a system level. Our hypothesis is that in the context of rural transition, vital coalitions can be seen as the beginning of a transition process towards the establishment of new regimes. Vital coalitions occur in 'niches', incubation rooms on the regional level, where actors feel a sense of urgency towards rural problems and possibilities for new perspectives.

An important question however is if and how these regional vital coalitions can be organised and how governments can function as 'enabling power' in sustainable regional development? Can (urban) regime theory offer a theoretical framework to answer this question?

Of course, a lot has already been said about regimes in (inter)national literature. Therefore we give an overview on the concept of regimes (par. 4). The advantage of the urban regime theory and including the concept of vital coalitions (described in par. 6 and 7) is that it offers a concrete perspective for change in regional situations. The assumption is that a relatively small group of actors can make a difference by viable cooperation with public and private partners in concrete, informal networks.

4 For example projects inside en outside TransForum such as the Northern Green Woods, Green Valley, Meierij. California Streaming and Heuvelland, where different types of logic of private and public actors clash and regional processes are hampered by governmental procedures.

We also expect that the urban regime approach will offer lessons from a fresh, non-rural perspective. Urban experiences are important "all the more because rural areas as 'consumption space' are becoming more dependant on urban preferences. As part of an urban field they face almost the same transformations as urban districts" (Van der Cammen & Lange, 1998: 27).

In the last paragraph we will conclude with an agenda for further research and a proposal for a scientific project within the program of TransForum, based on the experiences and questions incurrent empirical projects (par.8).

2. Case: Interactive region-oriented rural policy

Since the nineties, answers to rural problems are new regional policies, in which regional stakeholders participate in designing rural development plans. Regional policy in itself is not new. Historical examples are the nineteenth century cultivation policy on the sand soils of east and south of the Netherlands, the employment policy in so called development areas after the Second World War, and the urban growth policy. Especially after the national Action Plan Regional Policy (1990), regional policy got more attention due to the decentralisation impulse and new instruments like the Stimulation regulation Regional Policy.
Examples in The Netherlands of region-oriented policy in the nineties of the last century and recently are:

- the 'Spatial integrated policy' (ROM-beleid);
- 'Valuable Man-made Landscapes' (Waardevolle Cultuur Landschappen) and
- 'Reconstruction Areas' (reconstructiegebieden) in the east and south parts of the Netherlands.

More branch oriented examples of regional interactive policy are the Strategic Green Projects, National Parks and regional nature development projects. We will give a brief overview of the evaluation studies on region-oriented policy.
This region-oriented approach is not particularly Dutch. In other countries similar innovative modes of policy organisation and implementation in rural areas can be found, such as 'Kulturlandschafts entwicklung' in Germany, 'Parcs Naturel Régionaux' in France and 'Areas of Outstanding Natural Beauty' in Great Britain (Janssen en Van Dijk, 2003).

The organisation of the policy arrangements in region-oriented policy in the Netherlands was innovative (Pestman & Van Tatenhove, 1998; Frouws & Leroy, 2003). Within the framework of integrated region-oriented policies, regional coalitions of state, civil society and market parties have started seeking solutions for rural problems by carrying out projects. Characteristic for this kind of 'network governance' are the:

- Initiatives of governments as a starting point. Instead of dealing with one dominant sector, one single policy objective or one single point of view, the approach aims at integration, synergy and 'win-win'.
- integral approach to rural problems;
- emphasis on negotiation between public and private partners;
- joint decision-making and the formulation of regional visions and measures on the regional level;

The motives behind these interactive forms of rural policy are interpreted differently: as a mobilising force for political or societal capacity, to experiment in a network situation with a dif-

ferent style of government, or as an opportunity to facilitate self regulation and new elements of 'new public management in regional projects' (Frouws and Leroy, 2003). Boonstra states that region oriented policy turned out to be an attempt from different authorities to consolidate or strengthen their position in the rural policy domain (Boonstra, 2004).
Regional processes with several actors, resulting in a broad consensus are adjusted to the current spatial plans. This leads however to the paradox that: "the informal and interactive character of this policy has mobilising and legitimatising effects, but the deliberative democracy leads also to tension with the constitutional democracy" (Frouws and Leroy, 2003). This can create protests of private actors and action groups when negotiated results resulting from interactive processes are reconsidered and weakened in the traditional spatial plans.

The concept of the ROM-policy was designed within the national policy on spatial planning (Vierde Nota Ruimtelijke Ordening, 1989) to integrate planning and environmental policies on a regional level. In the Valuable man-made landscapes a bottom-up process was stimulated by regional and national governments to maintain and develop the values (nature, landscape, recreation) of these agricultural regions together with economic goals. Strategic Green Projects are large recreational sites mostly in urbanized regions, combined with nature development.
Pestman & Van Tatenhove (1998: 254-272) evaluated the involvement of actors in the ROM-areas, in Strategic Green Projects and in Valuable Agricultural landscapes. Keywords in the regional decision processes were: a consensus approach, voluntary agreement, strategic planning, aiming at governmental and societal agreement, combining policy measures and the creation of 'win-win-situations'.
In most cases the national and regional government decided the main goals, based on the current policy. Interest groups had some possibilities in the decision process to influence the 'rules of the game' and to formulate their own definitions of the regional problems. Pestman & Tatenhove conclude however that in the analysed projects the influence of actors to change the rules and to mobilise resources like money or knowledge, were negatively influenced by the existing power relations in the decision process (Pestman & Tatenhove, 1998: 268).

Boonstra and Frouws draw the same conclusion from an evaluation of a ROM-area in south-east Friesland in the Netherlands. Rural governance can be understood in their view as a power struggle between government and regional stakeholders. "The focus on consensus building and so called win-win solutions, which are thought to be inherent features of 'good governance' and new rural governance in the Netherlands, tends to cover up this power struggle" (Boonstra & Frouws, 2004: 2).
Their observation is that rural governance is not equal by definition to a redistribution of power or a retreat of the State. "Instead a new regulatory regime is being put into place, based on a procedural rationality. Rural governance is explicitly perceived as a procedure set up by the state and employed to solve a specific problem bounded by time and space. To rule out

context by procedure is a strategy to maintain a neutral appearance, which is in its turn necessary to construct legitimacy. In contrast, local actors applied a more value-oriented rationality, putting the area-based policy in the local context". Despite the ideology of interactivity, aspects such as de-legitimisation, distrust, conflicts, self-interest and power struggles are also structuring the outcomes of rural governance (Boonstra & Frouws, 2004: 16).
From ROM-areas like 'Schiphol' and 'Gelderse Vallei' (Gijsberts, 1995) the conclusion can be drawn that the ROM-policy aiming at integrating policy measures by negotiating with different stakeholders, turned out to be an instrumental-technical approach institutionalized in traditional arrangements. The effect was that environmental measures were weakened during the process.

The policy in Valuable Man-made landscapes focussed on regional processes, and stimulation of bottom-up initiatives. This led to new alliances between actors. The informal relations and new ideas created however tensions among this policy and regional institutional processes like the spatial planning procedures (Pleijte a.o, 2000).
Not only in Valuable Man-made Landscapes but from a broad range of regional evaluation studies the conclusion can be drawn that it is often not clear what the results and effectiveness of region-oriented policy are, as a consequence of inadequate formulation of the goals (Novioconsult, 1998; Driessen en Groenenberg, 1998; Pleijte et al, 2000; Goverde et al, 1997).

An evaluation of three interactive regional nature development projects (Alblasserwaard, Midden-Groningen and Gelderse Poort) show that important success factors for cooperation between actors are the building of trust relations, the availability of finances and flexibility in policy goals (Hensen, 1998; Huitema en Hinssen, 1998). In the analysed nature projects but also in two analysed 'valuable man-made' landscapes financial resources (such as subsidies for farmers) were an important stimulating factor to reach consensus (Hensen, 1998; Oosterveld, 1998).
An evaluation of three National Parks shows that in these parks governments combined a consensus-approach with little pressure. The conclusion was that interactive policy turns out to be more effective when there is a strong dependency between actors (Hinssen: 1998: 123-139).

New regional forms of interactive policy in the last few years are shown in the Reconstruction Areas in the Netherlands. The environmental problems caused by intensive cattle farming were the driving force for the reconstruction. The regional aims are broadened during the process towards an integral approach of all rural problems: economical, social and ecological. In this process a lot of actors were involved, organised in so called reconstruction committees: regional and local governments, farmers' organisations and a broad range of societal organisations. This cooperation between different public and private actors led in the province of Brabant to consensus building, resulting in seven reconstruction plans. An evaluation of reconstruction

plan 'De Peel' showed however, that chances for the self-organising capacities of concrete initiatives are still insufficiently used (Haarmann, 2004).
Cooperation is mostly organized within reconstruction committees in the form of traditional arrangements and negotiating processes with already well-known interest groups. This leads to a process of consensus building that can hamper innovative solutions of new actors that are not able to participate. The long process of negotiation resulted in large plans, but the implementation with businesses in concrete projects is still too much neglected.
The role that private actors play within interactive policy process creates ambiguity, where they face a 'double loyalty'. Representatives of interest groups find themselves in a schizophrenic situation: they have to sympathize with other interests in order to find joint goals and create consensus and at the same time defend the goals of their backing group (Verhoeven, 2004).

Frouws and Leroy (2003) argue in an overview that region-oriented policy certainly is an exercise in social mobilisation, building consensus and accommodation of conflicts. Also new local and regional coalitions arose, mostly temporarily. But it was in their view not a thorough governmental renewal.
Boonstra (2004) states in her dissertation that region-oriented based policy has triggered intensive cooperation between governmental institutions and NGO's, mobilization of resources, joint problem definition and action, and insights into constraining legislation. But in spite of these accomplishments, the potential of this policy regarding to public support, participation, mobilization and integrating capacity has only been accomplished partially. Supra-regional authorities often perceive region-oriented policy as a vehicle they can use to achieve their own, very detailed objectives. As a result, policy aspirations of regional coalitions are not accommodated sufficiently and chances are being missed to mobilise new actors, resources and discourses. But also representatives of the involved NGO's often stick to old patterns (Boonstra 2004).

We draw the conclusion, based on the literature on interactive rural region-oriented policy, that governments try to mobilise societal capacity in rural areas, by governmental horizontal arrangements, forms of co-production and negotiation between public and private actors. They face however the boundaries of their management capacity. Problems like clashing discourses, dominant power relations, selective choice of actors and hampering cooperation between interest groups occur. The problem is that actors try to solve rural problems with new styles of governance but with traditional arrangements and coalitions. The current organisation of traditional actors within rural networks is a barrier to transition. Rural regions require cooperation with innovative rural partners based on new rural scenarios and arrangements, but public and private actors face the risk of incorporation in 'solidified arrangements' not suitable to face the new challenge.

3. Case: Self-governance and cooperation by innovative rural groups

The described forms of region-oriented policy are illustrations of the transition from 'governing' to governance. This transition is according to Pellizoni (2004) also visible in the development of voluntary regulation. Also Rhodes (1997) sees self-regulation of private actors as an element of governance. This creates possibilities for 'bottom-up' groups within the civil society to take responsibility for sustainable development of their own region and to participate in vital coalitions.
We will describe in this chapter examples of 'self-governance' based on more or less 'bottom-up' processes of regional self-regulating groups in the civil society who seek cooperation with governments. Characteristic is:
- the development of (voluntary) instruments like covenants, contracts and regional agreements between public and private actors;
- the focus on flexible policy solutions, experiments and 'changing the rules of the game';

Empirically, several types of voluntary self-governance in Dutch rural areas can be distinguished, such as village interest groups, rural women groups, cultural groups, and agricultural groups.
The last decades we see protest groups of farmers arise, and producer groups who sell regional products, environmental co-operations, agricultural nature associations and recently coalitions of farmers and citizens who protest against the governmental policy towards cattle diseases (Hees, 1995; Horlings, 1996; Van Ziel, 2003).
We focus here on one type of innovative, 'bottom-up' rural groups, relevant form the point of view of sustainability, the so called agricultural nature associations, groups of farmers and civilians working together in environmental care, nature- and landscape management (Melman, 2003). A recent overview shows that the working field of the groups covers more than half of the agricultural land in The Netherlands (Oerlemans et al, 2004).
Empirical studies show that this type of cooperation can contribute locally and regionally to a more sustainable and innovative rural development by carrying out environmental measures and nature and landscape care. (Oerlemans et al., 2004; Horlings, 1996). The groups form new coalitions by working together with citizens, and non-governmental organisations. Some of them develop towards innovative rural co-operations. An example is the cooperative 'Stadteland' that tries to establish coalitions on different levels between producers and consumers, between cities and rural regions and between farmers and regional governments [5] (Eemlandhoeve, 2003).

5 See also the IP proposal for TransForum 'Green Valley'.

The groups plead for self-governance over environment, nature and landscape by taking over governmental tasks and responsibilities (Horlings, 1997). The groups are interesting as 'intermediate organisations' between entrepreneurs and governments. A good example of public-private partnership is the 'self-governance' of the association Den Hâneker, in the southwest of The Netherlands where in 1996 a new regional policy has been formulated for the region Alblasserwaard / Vijfheerenlanden. Some innovative agricultural entrepreneurs took the initiative to start an association and work together with the province. In 2004 the association launched a model for an integral regional contract with the province, twelve local governments and at least fifteen other organisations to reach goals on nature, landscape, housing, recreation and tourism, transportation, vitality, economy and archaeology (Den Hâneker, 2004).

Also other innovative associations try to establish durable relations with governments by establishing contracts or covenants aiming at reduction of environmental problems and maintaining nature and valuable landscape. These covenants and contracts, can be seen as voluntary arrangements between public governments (mostly provinces) and private actors (like agricultural producers and nature- or landscape organisations).
The experiences with several regional covenants illustrate that crucial in cooperation is the extent to which governments can play a flexible negotiating and bargaining role, to reach goals by creating more room to manoeuvre for entrepreneurs (CLM, 1999; Hees 2004). Experiences within the TransForum project 'Noordelijke Friese Wouden', aiming at a regional approach of manure problems, also show the necessity of such a governmental role [6].
The experiments with regional contracts show however that several institutional barriers obstruct the development of regional coalitions, such as a narrow focus on sector-based instead of integral rural policy, European regulations, existing power relations and a bureaucratic role attitude of civil servants.

The experiences with the two described types of policymaking, region-oriented policy and self-governance show that the current arrangements used in rural policy strengthen governmental legitimacy but are not sufficiently effective and leave possibilities for self-governance unattended. The 'policy management gap' on regional level still exists. The lack of effectiveness can be explained by the way defensive rural regimes work, as we will explain in paragraph 5.

6 See the IP proposal for TransForum 'Noordelijke Friese Wouden'.

4. Regimes

The described obstacles in the two cases can be explained by introducing the concept of regimes. But first we will give a brief overview on regimes.
This concept is the subject of a broad debate. Regimes are interpreted in different ways, from forms of public-private cooperation, organizational networking to policy arrangements. Similar in different perspectives is the assumption that the network society consists of diffuse relations between all sorts of actors. The different views and interpretations on regimes are analysed by a broad variety of scientific institutes and universities [7].

We make a pragmatic distinction in theories on:

1) *Public-private partnerships.* Klijn and Teisman for example state that cooperation between public and private actors can be beneficial in complex and dynamic situations. However, the network society with its interdependencies and dispersion of resources, information and (political) legitimacy creates a management problem, how to bring both knowledge and resources together in public-private partnerships (Klijn & Teisman, 2000: 85). The research focus is on management of networks, public-private partnerships and multi-actor governance (Huxham & Vangen, 2000; Klijn & Koppenjan, 2001).

2) *Socio-technical regimes.* The characteristic interaction patterns in (inter) governmental networks are also the result of current social rules. 'Interaction regime' is the whole of social rules to which actors commit themselves. Regime-analyses identifies and deconstructs these rules (Huizinga, 1993: 81).

Socio-technical systems are described as heterogeneous clusters of organisations, artefacts and knowledge. The focus is on the sociological concept of rules. "A technological regime is the rule-set or grammar embedded in a complex of engineering practices, production process technologies, product characteristics, skills and procedures, ways of handling relevant artefacts and persons, ways of defining problems; all of them embedded in institutions and infrastructures" (Rip and Kemp, 1998: 340). Many sources of lock-in stability can be distinguished in socio-technical regimes. However, 'niches' are regarded as the locus of radical innovations. They act as 'incubation rooms' for radical novelties and emerge in 'protected spaces' to shield from mainstream market selection in the regime [8].
The agro-food system is regarded as a complex system made up of social organizational elements as well as technical elements, both artefacts and knowledge. Three analytical dimen-

7 In The Netherlands for example: the University of Tilburg, Eindhoven, Nijmegen, Amsterdam, Wageningen, Enschede.
8 Socio-technical regimes are for example analysed in the context of agro-food systems at the Technical University of Eindhoven

sions are: 1) rules, institutions 2) socio-technical systems and 3) human actors, organisations, social groups. In technological and small market niches, rules are unstable and not well articulated. There is much uncertainty and actors may have different ideas, beliefs and expectations, leading to the exploration of a variety of directions.
Stability and change can be understood through interactions between three levels: technological niches, socio-technical regimes and socio-technical landscape. The three levels refer to different degrees of structure of activities in local practices. (Geels, Schot and Verbong, 2004; Geels, 2004).

3) *Policy arrangements.* The starting process of this approach are the processes of institutionalisation and political modernisation in Western-European societies. Van Tatenhove et al (2000a: 19) describe institutionalisation as a process of transformation in which policy

arrangements are produced and reproduced in interaction, within the context of long-term processes of societal and political change. Policy arrangements are the outcome of temporary stabilisation of an organisation and 'substance' of a political field on a certain level of policy. The concept of arrangement is chosen to express the intention that the focus is more on 'stability' than voluntary policy networks analysts do. An arrangement links the patterns of interaction between actors with the social-political structural context were these interactions occur (Van Tatenhove et al. 2000b). Policy arrangements are described in four dimensions: 1) policy coalitions, 2) resources including power, 3) rules of the game and 4) policy discourses (Arts, et al. 2000: 54). Research focuses for example on the possibilities for changing the rules in interactive region-oriented policy (Pestman & Van Tatenhove, 1998).

4) *Urban regime theory.* Urban regime theory has a different starting-point and is in many ways a hybrid of political economy approaches and political science pluralist approaches. It places a great weight upon development as the major urban issue and the need for politicians to develop coalitions of interests in order to promote development. Urban Regime analysis thereby focuses on "the conditions under which such effective long-term coalitions emerge in order to accomplish public purposes" (Stoker 1995: 55). A few important aspects considers within urban regime theory are informality, durability, and cooperation (coalition). Especially the focus on informal networks in contrast with institutionalized networks is interesting from the point of view of transition of rural areas.
   The translation of the concept is according to Dowding, difficult since the need of coalition formation, the requirements of the 'capacity to act' are so different. Therefore we have to 'unpack' regime theory formation into the study of collective action. Research should be directed at examining the elements that make up all forms of successful coalition formation and the components that lead to the 'capacity to act' (Dowding, 2001:16-17).

Our conclusion based on the literature on regimes is that urban regime theory offers a theoretical basis for analyzing rural processes. For example the distinction between regimes, niches and landscape and the factors that hamper transition is useful. Where regime theory is a general approach, urban regime theory can probably make the concept practical suitable for projects on regional scale by focusing on concrete coalitions between public and private actors as a possible starting point for the development of new regimes. The urban regime approach identifies room for political action within complex multi-actor processes by mobilizing and organizing institutions, people, ideas and other resources. Usable are for example the focus on the role and values of (non-traditional) actors like citizens, on informal networks and on different types of logic. We consider it a promising approach for gaining insight in the conditions for cooperation, the vitality of coalitions, and the possibilities for an 'enabling government'. Therefore we will go deeper in this theory in chapter 6 and 7. Our hypothesis is that vital coalitions already exist in regions as niches for innovation and can develop into new 'cultural development regimes' that take the creativity, motivation and values of different types of actors into account.

5. Public-private cooperation in rural regimes

In this paragraph we will analyse the possible success factors and obstacles for rural development from the perspective of regimes. Region-oriented policy is embedded in rural regimes. Rural regimes express the new relations between state and businesses.
Important success factors for cooperation between public and private actors, drawn from the described empirical experiences are professionalism of private actors, flexibility of regional and local political power, dependency between the actors and (financial) resources.

However, rural defensive regimes also hamper the cooperation between public and private actors and the realisation of new rural scenarios. An explanation is that regional policy demands much coordination: between governmental levels, between different fields of policy and between sustainable goals and private business interests. This seems to be a large challenge for existing arrangements and institutions. We will describe two main problems:

a) The pre-definition of problems by current rural regimes;
b) The structure of current rural regimes and the way participation and cooperation is organized.

a) Problem definitions in rural regimes

Discussions about rural problems are to a certain extend pre-defined within rural regimes. This can be illustrated with two examples.
First, cooperation in regional policy processes can be hampered by different views on regional identity, the images of and opinions on the characteristics and values of the region. Regional identities are social constructions, related to social relations. Regional identities can therefore be seen as 'acts of power' (Simon, 2004). Views on the identities of regions are often dominated by governmental institutions.

This is particularly shown in the reconstruction areas where the physical-spatial oriented problem definition clashes with the logic of the people. The reconstruction plans focus on spatial division of different functions, leaving non-spatial aspects 'that can't be shown on a map', unattended. The experiences of people, social-cultural wishes of inhabitants and non-spatial issues are too much unattended (Haarmann, 2004).
The second example of pre-definition of problems is connected with the fact that different actors often represent different discourses and scenarios about rural development. The different scenarios, described in paragraph 1 are not represented equally and have different 'persuasive power' in rural development processes. Conflicting discourses appeared for example during the mouth and foot disease in the Netherlands where the image of rural life of citizens and (hobby)farmers conflicted with that of the dominant economical and export-oriented interests of the national government (Van der Ziel, 2003).

b) Current rural regimes structure policy decision networks

The structure of current rural regimes hampers cooperation between public and private actors by 1) inclusion and exclusion of actors in the policy arena 2) creating distrust and 3) incorporation of self-governance groups. We will illustrate these aspects below.

1) In- and exclusion. In the Dutch rural context the traditional neo corporative system that tried to harmonize the relation between government and agricultural sector, has eroded (Frouws, 1993). The traditional agricultural unions have difficulties to continue their cooperation with governments, their backing group is less loyal than before (Goverde, 2000).
   Despite the diminishing role of traditional interest groups, new actors face difficulties to enter the national policy arena, when new rural policy is being formulated (Horlings, 2004). The question 'who's in and who's out' the policy arena is power-driven.
   On a regional scale a study on the role of women in reconstruction processes in two Dutch provinces shows that woman play a rather limited role in the decision processes (Bock, et al. 2004). A Governmental Experiment started by the Minister of Agriculture on cooperation with five environmental co-operations in the late nineties failed. The proposals for self-governance of the co-operations clashed with the dominant routines and procedures and "the involved Department of the Ministry refused to develop agency" (Van der Ploeg, 2001, p.411-414). The national government can be seen as part of a defensive rural regime that has not yet found an effective way to cooperate with these new actors.

2) Lack of Trust. Cooperation within rural regimes depends on trust between public and private actors. Van der Ploeg (2001) describes the community of parties involved in rural development however as formed by 'distrust'. Innovative farmers choose their own development path, clashing with the development project of the expert system, governments and their own union (Van der Ploeg 2001, 359-377). Symptoms of a lack of trust from the governmental view are a 'legalisation' of agreements, bureaucratisation and an increase of regulation.
   The experiments with regional contracts (see paragraph 3) show that representatives of innovative private organisations within the civil society face the power-driven and complex rules of the game, set by large bureaucratic institutions such as regional and local governments. This leads also to lack of trust towards governments.

3) Incorporation of self-governance groups. Rural regimes incorporate private actors within an interactive decision making process. On the bases of experiences in Denmark, Bang sees the threat of an incorporation of conventional practices of civil society, the lifeworld and the

democratic public as domains of strategic communication between political authorities in the regime. This form of governance he describes as an all-pervasive form of systems colonizing the lifeworld, breaking down all barriers between private, public and voluntary (Bang, 2004).

This creates a major dilemma for private actors, in order to realise more 'room to manoeuvre', they have to incorporate in institutional structures. The result can be high 'transaction costs' with the risk of vitality-loss.

Problem	*Examples*
Pre-definition of rural problems	Power driven view on identity Clashes between discourses
Structure of regimes	Inclusion and exclusion of actors Lack of trust Incorporation of self-governing initiatives

Figure 1. Rural regimes and cooperation between public and private actors

Our conclusion is that the pre-definition of problems within current defensive rural regimes, the constitution of networks, lack of trust and incorporation of private actors hamper the restructuring of cooperation between public and private actors in rural regimes (see figure 1). The question is whether these problems can be addressed from a rural development perspective or do we need a fresh view from a different but related development arena? What can we learn from an urban perspective? Can the urban regime theory be a promising approach?

6. Urban regime theory

The development of Urban Regime Theory is based on the work of several authors, of which the work of Stone is regarded as one of the most important contributions (Stone, 1989). Stone studied the politics of the city of Atlanta over a period of more than forty years after World War II. He noticed a coalition of urban actors that each had their own goals, but could not accomplish them without one another: the black community that became a powerful group within the city and "gained control of city hall" and the business elite (Stone, 1989).

Urban regime theory strongly emphasizes the mutual dependency of state and non-state actors. It can therefore be regarded as an interpretation or elaboration of the governance or network approach to public decision making (Van Heffen e.a. 2000, Stoker, 1989, 2003, Torfing, 2003). Institutions and actors are seen as being part of a complex network that is characterized by fragmentation, lack of consensus and mutual dependence. Such networks cannot be governed by command power (i.e., hierarchical power).

A question that arises from these observations – which also is the challenging question for governance theories - is whether and how meaningful political action is possible in such a fragmented urban society. One of the answers to this question is: by establishing regimes. A regime may be able to make meaningful action possible through its ability to mobilise and organise institutions, people, ideas and other resources. As Stoker observes: "Regime theory stands in contrast to hyper-pluralism. It is about how in the midst of diversity and complexity a capacity to govern can emerge within a political system" 1995:57)

Productive action in a network society might presume more and more the ability to both form coalitions and alliances and to concentrate and direct institutional capacity on the basis of these coalitions. If that is true, then urban politics is becoming increasingly a matter of how to establish sufficient cooperation between urban actors with different positions and interests.

The power of social production

Essentially, URT is about how cooperation can be established between different actors in society to get things done. "To be effective, governments much blend their capacities with those of various non-governmental-actors" (Stoker, 1995: 58). That capacity is not presupposed, but must be created and maintained. It is not about 'who governs' but about how to develop the capacity to govern. URT therefore shifts away from earlier community power studies that were interested in answering the questions 'who governs' (Dahl 1979, Hunter 1953), but is more interested in 'how' this is done. "The power struggle concerns, not control and resistance, but gaining and fusing a capacity to act – power to, not power over" (Stone, 1989: 229). Leadership

is essential in the process. The act of power is to build a regime and achieve the capacity to govern. This form of power is intentional and active. As Stoker states: "In a complex society the crucial act of power is the capacity to provide leadership and a mode of operation that enables significant tasks to be done. This is the power of social production. Regime theory suggests that this form of power involves actors and institutions gaining and fusing a capacity to act by blending their resources, skills and purposes into a long-term coalition: a regime" (Stoker, 1995: 69).

Actors are willing to cooperate with actors that possess essential resources, for example, money or knowledge, to achieve their desired goals. "Instead of the power to govern being something that can be captured by an electoral victory, it is something created by bringing cooperating actors together, not as equals claimants, but often as unequal contributors to a shared set of purposes" (Stone, 1993: 8). Of course, resources are not equally divided among the different actors: some actors are more important than others. Control over the important resources is therefore essential.

According to Stone, a regime can be defined as "an informal yet relatively stable group with access to institutional resources that enable it to have a sustained role in making governing decisions" (Stone, 1989: 4). Regime analysis thereby focuses on "the conditions under which such effective long-term coalitions emerge in order to accomplish public purposes" (Stoker 1995: 55).

A regime is informal because regimes do not operate on the basis of a formal hierarchy. Actors can have their own formal (institutional) basis within their organization, but in their mutual contacts within the regime, the coalition is based on an informal way of coordination. Regime analysts often point to the network model in the way that a network also "sees effective action as flowing from the cooperative efforts of different interests and organizations. (…). Under the network model organizations learn to cooperate by recognizing their mutual dependency" (Stoker, 1995: 59). In later work, Stoker calls a regime a specific type of network (Mossberger and Stoker, 2001: 817).

Instrumental and cultural regimes

Following and adjusting Mossberger and Stoker, we can make a distinction between two kinds of regimes, the instrumental and the cultural regimes (Mossberger and Stoker, 2001: 825-826). An instrumental regime focuses on economic development and short-term results. According to Stoker, Stone's description of Atlanta offers a perfect example of an instrumental regime. Much of the development is generated by an extensive strategy of exclusion (Stoker, 1994: 209). Actors that are not necessary for the regime are excluded. A cultural regime strives for a clear change of direction within society. Coordination at the highest level, which is typical for instrumental regimes, is not enough (Ward, 1996: 432). A cultural regime needs broad acceptance. Symbols play an important role in this process of image formation.
The distinction between types of regimes is relevant from the point of view of transition, because cultural regimes can be regarded as promising new regimes, that can contribute to a redirection of scenarios for rural areas

Defining characteristics	*Instrumental*	*Cultural*
Purpose	Project realization	Redirection of ideology, discourse or image
Main motivation of participants	Tangible results	Expressive politics
Basis for sense of common purpose	Selective incentives	Strategic use of symbols
Quality of coalition (congruence of interests)	Political partnership	Competitive agreement
Composition of coalition	Elite	Elite and 'mass' (citizens)
Relationship with environment (local)	Exclusive orientation	Inclusive orientation
Relationship with environment (non-local)	Dependent	Dependent

Figure 2. Instrumental and cultural regimes and characteristics

What are the specific characteristics of cultural regimes? A cultural regime sets broader goals. This regime focuses not only on economic development (as is an instrumental regime), but also on a (re)-direction of ideology. Whereas an instrumental regime focuses on results, a cultural regime accepts the expressive dimension of politics as well. 'Politics and policymaking are about saying as well as doing things. They are about communicating values, intentions, and symbolic rewards' (Stoker & Mossberger, 1994: 203). In a cultural regime, more is at stake than just economic development. It is about pride and competition (e.g., with other cities; 'putting your city on the map' for example by a form of 'branding'). Also on a higher geographical scale a regime can use cultural values combined with regional characteristics to brand their region. An informal group of actors in the Meierij in Brabant has started such a process [9]. Just as individuals seek to distinguish themselves, so do cities and regions. Regime partners can be driven by this urge, or by a concern for their environment or by a desire to advertise their city. Other motives can also play a part, however, as in when a regime partner or individual seeks to be associated with prestigious projects.

Three important aspects distinguish the cultural regime from the instrumental regime.
Firstly, a cultural regime is characterised by competitive agreement between the partners in the regime. They work together – but more out of necessity than out of choice. 'What is involved here is an issue network focused around a common concern but one where the various interests lack a deep, shared understanding and where there is an absence of consensus and the presence of conflict' (Mossberger and Stoker, 1994: 206). Even though some partners may actually be unwilling, they are able to come to the conclusion that they can accomplish more by joining the regime than by remaining outsiders.

Secondly, cultural regimes seek to incorporate as many groups as possible, influencing them to subscribe to the image of the city that the regime is propagating. This is in stark contrast to the exclusive orientation of instrumental regimes (Henry and Paramio-Salcines, 1999: 659). Because a cultural regime pursues more ambitious goals than does an instrumental regime, a cultural regime requires broader support and uses symbols strategically to seduce new actors into the regime and to gain citizen support for the new ideology or image.

Thirdly, instrumental regimes pay little attention to the role of citizens, as they are assumed to act largely in accordance with the functioning of the (socio-economic) elites. This assumption however, is untenable for cultural regimes. The core of these regimes is to try to govern 'close to the people' and in direct interaction with citizens. The reason for this is not primarily based on ethical or normative considerations. The answer is more functional and pragmatic; it is necessary for the functioning and survival of the system (Bang 2002, 2002a, Stoker, 2003). Public

9 See the IP proposal for TransForum: "Vital coalitions in the Meierij"

organisations and professionals are no longer able to direct and control their environments alone using only their own resources. Governance is thus primarily an extension of the ability to 'self-govern' in all facets of organisations and society. Cultural regimes are the expression of these developments.

Finally, the distinction between instrumental and cultural regimes is an ideal-typical one. A regime can have some characteristics from one type and some from another. It is also a dynamic distinction. A regime with many characteristics of one category can develop into another type over time. Opponents can also choose to participate with the new regime (Stoker, 1995: 65).

Regimes and rural transition
A weakness of urban regime theory is that it offers less theoretical knowledge on how regimes change in time. The aspect of transition is not thoroughly analysed.

An interesting question for example is, if instrumental regimes can transform into cultural development regimes and under what conditions.

A possible starting point for analysing the changing of regimes is the model of Orr and Stoker (1994) who proposed a model of regime transition. This model gives recognition to the influence of non-local forces – reflecting broader shifts in the political and economic environment – as well as the internal dynamics of coalition building. They argue it is useful to think of regime transition in terms of a three-stage scheme.
The first stage revolves around the questioning of the established regime. Doubts may be raised about its capacity and about the goals it is pursuing. Such questions are most likely to be raised where developments in the wider environment appear to contradict or challenge the established regime. We have described in the earlier paragraphs that the rural problems in The Netherlands, for example in reconstruction areas, challenge the current rural regimes.
The second stage involves a conflict about redefining the scope and purpose of the regime. Here competing groups of elite actors may organize to seek new ways forward and a new policy direction. This is a period of much uncertainty and debate. Experiments and pilot initiatives may form the useful function of visible flags around which the challenging forces can assemble, gathering strength and gaining mutual understanding. This is certainly relevant for the Dutch rural situation where self-governance initiatives like agricultural nature associations since the nineties of the last century plead as 'niches or incubation rooms' for 'room to manoeuvre' and policy experiments.
A third stage involves the institutionalization of the new regime. This involves the establishment of a new set of material incentives and ideological outlook. In short a new solution-set would need to be established alongside appropriate institutional arrangements and selective incentives (Orr and Stoker, 1994). In the Dutch rural situation the search for new arrangements

and incentives is still going on. We therefore have the impression that several dominant rural regimes in the Netherlands are in the second phase of transition. However, the seeds for new development regimes are already being sown.
Regime transition is not likely to be a simple and straightforward process. To challenge a regime is a difficult task. To assemble an alternative regime, as had been argued, reflects a considerable expression of power (Stoker, 1995: 69).

Our conclusion is that urban regime theory can offer an interesting framework for analysing regional transition processes. The assumption is that informal networks of public and private actors can create the capacity to act, necessary for transition processes. Vital coalitions can probably function as incubation rooms for innovation and develop into new cultural development regimes.

7. Vital coalitions and different types of logic

Interaction with citizens and social and private organizations is an essential feature of modern governance. The emergence of cultural regimes is one of the expressions of the necessity to organize public influence in decision making in an interactive way. But organizing interaction is more than a neutral way of strengthening the effectiveness and legitimacy of modern government. It involves its own tensions and contradictions. These tensions are relevant, not only in an urban context but also for sustainable rural development.

We launch here the hypothesis that hampering factors for cooperation and development in the rural context can be analysed in terms of tensions between different types of logic. This has to be researched further in empirical case studies.

We will describe two such tensions, between institutional and situational logic and between instrumental and cultural logic. These tensions can be neither removed nor avoided; they express ambiguities that are part of reality itself. It is possible, however, to make the tensions productive, assuming that they are recognized and that a certain balance has been created in dealing with them. Under such circumstances, vital interaction can arise. Vital interaction is a form of interactive decision-making, in which the cooperation among actors is energizing and productive. By productive we mean that results are achieved; by energizing we mean that the interactions lend energy and inspiration to those who are involved. Vitality is a combination of productivity and energy.
Interactivity has to be connected to vitality in order to attract citizens. Modern citizens are not prepared to spend much of their time in public decision making if it is not made attractive to them. A connection to tangible results and a context that is inspiring and energizing is indispensable. Productive interaction therefore more and more takes the form of ‘vital coalitions’. While cultural regimes are the expression of a new developing relationship between (urban) state and (local) society at the system level, vital coalitions are the expression of the same developments at the level of concrete projects in the urban environment.

Tensions in organizing interaction
Interactivity is not simply a way of increasing the effectiveness of government. Because interactivity involves working beyond the boundaries of government agencies, it requires allowing for systems of logic other than those that have been inspired by the routines and needs of the government. This situation intensifies tensions that are already latent in the operations of public administration, bringing them more sharply to the surface. Two of these tensions are of particular importance: the tension between institutional and situational logic, and that between

instrumental and cultural logic. The former has to do primarily with how things are organized (process), and the latter primarily with the results that are desired and the terms in which they are formulated (product). Together, these tensions form four perspectives representing different positions, interests, and expectations.

The tension between institutional and situational logic
In institutional logic, the operations of government and the principles and routines upon which they are based form the point of departure. Interaction between government and citizens is organized at moments that fit into the administrative style of working. Planning, managing, control and predictability are all matters of considerable importance. Key concepts in the institutional argument include comprehensiveness, accountability and political primacy. The institutional logic of the government agencies is at the centre of all activities and communication. In institutional logic, institutions dominate the behaviour of individuals. Rules, procedures, prescriptions, and routines dictate what is proper and "how it ought to be done."

Concrete situations in social reality are the starting point for situational action. Interaction involves the forces that present themselves in particular situations, and it is directed toward the organization and mobilization of these forces. Key concepts in the situational argument include commitment, productivity, and orientation toward results. The situational logic of the concrete situation is at the centre of all activities and communication. In situational logic, concrete situations prevail over institutions. The starting point is how actors in concrete situations can achieve results. Their efforts and involvement provide the impetus for the activities and they determine the form of cooperation. Trust, intuition, and belief drive the process. People do things that they believe in and work together with others because they trust them. Such trust is not known but experienced. This way of working also has its own logic. Some things are accepted while others are not.

The exact nature of the relationship between institutional and situational logic is an empirical question [10]. It is obvious, however, that they need each another. Institutional logic becomes mired in bureaucratic incapacity if not corrected and complemented by forms of situational logic. Situational logic, in its turn, dissolves into chaos if not embedded within a framework of institutional logic. In spite of their mutual dependence, however, institutional and situational logic can not simply be combined, as they are ultimately rooted in different principles.

10 A concrete example of tension between institutional and situational logic is probably the research project TransForum itself. Private initiatives can get finances for empirical projects (IP's) aimed at renewal of the knowledge infrastructure, but face the preconditions, rules and procedures for co-financing and administration. 'Green Valley' for example is such an IP-project that faces many difficulties in getting co-funding from regional governments.

The tension between instrumental and cultural logic

A cultural perspective on administration can be contrasted with an instrumental perspective on administration.

In the instrumental approach, the central question is how to solve a policy problem efficiently and effectively. In this approach, policymaking is combined with a perceived distance between "norm" and "reality." Policymaking boils down to rational and conscious intervention in reality, with the goal of bringing previously formulated goals and objectives closer to that reality. It is primarily an instrumental, result- and solution-directed activity. In this logic, interaction is a means of achieving efficient policymaking that is substantively enriched by the insights of citizens ("experiential experts") and is made procedurally more successful by the broader basis of support it generates for the policy.

In the cultural approach, the question of which instruments to deploy in solving pre-specified problems is of less importance than the question of how the relevant interactions and interpretations will take shape – whether cherished positions, uses, and habits will be respected in the process, thereby leading to meaningful negotiation between the various systems of values. Actors ally themselves with policy processes for reasons that are not only related to substantive policy. For them, the process involves more than merely weighing instrumental costs and benefits, but also respecting and reproducing an identity and manner of interacting with others. These patterns of assigning meaning are expressed through interaction, and cannot be reduced to instrumental problem solving. They have to do with cherished, though often dormant, norms and values; they express opinions of how the world ought to work. An interactive policy process does also have to deal with this sort of implicit norms and values. From a strictly instrumental perspective, they often seem troublesome or irrational, while in a cultural perspective they form the basis for involvement and engagement.

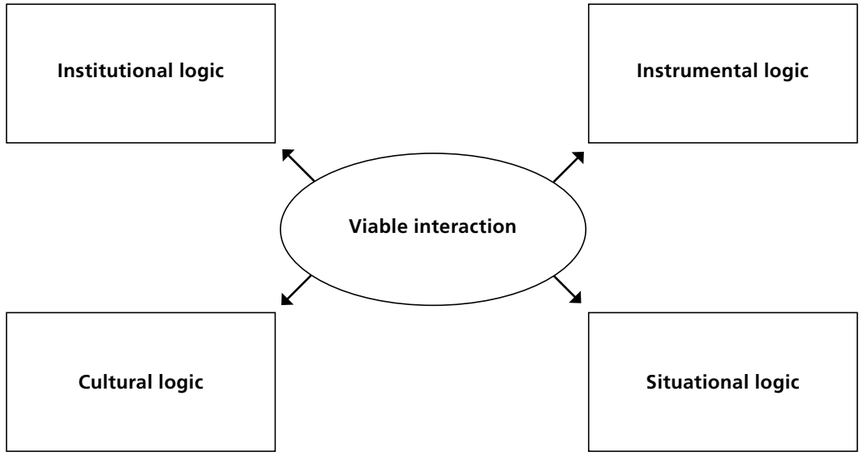
Interactionist rationality is at the heart of the cultural approach, particularly as expressed by Goffman's dramaturgical approach (Atkinson and Housley, 2003). This approach is based on the concept of impression management – a half-conscious, half unconscious manner of understanding and influencing the impressions existing within the process of interaction (Drew and Wootton, 1988). Impression management is only possible when people are prepared to take the role of one another; it assumes an ability to interact. Impression management emphasizes rules of style and forms of getting along with others. It has to do with principles of courtesy, reliability, meticulousness, decency, and respect, but also with aesthetic principles of seduction and beauty.

Four perspectives

The two-dimensional tensions described above are constantly present in interactive decision-making. Together, they form four distinct positions, each representing different interests:
The instrumental perspective demands that the process make a tangible contribution to the solution of a problem (i.e., improvement is expected in a situation that is experienced as a problem).
The cultural perspective assumes that the process allows for the expression of the emotions, sentiments, and feelings that manifest the underlying patterns that provide sense and meaning (i.e., identities are expected to be respected).
The institutional perspective expects the process to be capable of successfully connecting itself to the procedures of positions that are considered important in the institutional order.
The situational perspective assumes a process that allows for the interplay of the concrete situation and the dynamic elements that are hidden within.

We assume that viable interaction can arise when sufficient space exists within a process for all four of these perspectives. Such a viable interaction cannot be designed, but originates in practical action.

Figure 3. Four perspectives



The perspectives are present in every concrete situation. How they are related (whether they are in conflict, which approach is dominant, or whether they can complement each other) is an empirical question. The rural case studies described in paragraph 2 and 3, but also several practice projects within TransForum, can for example be analysed with the framework in figure 3.

A relevant question is whether forms of self-governance in Dutch rural areas are hampered as a result of tensions between the different types of logic.

In the optimal case, a certain balance between the types of logic is possible; the tensions are not reasoned away but recognized and made productive.
Frequently, however, such equilibrium is not possible. We assume that the institutional and the instrumental arguments become dominant quickly, given their relation to the practices and routines of administrative forces and powers (Scott 1998, Van de Donk, 1997).

At any rate, interactive decision-making is always evaluated according to instrumental criteria. Performance, effectiveness, efficiency, speed, consistency of content, and rational logic are important norms in political-administrative interaction, which also belong in some way to specific cultural orders. In the practice of interactive administration, the (inter-actionist) logic of the situation often receives less attention than does the (instrumental) logic of the project, as expressed in the circulation of countless multi-step plans, timetables, and other blueprints for interactivity.

At the same time, modern governance also allows sufficient room for the cultural and situational perspectives, as they represent pre-conditions for achieving effective action. This space is not necessarily self-evident, however, and must be secured time and again from within the usual routines and rituals of the administration. From this situation flow the tensions that characterize modern administration.

8. Conclusion and Research proposal

We conclude at the end of this paper that in current regional rural processes the search for innovative new perspectives is organized within traditional arrangements. The constellation of actors in defensive rural regimes influences the way rural problems are defined. A regime is, in other words, a 'values included system'. New actors like non-agricultural entrepreneurs, civilians and urban representatives face difficulties to introduce their own problem definitions, to participate in rural decision processes and to cooperate with institutionalized governments

The urban regime theory is a promising approach as the theoretical framework for analysing rural regimes.The urban regime theory identifies room for political action within complex multi-actor processes by mobilizing and organizing institutions, people, ideas and other resources. Vital coalitions can be analysed in practice as relations between public and private partners that are energizing and productive and can create political power and 'capacity to act'. An advantage of the urban regime theory, compared with more general regime theories, is the focus on concrete types of public-private cooperation, rooted in informal networks, that can create the capacity to act and can function as niches, incubation rooms for the establishment of new cultural development regimes.
The theory however is still 'work in progress' and needs to be further developed. It is possible to enrich the framework with:

1) A multi-level perspective. Since the theory is developed on a local level, the interaction between actors on a local, regional and national level should be taken into account as well as the institutional barriers for cooperation that occur on these levels. The distinction between the concepts 'niche, system and landscape' can offer such a multi-level perspective
2) Operational dimensions of regimes. The distinction between the dimensions coalitions, power, discourses and rules can be useful to analyse empirical case studies (Arts e.o. 2000). But also the focus on the informality of networks should be an important part of the analyses.
3) Elements from transition theories. The (possibilities for) transformation of regimes as contribution to the transition of rural areas should be an integral aspect of the research programme. A possible starting point can be the described three-stage model of Orr and Stoker (1994).

The usefulness of urban regime theory in a rural context is still an undeveloped research area. We suggest therefore starting a scientific project within the program 'TransForum'. Such a project should be based on knowledge questions in concrete rural processes (such as the TransForum IP's), because the transition of rural areas takes place in practice. Forms of self-governance offer creativity and innovative power to find new sustainable perspectives. Three cases, dealing with clustering of businesses and regional processes are particularly interesting. These cases reflect different scenarios for rural (-urban) regions:

- California Streaming, a clustering of different types of agricultural firms in the province of Limburg, deals with environmental problems and the societal/governmental knowledge question of how new innovative large firms can be spatially and governmentally imbedded in the region;
- Vital coalitions in the Meierij, a rural-urban region in Brabant, aims at the broadening of agriculture and the cooperation between private businesses and urban commitment contributing to the 'branding' of a rural-urban region. This includes new networks between cities and rural areas, between agricultural and non-agricultural sectors and between private and public actors on the local and regional level [11];
- Heuvelland in Limburg near the tripole of Maastricht, Heerlen and Sittard-Geleen, aims at developing new scenarios for integrating economic vitality with the quality of the landscape by organising alliances between businesses of different sectors from a more urban approach (ZKA e.a., 2005).

We can raise here three innovative research lines for further research.
The first line focuses on how vital coalitions can be established. This raises different questions like: What are vital coalitions exactly? Are vital coalitions a necessary condition for effective rural processes, not only in an urban but also in a rural context? Can we design a 'rural regime theory' that is of use analytically and strategically? What are the preconditions for vital coalitions?

The second line focuses on the mobilising force in vital coalitions. To establish coalitions with businesses and civilians, people have to feel the motives and urgency to participate. Civilians want to gain 'energy' from their activities. The 'personal experience' of actors within the civil society becomes more important. People act when they see a close link with their personal motivation, identity and values, and can realise personal goals without being institutionalized. Perhaps this 'experienced based motivation' can be an energizing factor energy in vital coalitions. Does this require also a more 'experience' directed role of governments?

A third line focuses on the need for transition of rural regimes. What are the possibilities for transformation of current defensive rural regimes? What is the influence of changing networks and the introduction of new discourses and actors on the transformation of regimes in rural processes? What is the influence of existing power relations on emergent regimes?
An innovative question is: can new informal networks within society play a role as countervail-

11 See the IP-proposal 'Vital coalitions in the Meierij'.

ing power and develop into new cultural development regimes, based on the motives, experiences and values of civilians? Which informal networks and coalitions can function as niches, incubation rooms for the establishment of new regimes, representing a more urban oriented scenario for future rural areas?

We suggest a case-study approach, by comparing rural regimes and vital coalitions in the three described regional processes, dealing with clustering of private businesses as well as regional development.
Public-private cooperation and cooperation between businesses is a key element and subject of research in all of these projects. These cases can provide the empirical background for a scientific project focusing on the following research questions:

a) To what extend are the experiences and preconditions analysed in urban regime theory transferable to this rural context?
b) How can vital coalitions in these empirical projects be established? What are the obstacles for vital coalitions? Can these obstacles be seen as expressions of tensions that occur between an institutional, situational, instrumental and cultural perspective?
c) What is or can be the role of a 'enabling provincial and local government' in these regions?
d) What is the mobilising force in vital coalitions in these rural processes? To what extent is personal experience of civilians (motives, goals) a driving force?
e) How do new networks and vital coalitions develop in these regions? Which scenarios for the future do the three cases reflect? Can new coalitions potentially function as countervailing power for current rural regimes and contribute to the forming of new cultural development regimes?

Research in this field requires particularly interactive research. By participating in interactive policy processes the mechanisms of cooperation can be studied from within. The hidden and sometimes unconscious motives, values and obstacles in cooperation can only be made explicit at close view. An attitude of the researcher of commitment and distance is thereby required. This implies different research activities such as analysing, designing, clarification of values, advising, democratising and mediation (Neven e.o., 2004). The program TransForum offers possibilities for such 'interaction-research'.

Summary

In this paper we have described different perspectives or scenarios that can be distinguished in the transition of agriculture and rural landscapes:

1) An ongoing development towards increasing scale of production, intensification and technology development within agribusiness;
2) The broadening of agriculture and rural development with new functions like tourism, nature care and water management;
3) A more urban approach, defining rural landscapes as 'spaces of consumption', designing new concepts bases on rural-urban relations and non-agricultural entrepreneurship.

We have stated that the different scenarios reflect different discourses and problem definitions. They also require different relations between actors involved in rural issues. The current debate about rural development is mainly dominated by assumptions from the first two scenarios. Also the current defensive rural regimes are mainly organized along these lines.
New perspectives on rural development require new forms of cooperation between state, business and civil society. We evaluated two forms of current 'reflexive' policy-making:

- Interactive region-oriented policy, initiated from governments. Characteristic for this kind of network governance is negotiation between public and private partners, the initiative of governments as a starting point and the formulation of regional visions and measures;
- Self-governance like covenants and regional agreements, based on more or less 'bottom-up' processes of regional self-organising groups in the civil society who seek cooperation with governments. Characteristic is the focus on 'changing the rules of the game'.

We described that in current regional rural processes the search for innovative new perspectives is still organized within traditional arrangements. The constellation of actors in rural regimes influences the way rural problems are defined. A regime is, in other words, a 'values included system'. New actors, like non-agricultural entrepreneurs, innovative associations, civilians and urban representatives face difficulties to introduce their own problem definitions, to participate in rural decision processes, and to cooperate with institutionalized governments. One of the effects is that opportunities for self-governance of local and regional initiatives are missed.

The central question is whether regime theory can provide a useful framework for analyzing coalitions between public and private actors in rural areas? Can views from a fresh, but related perspective like the urban context give new insight? We focus here on the modern urban regime theory, to see if this framework offers lessons for the transition towards new cultural development regimes in rural areas.
The modern urban regime theory (URT) has advantages as a theoretical framework, compared

to more general regime theories. Urban regime theory:

- Points out 'how power is organized to act' and how the potential for self-governance in society can be stimulated;
- Analyzes informal networks as bases for cooperation and vitality and as a possible starting point for new (cultural) regimes as countervailing power;
- Offers insight in emergent regimes, especially the success and obstacle factors of (informal) cooperation between actors;
- Describes regimes as common base for cooperation in the form of new 'vital coalitions' between actors that can create 'capacity to act';
- Offers insight in tensions that can arise between an instrumental, cultural, institutional, and situational logic that hamper cooperation;
- Analyzes 'cultural development regimes', in which discourses, motives and values of civilians play a major role.

The urban regime theory is a promising approach as theoretical framework to analyse regimes in rural (-urban) regions, and to discover conditions for vital public-private partnerships that can provide the 'capacity to act' in complex rural-urban regional processes.

The central question, that has to be studied in empirical case study research is: "Can vital coalitions, as possible niches for the transition of rural processes, be the starting point for new cultural development regimes, oriented at new rural scenarios?"

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Steering for opportunities

Towards an actor-based approach in sustainable regional development.

Hans Mommaas
University of Tilburg, Telos

Summary

This position paper is implied as a background paper for the development of a research project in the context of the TransForum program. The project is aimed at analysing ways in which innovations and transitions towards a more sustainable regional development might be organised (mobilised, facilitated, stimulated). The paper starts from current changes in spatial policies in the Netherlands, from regulatory to more developmental modes of planning. The text explores the background of these changes, discusses the current approach to more developmental modes of spatial planning and takes position therein by presenting a more actor based instead of plan based perspective. This is done on the basis of a preliminary analysis of a development project in the South of the Netherlands, aimed at the mobilisation of market parties, able to enhance the economic basis for a future maintenance and development of the physical and socio-cultural landscape involved.

The project can be characterised as an attempt to circumvent the path-dependency in which many spatial innovation projects get caught up, due to established institutional planning and policy arrangements. Although we are supposedly living in a post-corporatist society, nevertheless, former institutional arrangements are still having their influence in current planning processes. In order to stimulate innovation and create a new economic base for regional developments, new economic actors and new public-private structures and networks will have to be mobilised, able to explore and develop new opportunities. Here economic, organisational and spatial innovations come together. But how can this be done, while at the same time keeping an eye on the importance of democratic control, spatial qualities and sustainable development?

In order to answer this question, the paper ends with a plea for more comparative research on the effects of different 'modes of steering', aimed at combining economic regional developments with the maintenance/development of both natural and cultural qualities, in the context of an increasing diversity of conceptions of and involvements with rural space.

Introduction

Dutch spatial planning is going through some interesting changes. The depth and extent of these changes can be indicated by the nation-wide call for a more pro-active, developmental, instead of regulatory mode of spatial planning, both on the Left and on the Right, better able to meet the challenges of a post-corporatist, post-industrial society (Hajer 2001). Faced with growing problems concerning its effectiveness and legitimacy in a more dynamic, highly educated and culturally diversified environment, a new, more developmental mode of spatial planning should become more receptive to emerging actors and processes, thus more effectively anticipating and accommodating future opportunities (WRR 1998).

This is not only true for cities, where the possibilities of a new 'cultural economy' and of new leisure and consumption practices present themselves as alternative sources for a future urban space (Mommaas 2000), it is also true for rural areas. Here, agriculture, from times onwards the primary source of rural spatiality, is undergoing important changes. Ongoing rationalisation processes in the agricultural field itself, a globalising agricultural market, pressures on subsidy systems, environmental problems and an increasing pressure on rural space are changing the role and position of agricultural production in the maintenance of the country side. There is talk of the coming into being of an agriculture without soil and a soil without agriculture, of the formation of a post-agrarian rural landscape, of the exchange from a production to a consumption based 'rurality' (VROM-raad 2004). New functions, new inhabitants and new practices are establishing themselves in rural areas, thus decreasing the power of traditional rural actors, complicating the rural arena, and raising questions about conceptions of rural space, that is of rural nature/culture (Mommaas 2003). Established relations between function and space have lost their self-evidence, and issues of morality, experience, emotion and taste (re-)submerge, at the same time turning the future of the countryside (once again) into an issue of public concern. Here the search for new forms of spatial planning, better attuned to a more diversified and more mobile post-corporatist society comes together with the necessity to culturally reinvent the countryside, going along with a search for new economic actors and production chains, able to support a reinvented countryside with new economic activities.

At the same time, this coming together of the necessity for a new spatial planning facing a diversification and mobilisation of stakeholders, and the necessity for a cultural re-invention of the countryside aimed at the development of a new rural economy, takes place in a context in which changes are noticeable in the environmental agenda. A 'limits to growth' perspective, pre-dominantly aimed at issues of prevention and preservation, is being exchanged for a sustainable development programme, widening the environmental agenda to issues of sustainable social and economic growth (Telos, 2005). The effect is to further increase the complexity of the regional development agenda with claims concerning the relations between alternative economic futures, and environmental and social qualities. The challenge is not just to prevent a zero-sum game, but to go beyond those and create 'win-win situations' in which a successful regional development goes along with an increase in environmental and social qualities. In fact, the very idea is that we should search for opportunities in which environmental and social qualities act as a pre-requisite for economic regional success.

But how can all these claims be built into a developmental process aimed at the stimulation of new regional activities, without frustrating that very process beforehand? How can we organise together a concern for sustainable development with the need to not just plan but actually develop new conceptions of rural space? In short: how can we steer for new opportunities for rural spaces in a context in which there are not only more stakeholders involving themselves with the countryside, but in which these stakeholders are also piling up the developmental agenda with an increasing amount of uncertain and diversifying claims?

In the following we will explore this question, and the experiences already gained in trying to face it. First, the text will explore changes in spatial planning processes in The Netherlands. Using a new more developmental mode of planning, there is an attempt to bypass what is experienced as the laming effect of established institutional practices. The creation of spatial qualities is no longer sought after solely on the basis of mechanisms of public regulation and control, but more and more (also) on the basis of the creation of public-private networks, stimulating and facilitating private actors to act. But what then about issues of democratic control and spatial quality? How should we envisage the new relation between public government and private development? As a part of this, the text will specifically turn to the countryside and the challenges facing it. Here, we will deal with the changing role of agriculture, the culturalization of nature and space, and the changing relation between the city and the countryside. Third, the text will explore some experiences gained in trying to combine the two agenda's in the context of a case study in the south of the Netherlands. Last, the text will combine these experiences with other insights taken from the literature, thus establishing an agenda for future research.

From regulatory to developmental planning

In 1998, a report written by the Dutch Scientific Council for the Government (hereafter the WRR report) called for a change in the spatial planning processes in The Netherlands (WRR 1998). Established regulatory modes of planning, based on a strong government enforcing its conception of space on society, with the spatial plan as the pivotal document, were considered less and less effective.

First, in an open, democratic society, effective spatial planning should perhaps be much more based on communication and conviction rather than on principles of command and control. That the more so, the more educated the population and the more horizontally organised the political and cultural relations.
Second, the spatial principles on which the established hierarchical planing procedures were based were becoming obsolete, or at least questionable. In a society which was rapidly becoming more mobile, spatial functions were on the move. New conceptions of space, such as that of the networked city, the urban field, or of the countryside as a park, were entering the spatial discourse (Boelens 2000). Due to this pluralisation of spatial forms, and the related decline of existing spatial hierarchies, balancing different spatial claims became ever more difficult and less self-evident.
Third, the political field was changing rapidly, with new civic (NGO's) but also administrative (EU) parties entering the field, resulting in a situation in which government could no longer rely on formal-political forms of legitimisation, or restrict itself to the consultation of established corporatist partners.
Besides, new spatio-economic challenges, due to a more dynamic, competitive and globalised environment, asked for a much more pro-active instead of consolidating spatial policy. Spatial policies should be able to motivate and facilitate instead of just regulate private activities. In order to do so, they should also be able to respond much faster to changing circumstances.

Because political considerations were only considered meaningful if they could lead to an effective execution of policies, the issue of the legitimization of spatial policies was directly linked to its effectiveness. Hence the surge for a mode of spatial planning which would proof more adapted to a more open, dynamic, post-corporatist, post-industrial society.

Under the label of 'spatial development politics' the WRR report presented an alternative to the existing corporatist mode of spatial planning.
First and foremost, a more dynamic approach to spatial planning should inform institutional arrangements instead of the other way around. Hence a choice for more differentiated instead of generic spatial concepts, and for a more selective, strategic involvement of national government with spatial issues, leaving ample room for regional initiatives.
Second, spatial planning had to be directly linked to spatial investments. The conventional separation between conceptual planning on one side and finance and investment on the other should be abandoned. Future forms of public participation should no longer be primarily focused on the preparation of a conceptual plan, but on concrete developments.
Third, spatial development politics should no longer restrict itself to established coalitions, but promote an open approach to the planning process, leaving enough room for new institutional coalitions between public and private partners.
Next, spatial development politics should follow the more general transformation in public policy making, from modes of government to modes of governance, moving away from linear forms of inter-governmental co-ordination to the creation of societal coalitions and public forms of legitimisation. Spatial developmental politics should be based on a stakeholder instead of shareholder principle, with an active identification and mobilisation of selected stakeholders as part of the planning procedure. This identification and mobilisation of stakeholders should not be done on the basis of generic spatial concepts, but on the basis of a definition of the specific basic qualities of a given region and the Leitmotiv behind its development.
Thus, the concept of spatial development politics was implied as a pluralistic, more open response to societal developments, without lapsing into a sheer accommodation of apparent autonomous societal developments. The safeguarding of important spatial qualities, in danger of being lost, was still of importance. However this could perhaps better be reached by a more pro-active approach, acknowledging dominant structuring forces, instead of by turning once back against them.

In the years following the WRR report, the developmental approach to spatial planning has become something of a mantra in formal Dutch planning. Two subsequent governmental papers on spatial planning have embraced the central notion of a developmental approach, although framed in rather different general perspectives. While the first paper (Vijfde Nota Ruimte) expressed a strong concern about spatial qualities, presenting developmental planning as a means to increase quality awareness and quality construction, for instance by imputing historical landscape characteristics with new post-industrial functions, the second paper (Nota Ruimte) was more concerned with a decentralisation of spatial planning and a new, more narrow demarcation of the involvement of central government.

Thus, the WRR report can be said to have functioned as an important catalyst for what was already in the air. Three things were, and still are, of a major influence, namely (1) the diversification and thus diffusion of spatial scales and spatial forms (2) the diminishing role of traditional co-producers of spatial forms, and (3) the horizontalisation of public relations and the related crisis of expert knowledge.

Whereas in former decades, there was a rather clear national consensus about how Dutch national space should be conceived of, with not too densely built medium-seized, concentric cities clearly demarcated from and situated in an open rural environment, with daily urban systems predominantly being executed on the level of the city itself, and with clear hierarchical relations between the local, the regional and the national, during the 80's and 90's this became increasingly problematic. Strong attempts to hang on to a concentric urbanisation model, with new residential quarters being built attached to the cities, could not prevent ongoing forms of suburbanisation, going along with an ongoing increase of infrastructure and an ongoing increase in the use of the automobile, from resulting in urban centres increasingly coming into each others sphere of influence. Notions of urban networks or the networked city started to surface, both as a means to try to accommodate spatial dynamics on a higher scale, and as an attempt to overcome the medium-seized character of Dutch cities and create robust urban structures able to compete on a global scale with powerful agglomerations elsewhere (Boelens 2000). Urban forms started to expand along infrastructures, creating new suburban entertainment and sports centres, alongside new motorway oriented shopping boulevards (Mommaas 2000). Principles of reachability started to dominate principles of availability.

Helpful here was also the work of Manuel Castells (e.g. 1996), proclaiming the coming into being of a network society in which the dynamics of a space of flows were thought to supersede the space of places. Thus, a new perspective on spatial relations or spatial forms was introduced moving away from static, hierarchical concepts of space, in the direction of much more fluid, multi-level place-network perspectives (Boelens 2000). As a result, uncertainty settled in a planning tradition which traditionally was dominated by a rational-scientific approach to space.

Besides, changes were taking place in the social position of functions, traditionally of importance in co-supporting or co-producing spatial forms and relations. In the cities social housing was on its return. In the countryside agricultural production was going through important transformations.
As far as the first was concerned, there were attempts to diversify the urban residential market. Due to its larger share in the urban housing stock, social housing was supposed to be stagnating the urban housing market. Hence existing norms on social housing were lowered, housing corporations privatised and attention moved away from social housing to the market. As a result, the semi-public social housing regime could no longer function as an organisational co-producer of space, on a larger scale determining spatial relations and spatial forms.
On the countryside, agricultural production decreased in importance. Although not as strongly linked to public spatial planning compared to social housing, still as far as the countryside was concerned, agriculture was an important co-producer of space. Successive ages in The Netherlands have seen on ongoing search for land as a source for agricultural production, with the famous 'polder landscape' as a result. Besides, the agricultural regime has always functioned as a strong co-supporter of the open landscape, enabling an ongoing industrialisation of agriculture. However, ongoing industrialisation processes, together with an erosion of the self-evidence of subsidy principles and an ongoing profit squeeze, are leading to a situation in which less ground will be necessary for maintaining agricultural productivity, while at the same time smaller farmers, with less expansion possibilities, will find it more and more difficult to maintain their income level or find successors. Hence there is the danger of the open landscape loosing its traditional co-producer.
The result was that both in the city and on the countryside spatial planning had to look for new co-producers of space.

In a more general sense, spatial planning underwent the influence of changes in the relations between government and its citizens, and between different groups of citizen themselves. These changes can best be summarised and typified in terms of what the sociologist Bauman has earlier referred to as shift 'from legislators to interpreters' (Bauman 1987). With this phrase Bauman pointed at the changing role of intellectuals in post-modern society. Due to a rise in mass-education, the digitalisation of information, social mobility in general, the public emancipation of popular culture, and the end of many former (semi-)public cultural monopoly (e.g. on the media, architecture, taste in general), intellectuals and with them politicians, technicians and administrators, have lost their monopolistic position in the mediation between the present and the past, the here and there, what is and what ought, the present and the future. Hence expert opinion becomes just that; an opinion amongst others, in need of a further proof of principle. At the same time the category of 'the people' has lost many of its former odious, repulsive and socially damaging connotation (ibid. 77). Citizen-consumers have become important co-producers of public reality. As a result, also space no longer speaks for itself. Modernism with its universal and ontological knowledge claims has become de-sacralised to the level of an opinion amongst others. Within post-modernity planners are faced with the problem to find new grounds for the public acceptance of their spatial perspectives, in competition with the wide variety of spatial possibilities presented through popular media channels, consumer culture and the entertainment economy.

Faced with this abundance of uncertainties, spatial planning indeed had to start looking for a new legitimacy basis for its involvement with spatial planning, and the spatial discourse related. Here, roughly spoken, three lines of re-orientation might be distinguished: a participative, design, and ecology oriented one.

The participation based line of reorientation, also possibly labelled a welfare orientation, followed an already older tradition of participatory planning, concerned with the democratic character of what is regarded as an overly technological, procedural approach to spatial (ru-

ral/urban) planning. Traditionally the focus is on analysing how, despite a quasi neutral tone of technological and procedural rationality, power relations still structure spatial planning, and on inventing ways to include different forms of rationality and interests in what is typified as deliberative forms of area-based planning (see e.g.Boonstra & Frouws 2005). From a planning perspective, the deliberative form of area-based planning is hoped to deliver the new kind of consensus, necessary to gain a 'license to develop'.

The design or culture oriented approach is based on attempts to mobilise public consent and public enthusiasm, not so much through cognitive deliberation (e.g. 'words'), but through design techniques, visionary images and artistic perspectives. This approach is rather new, going back the late 1980's. It breaks with the 'modern' idea that image making techniques have to be considered as disruptive of democratic politics. Here, an essentialist approach to politics, primarily focused on what politics is and should be, is replaced by a more pragmatic one, aimed at the effects of policy programmes. As Gomart (2004) has it: "It is not simply that images suddenly replaced participative techniques as the appropriate means of doing politics (…), but that (…) the most formal of forms – image and image making – might be appropriate in doing politics" (Gomart 2004, 2). More basically, there are obvious links here with a deeper critique on the one-sided character of notions of subjectivity and reflexivity dominant in contemporary social theory, and with attempts to re-introduce more aesthetic or experience oriented ones, for one thing going back to Romanticism and to the German Geisteswissenschaften (see e.g. Bowie 1990, Lash 1999). Better than words, images, Grand Design and the spectacular are supposed to organise the kind of public commitment, needed for consensus building with regard to possible spatial futures.

The ecology-oriented approach is based on attempts to meet the uncertainties of contemporary spatial planning by using history as a new source of inspiration and mobilisation. In one approach, a combination of soil conditions, the historical infrastructure of networks, and historical occupation patterns were presented as possible guiding principles for the development of new urban and rural spatial plans. This so-called sedimentary approach (see e.g. De Hoog, Sijmons & Verschuuren 1998) was explicitly promoted as a way to meet the lack of consensus regarding the future spatial order. Although perhaps not intended by its inventors, the sediments quickly started to function as a new kind of conditional yardstick, with a clear hierarchy of forms (from the deepest sedimentary layers to present-day occupational structures) supposedly presenting a self-evident topological structure. In a broader sense, the approach coincided rather well with a renewed interest in history as a potential co-producer of spatial forms and identities. Here, not only (late-)medieval castles, churches, monasteries and farmhouses, but an entire 19th century infrastructure of garrisons, hospitals, harbours and factories started to function as a new possible source of spatial identity and form. Stimulated by a government paper concerning the possible role of the historical infrastructure in the fight against a fragmentation of space and the search for new sources of inspiration (Nota Belvedere), history became an alternative source of area-based spatial planning, possible overcoming current spatial uncertainties.

While these re-orientations surely enriched the Dutch spatial planning tradition with new, more dynamic approaches, nevertheless, there was one problem they didn't resolve. In a certain sense, they continued the tradition of the separation between the conceptualisation of a spatial plan and the actual development process. Although searching for new ways to fill the legitimacy gap, either through the mobilisation of historically sedimented spatial qualities (the ecological approach), through deliberative consent (the welfare approach), or through aesthetic enthusiasm (the cultural approach), nevertheless, all these attempts to construct a new more development oriented form of planning were still hampered by a strong 'inside-out' kind of approach, in which the actual development actors (mostly market parties) were only allowed on the stage after the conceptual plan as such had been established (mostly by semi-public institutions) (Boelens & Mommaas, forthcoming). No wonder a lot of these plans just ended up as promising futures in the galleries of 'un-built Holland', however integrative, deliberative or enthusiastic the planning process. Despite their dynamism and inspiration, they still had not been able to resolve the stubborn gap between content and process. If successful, the gap was mostly filled by public institutions or larger institutional investors taking the lead in the development process. Were the plans involved a spatial entity, where by definition a more complicated string of actors would have to be involved, things often became too difficult.

The actor-approach: the hills of Limburg case

Against this background, already for a year and a half, in the hilly country of South Limburg in the South of The Netherlands an alternative approach is being explored. Here, not presumed qualities of nature and culture are the primary focus of attention, but the necessity to mobilise regionally bounded or embedded developmental actors, able to economically maintain and further develop those qualities. The project concerns an attempt to link content and process in a more direct and productive kind of way.

The starting point for the project was not so much a spatial planning issue as such, but a concern about the economic future of the region, especially with regard to tourism. From the side of the regional investment and development agency, concerns were ventilated about the future or regional tourism. The region represents one of the oldest tourist regions in The Netherlands, because of its scenic landscape already at the end of the 19th century connected by high speed trains to the Randstad area. Still, in the small city of Valkenburg, almost 70% of the employment is tourism related. Besides, together with agriculture, tourism is an important regional co-producer of the scenic hilly landscape. However, both tourism and agriculture are under pressure. Due to an increasing competition both are experiencing profit-squeezes. In the case of tourism, low-cost carriers are enabling cheaper holidays trips further away. In the case of agriculture, the ongoing industrialisation of food production are lowering the cost per unit, and thus also market prices. The idea was that, if left by itself, both tourism and agriculture would gradually become marginalised, thus no longer being able to act as co-producer of the small scale hilly landscape. Already hotels unable to keep up with the competition, were being sold to property developers, turning them into apartment buildings. How could the economy of the hilly landscape be strengthened in such a way that this would accommodate the mutual dependency between tourism on one side (the starting point of the entire project) and the cultural and ecological qualities of the landscape on the other?

After en extensive analysis of the composition of the tourist value chain, both in general, and specifically for the region, an activity supported by Zka Consultancy, an advisory bureau specialised in leisure and tourism, the conclusion was that not enough could be expected from the tourist production column itself. The financial and investment structure within the sector was dominated by a short-term orientation, and primarily focused on the transport and accommodation elements of the sector itself. If investment money remained, this was predominantly invested in this narrowly defined tourist production column itself. Despite the fact that tourism is heavily depending on environmental qualities, giving tourists a reason to travel, nevertheless, the tourist sector itself does not invest in these qualities, leaving that to the public sector (perhaps partly using tourist tax income), other institutions more directly involved with nature and culture (recreational facilities, museums, etc.) or to the tourists themselves. Hence, for several reasons a more horizontal strategy was needed, more directly aimed at maintaining surrounding cultural and natural qualities, stimulating regional 'traffic' and through that also enhancing the precondition for ongoing tourist activities. Regional cultural and natural qualities had to form the basis for new economic revitalisation impulses. Making use of an Intereg IIIc subsidy (the TouriSME) programme, and with the help of Urban Unlimited, an urban planning bureau, the project could also involve the spatial dimension into its programme.

The actual project started with an inventory of the core values of the region, both natural (the landscape and its various ingredients) and cultural (monuments, cultural activities, the type of social relations, occupation patterns). The inventory was based on interviews with key players in the region, and on a secondary analysis of existing data, especially with regard to regional business activities and tourist typologies. The data were expressed in GIS maps, enabling a topological overview of a variety of service structures (e.g. with regard to sports, wellness, health care, gardening, gastronomy, orchards and vineyards, etc.).

Next, a search was organised for European references. The references had to concern regions in which, on the basis of comparable regional qualities, horizontal clusters of economic activities were developed. On one side these activities had to act as co-producers of regional natural and cultural qualities. On the other side they had to function as stimulators of tourist activities, delivering a surplus value to the tourist value chain. References chosen concerned the Burgundy region (alliances surrounding wine production), Baden-Baden (alliances surrounding health and wellness), Poitiers (media and technology), Billund (product branding, in this case Lego), Nice (science and technology) and others. The references were brought together in an inspiring booklet 'Greetings from….(the entire world)' (Zka et al., 2004). The references were investigated for the way in which regional value chains were interwoven, linked to both natural and cultural qualities and to tourism.

The material thus collected has finally been summarised in the form of a regional matrix, expressing on one side the red and green core qualities of the region (monasteries, mills, farmhouses, hollow roads, orchards, hills and valleys) and on the other potential new markets. Finally five themes were selected: Healing Hills (linking the infrastructure of convents and woods to new health & care possibilities), Rich Tastes (linking e.g. farms and orchards to regional food), Lush Gardens (combinations of the infrastructure of castles and gardens with new lifestyle markets), Linked Fields (relating churches, chapels and the small scale landscape to possible multimedia activities) and Elementary Heritage (the landscape of watermills and valleys linked to new energy R&D).

Next, these themes, and the visual material related (maps and images) were presented to round table meetings with invited entrepreneurs and investors active in and around the region. The invitation resulted from an active search for entrepreneurs, both regionally and nationally, thought of as interesting for the project concerned because they had already proved themselves as innovative and willing to invest in uncertain futures. The meetings were meant both as a means to test the potential perspectives developed and to attract horizontal investments, able to support the natural and cultural qualities presented. These qualities should not just be perceived of as nice scenic contextual ingredients, but as crucial additions to or elements of projected value chains.

Both medium seized and larger entrepreneurs participated in the round table meetings. In general the response was an enthusiastic one. Especially the line of thinking in which area based value chains were linked to one another, to the cultural and natural qualities present in the region, and to area based agricultural production, the gastronomic economy, wellness and healthcare, technology and innovation, stimulated a renewed search for additional investments.

Based on explicitly expressed investment propositions, in the end, four development opportunities were identified. Around each of these opportunities, a table of interested entrepreneurs was organised. The four themes concerned: 'Healing Hills', a combination of hospitals and hotels aimed at the development of a new health care infrastructure enabling surgical patients to recover in regional hotels; 'Rich Tastes', a combination of regional food producers and a regional distribution company, aimed at scaling up the regional food chain, linking it more strongly to the urban-rural tourist market, the regional chain of quality restaurants, gastronomy courses, etc.; 'Wellness in Luxury', aimed at the organisation by insurance companies of preventive care trajectories, in combination with health resort stays, therapeutic baths, training courses; 'Glorious Life', a new formula for senior housing in monumental buildings, with health care guarantees. Finally an opportunity presented itself to cover the whole area with a wireless broadband connection, enabling a wireless availability of health care and tourist information, together with real time gaming.

At the moment, the five propositions are further developed by five groups of entrepreneurs. The project as such is co-ordinated by a steering group, besides representatives of the project tables including representatives from the provincial government, the regional investment and development agency, and the world of research and consultancy. The steering group involves itself with organising the links to the public governmental environment, with the development of a knowledge infrastructure able to meet the many economic, cultural, judicial, spatial and planning questions the project doubtlessly will produce, with the creation of a regional investment fund, with strengthening the interrelation between the projects and with linking the projects to the original aim of strengthening the core qualities of the region. Together these ingredients are producing something of a regional development arena, possibly able to circumvent existing institutional dependencies, and to more directly link area based cultural and natural qualities with future investment prospects.

Some preliminary reflections

Although the project originally started as a regional economic development project, aimed at strengthening the economic structure of the hilly country, because this involved tourism, it quickly became involved with existing spatial qualities, including e.g. small scale agricultural production. The object was to find new economically viable co-producers for the maintenance and further development of the cultural and natural qualities of the region. Because this could neither be done by tourism, nor by small scale agriculture itself, additional value added activities had to be brought into the region. Of importance here was that these value added activities had to strengthen instead of weaken existing cultural and natural values and production capacities, a clear case of attempts to create so called win-win situations.

In the end the project will produce a bundle of activities which will drastically alter our idea of the countryside. A new service economy is taking hold of rural areas. An important part of the agricultural production involved no longer focuses primarily on the vertical value chains of a global agricultural production system, but on the horizontal value chains of a regional urban-rural service economy, linking small scale agricultural production to tourism and recreation, health care, shopping, hotel and catering, nature maintenance, heritage culture: a clear case of what Patsy Healey (2001) has earlier typified as a strategy of 'collaborative placemaking'.

For the time being, the project developed within the framework of existing regional spatial plans. However, it is easy to imagine how a comparable strategy might, in one and the same movement, actualise existing regional spatial plans and mobilise the necessary market actors able to co-develop such a plan. Here, the conventional gap between conceptual planning and actual development processes might be narrowed substantively. Of course, a precondition for this is that government allows for, or even facilitates, the coming into being of parallel structures, in which corporate organisation are able to take their social responsibility as co-producers of space. An institutionally secured regional value map should prevent this parallel structure from weakening instead of strengthening existing spatial qualities.

Although it is yet unclear how the project will develop, a few promising characteristics might already be discerned:

- the project primarily involved entrepreneurs who wanted to think and act strategically. In an early stage, because of the urge to become involved as an investing party themselves, entre-

preneurs only interested in short term gains left the tables;
- policy was placed at a distance. Of course the regional and local political environment was, on the highest possible level, informed about the project, and those involved clearly supported the idea. However, at the same time, they were asked to keep at a distance because existing political-administrative arrangements, both spatially and organisationally, were thought to hinder a more open, integrated approach to possible value chains;
- for the same reason, semi-public interest organisations were neither invited to the tables. They also were thought to strengthen instead of overcoming existing sectorial cleavages, thus hindering an integrated, horizontal approach to new investment opportunities. An exception was made for 'Het Limburgs Landschap', as the name already says, an organisation involved with the preservation of the small scale Limburg landscape;
- hence the project was primarily based on groups of entrepreneurs, not organised around abstract appeals for collaboration, or around a pre-defined plan, but around self-defined 'windows of opportunity', stimulated by an informed perspective on the region;
- surely the design-element played its role in the project; the region was presented to the entrepreneurs in a specific kind of way, not through words, but through design instruments, such as maps, images and references. This was crucial in triggering the imagination, searching for new prospects. On the basis of that, deliberations took place about possible co-producing activities, enabling the parties concerned to strengthen their regional involvement, identity and inter-activity;
- in terms of transition (Elzen et al. 2004, Rotmans 2005) or regime theory (Stone 2001, Mossberger & Stoker 2001), these groups of entrepreneurs can be seen as potentially organising something of a small scale transition arena, or a development oriented coalition or regime, creating a collaborative space of opportunities, able to circumvent existing institutional and spatial arrangements, creating a new urban-rural space of action, also for the future enabling the mobilisation of further prospects and investments;
- the central co-ordinating party, the regional investment and development agency, could neither be identified as purely public nor private. It brought together the language of 'serious' banking and investment with possibilities to organise venture capital for pre-competitive activities. Because it was neither a regulating nor a subsidising body, the entrepreneurs involved could not address it as such. Hence they were forced to interact as professional entrepreneurs 'amongst each other';
- because of the fact that regional cultural and natural qualities were not presented as external qualities in need of preservation and protection, but as something that can be developed and might act as an investment opportunity, the parties involved quickly incorporated these qualities as a positive force, instead of as something to be negated or offended. Hence the quest for the Limburg Landscape organisation to join the debates.

A future research agenda?

The former only suggested one possible way of more effectively linking regional spatial qualities ('content') to future oriented investments ('process') in cases were a more complicated coalition of different actors has to be involved in the process. Other regional or project conditions and other spatial scales probably ask for a different developmental strategy. Because of that, the former can not be understood as a simple model, easily to be copied in other places. Every specific case will have to find out its own innovative development path, depending on the type of parties involved, the starting situation, the specific regional qualities to be addressed.

Here, a possible research agenda unfolds, involved with a comparative analysis of ways in which regional innovation powers might actually be mobilised and facilitated in relation to regional cultural and ecological qualities. The project might be involved with either side of the dilemma; how to find new economic actors, able to act as co-producers in the re-development of an existing landscape, or how to link new economic actors, involved with the development of new economic activities to the redevelopment of an existing landscape. Basic would be the question how to accommodate the relation between 'content' (a regions' ecological and cultural qualities) and process (the development of combinations of new regional activities) in such a way that this is inviting instead of prohibiting innovative prospects.

Factors to be involved in the comparison would at least have to include (1) the type of involvement of the public and the private sector (2) the type of situational and general knowledge included in the project (3) the accommodation of the relation between the new vertical/horizontal network of value chains and the existing public/private institutional setting, (5) the type of actor, organisation or setting, enabling the public-private co-production and co-ordination of this type of regional development project, and (4) the way investment prospects relate to principles of democratic control, public legitimization and sustainable development.

The above Limburg case presented an interesting example of ways to more effectively link 'content' and 'process', thus overcoming the kind of developmental vacuum in which many area based planning process unfold. Others will have to follow. The TransForum programme could act as a laboratory for the development of a richer port-folio of possible examples for a future 'post-agrarian' rural landscape.

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Towards Assessment for Sustainability

Dr. L.W.J.Knippenberg, ir. F.L.P. Hermans and drs. W.M.F. Haarmann

Summary

In this position paper we will explore the requirements of a new kind of assessment-method, usable to assess sustainable rural development in The Netherlands.
We start with an analysis of the trends and developments on the Dutch countryside and the impacts these have on the process of planning and policy-making. There is a strong link between on the one hand the problems of the countryside and the number of stakeholders involved and on the other hand the possibility to develop a coherent policy and control the process and outcomes. The transformation of the countryside goes together with a proliferation of all kinds of policy problems and the emergence of new stakeholders, each with their own interests, perspectives and discourses. Skepticism about the possibility to '(re)design' the countryside or rationally plan this transition-process is increasing. New horizontal forms of steering, such as forms based on policy networks and strategic alliances, are needed.
This also has consequences for the choice and composition of methods and tools to assess this process. Traditional assessment-tools, such as methods of environmental impact assessment or strategic environmental assessment, do not suffice any longer.
We need a new approach, one that pays more attention to cyclical and iterative processes and focuses more sharply on stakeholder participation. We especially need approaches and perspectives that pay attention to social, economic and ecological issues in a well-balanced way. This broadens the perspective from forms of environmental impact assessment to the evaluation of sustainable development.
Stakeholders play a crucial role in this approach, especially on a regional level. However, important as this be, stakeholder participation alone is not enough to guarantee sustainable outcomes. We need some kind of underlying sustainability framework that can be used to check and balance the sustainability of the participatory approach on the local or regional level.
We end this paper by formulating a research agenda for the development of a sustainability assessment method, specifically geared towards regional rural developments (in The Netherlands). In our opinion regional rural development provides an ideal case, since it encompasses almost all problems sustainable development is all about.

Acknowledgements
The authors wish to thank Mr. Geert Draaijer and Mr. Rob Verheem from the Dutch Commission for Environmental Impact Assessment (commissie MER) and colleagues of Telos for their valuable comments on a first draft of this paper.

1 Introduction

In the last decades an array of assessment methods and tools has been developed to assist policy makers in fine-tuning, monitoring and evaluating their strategies, plans, programs and projects. At the same time however, policymakers come across a growing number of problems that can't be assessed in depth with the help of the existing tools.
It is not that these tools do not perform what they are supposed to. By and large, they do the job for which they are developed, and sometimes they are even very sophisticated. The difficulty is that these tools were developed for other purposes. They are domain specific, whereas the methods policymakers need, should do more: they should span and connect different domains. This paradox is very visible in the arena of regional rural development. In this position paper we will explore the need for a new kind of assessment method, usable to assess sustainable regional rural development in The Netherlands.

Nowadays, rural development in The Netherlands involves far more than just restructuring agricultural production. We witness an integration of different styles of agricultural production, and at the same time, the creation and strengthening of (new) natural functions, the creation of new economic activities and growing attention for the social quality of life in rural communities. We also see conflicting claims with regard to the available space in the countryside, and the emergence of new demands with respect to housing and working, nature development, water retention, mobility and recreation.
In short, it's clear that the Dutch countryside is going through a major transition or at least is standing on a threshold. This transition process involves many stakeholders (old and new) with different views and aspirations for the future of the Dutch countryside. This implies that it is by definition a complex and rather unpredictable process, and that the outcome is uncertain.
Tools developed to assess regional rural development should be able to deal with all these aspects. In this paper we will investigate both these aspects and the characteristics of the tools themselves. As a result the first question is: what do the characteristics of the complex policy problems in the Dutch countryside imply for the process, content and outcomes of a sustainability assessment tool?

2 The 'New' countryside

Planning and assessment for sustainable development has to be considered within the context of the changing functions of the countryside and related with that, the changing balance of power between the actors and stakeholders involved (Huigen, 1992; Marsden 1993; Ilbery 1998).
From the fifties onwards, the traditional agrarian function of the countryside had to compete more and more with new functions, such as housing and recreation for city-dwellers. This led to the development of new nature areas and sometimes even to a complete rearrangement of the rural landscape (Cloke and Goodwin 1992; Van Dam & Huigen 1994; Hoggart & Buller 1995, Van Huylenbroeck and Slangen, 2003). More and more farmers and other people formerly engaged in rural activities found jobs in cities and more and more citizens settled in the countryside. With this change of functions, and the arrival of new stakeholders, the power balance slowly shifted.

For a long period rural policy in The Netherlands was the exclusive domain of closed economic-political networks in which agrarian actors and their representatives dominated. Non-agrarian actors were effectively excluded. The agrarian sector successfully shaped rural policy, both on the national, regional and local level (Frouws, 1994). The main goal of this policy was to raise agricultural productivity. Until the seventies this was done by rationalizing (modernizing) the agricultural production processes, but from the seventies onwards, spatial planning became an important tool for this goal as well.

At the same time, new actors, such as environmental NGO's and the Dutch Ministry of Housing, Spatial Planning and the Environment got involved (Bekke, 1994). They succeeded in putting new topics on the agenda, in the first place environmental ones. Other actors followed, such as project developers, insurance companies, estate owners and groups of concerned citizens, all with their own issues and interests (Haartsen, 2002). Their influence grew slowly but steadily. Partly, this was caused by the fact that the influence of the agrarian sector in Dutch society as a whole decreased.

The loss of power for the traditional rural actors resulted in the emergence of new perspectives for the countryside. It could no longer exclusively be seen as a production-area, but also, or even in the first place, as an area where citizens can 'recuperate themselves and recreate'; as a place to 'consume natural products in a natural environment' (Munters, 1996, Mormont, 1990; Cloke and Goodwin, 1993; Marsden et al., 1993: Driessen, 1995). More and more people started worrying about the 'degradation of the quality of the rural landscape', for instance the loss of open space, silence, scenic beauty, historical landscapes, biodiversity and rural village life.

The farmers became the culprits. Their image changed from that of simple, hardworking, people, devoted to natural, rural activities, into that of greedy entrepreneurs, going for quick profits, at the expense of the quality of the landscape, environment, or nature (Frouws, 1998). The call to allow other functions on the countryside became louder and louder. Some even proclaimed that the countryside changed from a 'production-platform' into a 'consumption-platform' offering all kinds of new products and services (Mommaas, 2003).

This shift in perception turns the future of the countryside into an issue of broad public concern. In the coming years, this process will go on and even gain in strength. Along with that, the need increases for a new rural policy. In recent years, many new ideas, perspectives, scenarios and designs have been put forward. Some authors speak of a torrent of new ideas and new catchwords (Elerie, 1994). Although their scope is broad, at the same time they all have one characteristic in common: the implicit suggestion that the Dutch countryside is rather moldable (Frouws, 1998).

This, however, could be an illusion. The interdependency between the problems that the countryside is faced with, the number of stakeholders involved, their divergent interests and resources and as a result the limited capacity to control outcomes, raises serious doubts about the possibility to straightforwardly '(re)design' the countryside, let alone rationally plan the transformation. This doesn't mean that steering isn't possible at all. In the recent history of the countryside, government, in cooperation with the agrarian sector, was able to direct developments in a certain direction. However, the changing nature of the problems and the increasing diversity of the actors, interests, and perspectives involved, ask for different approaches to handle policy-problems and, related to that, for different assessment tools.

2.1 Policy making in the countryside

Not every problem is a policy problem, and a cynic might observe that not every policy concern deserves the label 'problem'. What is the distinction between ordinary problems and policy problems? A problem refers to an undesired state of affairs or expected future development. A problem may or may not become a policy problem; it reaches this status when leadership or organizations see the problem as a serious threat. Those who see a problem as a policy problem assume that one can or should do something about the undesired state of affairs or prevent and/or react against the unattractive development. So, the assumption behind a policy problem is that it can be influenced (Duke and Geurts, 2004). When assessing possible interventions the questions becomes how a certain measure or strategy decreases the undesired state of affairs or the expected future enhanced, (see also section 3.4).

There are different views on policy problems and the way they could or should be handled. In the rational view, developed in the sixties and seventies, the main assumption is that government, supported by experts,¬¬ is able to explain why a particular strategy is appropriate in a particular context and how it should be implemented. According to such a view, policy problems refer to objective facts, to elements or aspects that exist in the real world. They can be defined and known in an objective way. The task of policy makers is to define these policy problems in such a way that their definitions mirror reality (Dery, 1984). This idea became linked to strategic decision-making, performance evaluation, and attempts of modeling situations to assess the likely impact of different courses of action. All these techniques are still in common use in twenty-first century urban and regional government, providing a methodological kitbag for planning office staff and consultants (Healey, 2001). Nowadays, this ontological view is strongly contested and often replaced by a constructivist approach. According to this perspective, policy problems are socially constructed, and as a result of that, they are intrinsically subjective. Policy makers often have different perceptions and definitions of a problem. Sometimes they even disagree whether something really is a problem. By their actions and interactions, they determine it's meaning, and they try to influence the prevailing view of that problem. Experiences, beliefs, values and the types of relationships between the actors will influence the emerging definition. However, this constructivist approach has its limits as well. It does not imply that the difficulties, which lay at the root of the problems themselves, do not objectively exist, or would vanish purely because of a change in our problem definition (Van der Graaf and Hoppe, 1992; Dery, 1994; Joldersma, 1993, Roelofs, 2000).

Policy problems can be characterized by their complexity. See for instance: Eden, Jones and Sims (1983); Douglas and Wildavsky (1983); Mitroff and Sagasti (1973); Dunn, (1994), Van der Graaf and Hoppe (1992); Geurts and Vennix (1989); and Hickson et al., (1986). Based on several classification schemes Roelofs (2000) distinguishes three interrelated dimensions of complexity: cognitive complexity, normative complexity and social-political complexity.

1. Cognitive complexity concerns questions of knowledge about an issue: what are its variables, how does an issue relate to other issues, and what are possible effects of developments on that issue. The more information is needed to grasp an issue, the more complex it becomes.
2. Normative complexity concerns the conflicting norms and values of stakeholders (and/or their organizations). These norms and values condition their perceptions, expectations and (inter) actions. The bigger the differences, the more complex an issue will become.
3. Socio-political complexity concerns conflicting interests. If there are many actors, chances increase that there are also many different interests. This also means that it becomes more difficult to align these interests.

These three dimensions are not equally important for all complex policy problems. Some problems are dominated by social-political complexity, whereas others are more cognitive in nature. Hence, there is no sequence in the way these three dimensions are connected (Roelofs, 2000). Moreover, the complexity of a problem is not stable in itself and can vary over time. Empirical research shows that, the "normal" assumption that, during the same governmental formulation/adoption process, problem definitions always move from unstructured to more structured has to be discarded, at least for environmental policies (Hisschemoller, Hoppe, Groenewegen and Midden, 2001). In regional development a mix of simple and complex problems has to be solved.

In the literature on governance and policy networks it is broadly acknowledged that, in our complex and fragmented society with many actors involved, it is necessary to increase the problem solving capacity. Solving problems implies an increasing cooperation and consensus between and increasing number of actors. New horizontal forms of steering such as forms involved in policy networks and strategic alliances are needed. In these networks decisions are not taken by one hierarchical decision maker as viewed in the rational view, but by a wide variety of public and private actors (Streeck 1985; Kooiman, 1993; Rhodes, 1997; Kickert, Klijn en Koppenjan, 1997; Scharpf, 1993; Mayntz & Scharpf, 1995; Mayntz, 2000). In order to facilitate these policy networks the traditional methodological kitbag isn't appropriate anymore. New assessment approaches –as part of the new methodological kitbag– have to be developed.

To tackle these problems most authors agree that the crux is in the question how and in what way stakeholders can be involved. In recent decades there has been an evolution in new approaches to address the intricacies of complex environments. These methodologies seek both to improve the scope of vision of the investigators as well as their ability to communicate both science and policy (Duke and Geurts, 2004). The research field of public participative analyses shows an overwhelming variety of participatory methods and techniques. Some methods found are: referenda, public hearings, public opinion survey, negotiated rule making, consensus conference, citizens panel, citizens jury/panel, citizens advisory committee, (electronic) focus group, repertory grid technique, back casting, decision support systems to inform debates, dialogues en deliberations, and policy games (Geurts and Mayer, 1996; Mayer, 1997; Van Asselt and Rijkens, 2002; Turnhout en Leroy, 2004; Hisschemöller et al., 2005; V.d. Kerkhof, 2004). Here, the question arises what participatory method fits best the process of finding norms and indicators for the assessment of sustainable developments?

Evaluation shows that each method has his own strength and weakness. No general conclusion can be drawn about their effectiveness. Probably the best results can be achieved by combining several methods (Fiorino, 1990; Rowe en Frewer, 2000). Rowe and Frewer further remark that determining the effectiveness of the methods is problematic because the methods are applied in a variety of ways and in different contexts. For our question concerning the process to find new tools for assessment and monitoring this means that we don't have to search for the best method, but rather that we have to focus on the criteria that they have to fulfill when solving complex problems within policy networks.

Duke and Geurts (2004) selected five criteria (the five C's) for solving complex policy problems. We will give a short description of these criteria:

– *Complexity:* In general there are many variables involved, and opinions differ about what

and how many variables are important. The same is true for the relationships between the variables. Complexity is a relative concept: something is complex in the eye of the beholder. System analysis and mental models can be used to enlighten the functioning of systems.

– *Communication:* the basic assumption on improving the handling of complex problems is to improve communication. Without communication networks can't function. Sustainability assessments must enable communication in a complex environment by creating a language or communication model that is understandable for the different actors and located on a well-chosen level of abstraction.
– *Stimulating creativity:* in many cases problems can be approached with new combinations of proven and well-tested lines of action. But this can only be done if the analysis of the problems results in the 'aha' effect of recognizing the analogy between the new situation and familiar examples. As Mintzberg (1994) points out, finding the appropriate response to a challenging issue is not a science, but a craft. It is about combining experiences with creativity to find a new, original, inspiring and adequate pathway into the unknown.
– *Consensus:* power balances in society are shifting. As a consequence 'new rules of the game' have to be defined. There is a need for a new consensus, which preferably should not be the result of a long and costly battle. Gaining consensus should thus be a part of the process of communication, which precedes the adoption, and implementation of a strategy [12].
– *Commitment to action:* People are action-oriented beings. Making things happen needs an entrepreneurial drive. That is why a good process for entering the unknown must create commitment from those people whose energy and endurance is vital to the success of a strategy (Duke and Geurts, 2004).

The final message of Duke and Geurts is: "each criteria is important, but it has to be seen in conjunction with the other four. Optimizing a process too much in the direction of one criteria will lead to sub-optimal results." (Duke and Geurts, 2004). When we evaluate traditional approaches such as Environmental Impact Analysis and Strategic Environmental Assessment according to these criteria, we would probably see that these approaches focus mainly on the understanding the complexity of a policy. They often neglect the normative and socio-political complexity and with that the other four criteria mentioned above. The question we have to solve in the design of tools for the assessment of regional sustainable development is how to combine scientific knowledge, the normative concept of sustainable development, and the views and interests of stakeholders.

12 But also during the implementation process because experiences and changing contexts can cause new conflicts and distrust.

3 Assessment methods

The range of possible useful assessment approaches and tools is rather large. It is not our intention to describe them all. We will restrict ourselves to a short description of those tools which are broadly recognized as some sort of sustainability assessment tools, either because they are predecessors in time, or because they more or less share the same approach or goal. For those readers interested in a thorough analysis of all types of sustainability assessment tools, we refer to the Sustainability A-Test research program (De Ridder et al., 2005).
First, we will discuss methods of environmental impact assessment (EIA), and its successor, strategic environmental assessment (SEA). After that we will shortly discuss forms of social impact assessment. Finally we will look at the possible contribution of approaches of integrated assessments (IA) to sustainability appraisal.

3.1 Environmental and strategic environmental assessment

The concept of sustainable development has always had a strong relationship with the environmental sciences. It is therefore not surprising that people dealing with environmental impact assessments always have taken a strong interest in the idea of a sustainability assessment tool.

Environmental impact assessment (EIA) can be defined as "a process of identifying, predicting, evaluating and mitigating the biophysical, social and other relevant effects of proposed projects and physical activities prior to major decisions and commitments" (Sadler, 1996). The idea was that a check of newly formulated plans and policies on their impact on the natural environment would greatly contribute to the concept of sustainable development (George, 1999). Nowadays many countries legally require entrenching an EIA in the planning of major infrastructural works.

There is therefore a lot of practical experience with EIA, and its strong and weak points are well documented. The classic form of EIA has three significant drawbacks that limit its potential use for a sustainability appraisal (Kessler 2003, Pope 2003).

- The first disadvantage concerns the late stage of the EIA in the project cycle. At a late stage much preparatory work has been done, and a lot of decisions have already been taken. As a result the outcome of the EIA - environmental concerns – are often perceived as something negative, as something that blocks the execution of a promising project, and with it economic progress.

- Secondly an EIA often fails to address alternatives to a project. Proposed projects are compared with a baseline scenario with some variations that leave the core of the plan unchanged.
- The third drawback concerns a more methodological issue. Environmental Impact Assessments have a hard time dealing with indirect and synergetic (or cumulative) environmental aspects.

To address at least the first two disadvantages of an EIA, Strategic Environmental Assessment (SEA) has rapidly gained in popularity. SEA can be defined as "a systematic process for evaluating the environmental consequences of proposed policy, plan or program initiatives to ensure they are properly included and appropriately addressed at the earliest possible stage of decision making, on a par with economic and social considerations" (Thérivel et al., 1994; Sadler and Verheem, 1996). In general one could say that SEA's mainly deal with the 'why question' (goals and objectives) while EIA's deal with the 'how, what and where' questions (methods and options). Whereas EIA is applied for specific projects, SEA can be applied on the whole range of policies, plans and programs.

In literature two types of SEA are distinguished (Partidário, 1999, Sheate et al., Pope et al., 2004)

1. The first category is called an EIA-driven SEA. The purpose is to broaden the range of applications for an EIA from concrete projects to the evaluation of the environmental impacts of policies, plans or programs. The difference with EIA is that this SEA makes it possible to identify modifications needed to improve the environmental outcomes, while the process is underway. The drawbacks of this type of SEA are basically the same as for project based EIA: the assessment takes place too late, and there is too little attention for alternatives.
2. The second category can be called objectives-led SEA. Objectives-led SEA aims to be a proactive, and ex-ante process. It promotes a comprehensive analysis of alternatives. A well-defined set of environmental objectives is therefore an important prerequisite for this form of SEA. It also makes it possible to link the objectives formulated at different levels of decision-making and implementation. This is called 'tiering' also known as 'trickle down effect' or 'vertical integration'. However it has been recognized that in reality, this is almost never possible (Nooteboom 2000).

There is a discussion about how far an objectives-led SEA approach can be suitable to assess the contribution of policy initiatives to sustainable development. According to Pope, this second type of SEA is suited to assess sustainability. However, other authors think that the scope is still too small (Gibson, 2001; Verheem, 2002). According to them, both EIA and SEA should be extended to incorporate not only environmental considerations, but also social and economic ones.

3.2 Social Impact Assessment

Social Impact Assessment has been developed, in an attempt to broaden the scope of traditional SEA and EIA. The idea was to investigate not only the environmental impacts of a project or policy, but also the potential social effects and the distribution of these effects among social classes.
Social Impact Assessment was originally used to identify, prevent, minimize, or mitigate potentially adverse social impact of a proposed (environmental) project. Vanclay defines Social Impact Assessment as the process of analyzing (predicting, evaluating and reflecting) and managing the intended and unintended consequences on the human environment of interventions (policies, plans, programs, projects and other social activities) and social change processes so as to create a more sustainable biophysical and human environment (Vanclay, 2003). The extent to which Social Impact Assessments is a suitable tool for sustainability assessments is subject of debate. Some authors (for instance Vanclay, 2003) see social impact assessments mainly as a kind of 'add-on' assessment that should be used in conjunction with SEA, or EIA's. However, there is also a trend to broaden the scope of Social Impact Assessments. Goodland calls this broadened concept, Social Assessment. He argues that: "Environmental and Social Impact Assessment are shifting away from 'do no harm' methods to the more positive 'do good' approaches. Still the major conceptual flaw in both approaches is that they assume that project appraisal is the decision point. Recognition is overdue that environmental and social assessment be applied before a project has been identified. Strategic Environmental Assessment and Social Assessment is doing this. They seek to move assessment upstream, and influence the actual selection of a project. But this is not enough. Social Assessment should state that development above all seeks to benefit people, communities and societies; that adverse impacts are to be prevented, minimized or mitigated; that benefits are to optimized and must be appropriate for society; that vulnerable segments of society merit special care, that culture is valuable; and that all design must be transparent and participatory (Goodland, 2000)

We see that in assessments, both from an ecological and social perspective, there is a tendency to broaden the horizon of the assessment, and to exchange the 'do no-harm' approach for a more proactive one, aimed at furthering opportunities for win-win situations. However, the question remains how the various disciplines might be integrated in such a broadened assessment approach.

3.3 Integrated Assessment

The traditional assessment methods, discussed so far, are typically expert driven assessments, strongly based on the idea of rational planning discussed earlier. If we evaluate these methods against the 5C's of Duke and Geurts, we can conclude that they are primarily aimed at the reduction of cognitive complexity, while the other aspects of communication, creativity, consensus and commitment remain undistinguished. In order to deal also with these aspects, integrated assessment has been developed.

Integrated Assessment aims at supporting decision-making processes, at an early stage, by generating relevant insights and by using an interdisciplinary approach. Rotmans defines Integrated Assessment as: "a structured process of dealing with complex issues, using knowledge from various scientific disciplines and/or stakeholders, such that integrated insights are made available to decision makers" (Rotmans, 1998).
Integrated Assessment uses a wide array of approaches, some more analytical and some more participative. Kessler distinguishes between three forms of integration (Kessler 2003).

1. Integration of time-perspectives, geographic scales or substance. An example of substantive integration concerns the blending of biophysical, economic and social aspects.
2. Procedural integration: the integration of environmental concerns in planning and decision-making processes (when, how, by whom).
3. Methodological integration: the integration of different approaches, concepts and terminologies; and the ways in which key actors are involved at different points in time.

These three types of integration can be weak or strong, and they can reinforce each other.

Integrated Assessment is also applied to assess sustainable development issues, see for instance Eggenberger and Partidário (2000), Lee (2002), or Sheate et al. (2001). The main difference between Strategic Environmental Assessment, Social Impact Assessment and Integrated Assessment therefore not only concerns the extent of substantive integration and conceptual interdisciplinary but also that of stakeholder participation. Whereas EIA and SEA rely on expert knowledge to perform the assessments, Integrated Assessment has explicitly been used to involve the ideas and knowledge of stakeholders in the assessments. See for instance Pahl-Wostl, 2002; Pahl-Wostl and Hare, 2004 and Turnpenny, 2004.

These findings are consistent with the remarks made earlier in this paper about the necessity to involve stakeholders in the planning and execution of regional sustainable development.
Integrated Assessment offers a lot of useful insights, approaches and tools for the assessment of sustainable regional rural development.

3.4 Assessment for Sustainability

Sustainability assessment is a hot issue (see for instance George, 2000; Ketting 2001, Pope 2005). Currently there are several European research projects on sustainability assessments [13].
These research projects have some common characteristics:

- They embrace the three-pillar approach, or triple-bottom-line-model. This model has become quite common after the World Bank adopted it, although it is not completely undisputed (see for instance Prescott-Allen 2001; WRR 2002). The three pillars model distinguishes three domains or pillars within sustainable development, a social one, an economic one and an ecological one. According to Hodge, the origin of this model goes back to the 1960s (Hodge, 1997; Serageldin, 1996),
- They focus on an integrated assessment of all three pillars.
- There is room for complexity, uncertainty, and coincidence (see also Van Asselt, 2000).
  - o Rational linearity and technical solutions, although still important, no longer dominate.
  - o Co-design, co-evolution, co-steering and network-based forms of participation have their role to play.

The viewpoint is neither totally ex-ante, nor ex-post, but something in between. Having said this, we immediately have to add that methods for Sustainable Assessment (SUA) still are in their infancy. Applying integrated assessment methods on questions of sustainability, invokes the fundamental question what sustainable development should entail. The debate centers on the question whether or not, and if so to what extent, objective, measurable criteria can be developed for the assessment of sustainable development. In the debate we can distinguish between two groups.
The first group argues that it is impossible, and sometimes even undesirable to come to a universally applicable meaning of the definition. See for instance, Jacobs (1999), Robinson (2004) and Evers (2003). These authors claim that in the end all definitions of the concept of sustainability are normative and questionable. They opt for a broad and not to strict connotation, one that always requires the involvement of local stakeholders to fill in the concrete meaning, in time and space.
The other group claims that sustainability can be defined, and that this should be done, by giving priority to ecological considerations. There are, according to them, clear and perfectly measurable limits to the carrying capacity of the global ecosystem. These limits confine or should confine the margins of the economic and the social system, and as such restrict the policy options and the options of the stakeholders (Hueting & Reijnders 2004).
This last position is very laudable and, on a global scale, defendable. However, it does not solve the problem posed by the first group, although it clarifies that human beings don't have

13 For instance: the SustainabilityA-Test project: www.sustainabilitya-test.net and the Matisseproject: www.matisse-project.net

complete freedom, when it comes to defining and delimiting sustainability and sustainable development.

Because in the end, not all the preferences of the stakeholders are automatically acceptable or sustainable, we are still left with the necessity to look for some kind of meta-criteria. Theo Hacking identifies the following problems, related to leaving issues of sustainability completely at the discretion of stakeholders: "difficulties that need to be overcome include: dealing with situations where there is no general consensus, accommodating concerns of future generations, tendencies towards self interest, and the fact that people do not necessarily understand the long term consequences of their choices or make rational decisions." (Hacking, 2005).

We will review two options for constructing a sustainability framework on the basis of which sustainability assessment can be performed. The first option is to measure the expected outcomes of a policy against certain predefined (minimum) norms or goals. The second option is to deduce some general theoretical principles from the concept of sustainable development.

3.4.1 Norms, Standards and Goals

In the assessment literature we find two types of criteria to evaluate the expected outcomes of a certain policy. The first type concerns a baseline, or norms-led assessment. The second type concerns an objectives-led assessment where the distance to a specific target is measured. Both types can be used to evaluate a policy problem. In our definition a policy problem can be "an undesired state of affairs" (which evaluates against certain norms) or expected future developments (which evaluates against a baseline) that one can or should do something about" (see also section 2.1). We will review both norm setting and goal setting strategies by experts and stakeholders, and their potential for developing a sustainability framework.
Standards, thresholds or norms describe a minimum, a lower limit that must be met to avoid undesirable situations. Depending on the pillar these norms may be stated in laws or treaties (international, national or regional), or based on shared values. Goals are not necessarily maximums, but represent an objective to be strived for. They may or may not be realistically attainable. We will look to the three pillars and to review some characteristics of existing norms and goals within each of the three pillars.

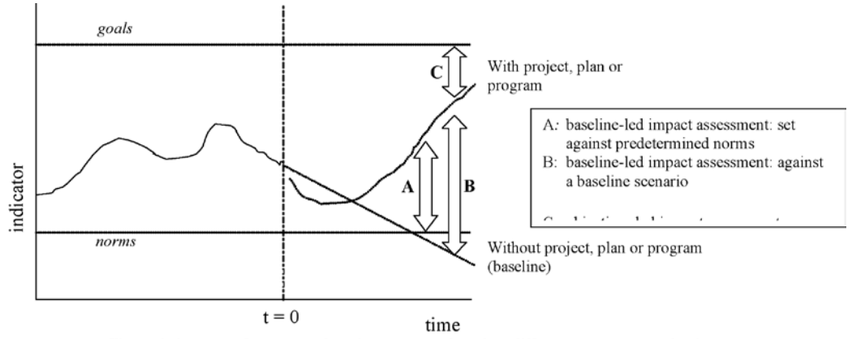

Figure 1: impacts of a proposed project measured against different assessment criteria
Adapted from: Hacking, 2005

The ecological pillar
Within the ecological pillar we have to deal with norms and thresholds regarding biodiversity, ecological resilience and irreplaceable functions or, as some call it, 'critical natural capital' (Deutsch 2003, Ekins 2003; Walker 2004).
In doing this, it is important to distinguish between the more or less hard norms provided by the natural sciences, for instance about biodiversity (Tilman, 1997), and the more value laden perceptions of stakeholders (Musters 1998).
The harder ecological norms and goals often are comparatively easy to define and to measure. There are a lot of existing methods that do this quite well. Ecological norms for sustainability deal with the awareness not to trespass ecological limits in such a way that the outcome is an undesirable ecological deterioration, scientifically and/or according to the stakeholders. Undesirability can refer to systemic characteristics, and as such resilience, or, depending of the context and preferences of the stakeholders, also to species, or subspecies.

The economic pillar
Economic norms deal with optimizing benefits and the distribution of those benefits. Unlike the ecological pillar, norms within the economic pillar are not so much about thresholds, then about a general sense of direction. There are a lot of widely used economic norms, goals and indicators. National and regional benchmarking is quite common. It is therefore clear that we do not have to reinvent the wheel (Lambooy, 1980). Norms and goals for sustainability in the economic domain should be about 'doing better', with respect to these norms and goals. What goals and norms are chosen in a specific situation or region depends on the one hand on the requirements of the existing economic system, the specific context and the interests and

perspectives of the stakeholders involved, and on the other hand on the requirements of the two other pillars with respect to the economic pillar, in that given context. As a result the focus should be on ameliorating the quality of the economic modeling and intervention, and about internalizing more social and ecological aspects.

The social-cultural pillar
The problems in the social domain are once more of another nature. Social 'facts and figures' are deeply impregnated by perceptions, values, and interests. What we find out about our 'condition' immediately changes our perception of that condition, and by this also those conditions themselves, and with it our perceptions and values (and norms) [14] (Giddens, 1984; Gellner, 1988; Urry, 2000). This makes it very difficult, if not impossible to define minimum norms for this domain. This implies that goals for sustainability in this domain should be about opportunities, capacities and capabilities to choose, adapt, adjust, improve, and communicate (Lehtonen 2004, Knippenberg 2005). Sustainability becomes here a guiding perspective. The content of that perspective again depends of the circumstances, the concrete context and the stakeholders involved.

The type of norms and goals that can be used for a sustainability assessment differs amongst the three domains, from hard scientific facts to empirical evidence to softer notions of shared perspectives or values. Therefore, as we have seen, within each pillar the problems for defining norms and goals also differ. More importantly; when combining these norms for an integral sustainability assessment tool, all these different norms have to be related to each other. The question then becomes how decision criteria should be selected and how they should be related to each other.

The same problem applies when formulating goals for sustainable development: relating the goals in the different pillars and constructing a coherent view on sustainable development may prove to be very difficult. Or as Hacking puts it: "Establishing objectives by which sustainable development can be defined is one of the greatest challenges in progressing the development of objectives-led assessment approaches, especially since there is still so little consensus regarding exactly what sustainable development entails." (Hacking 2005).

The best method to derive norms or goals also differs in each pillar. A lot of norms within the ecological domain can be set by consulting experts. However, experts can't define all the norms. Especially the social domain remains a problem. Another way to define goals and relate them to each other is by consulting stakeholders. However, this brings us back to the problem we have been trying to overcome by introducing norms: who or what controls or guides the stakeholders if it comes to sustainability. Again, the question remains whether it is possible to relate the goals to each other and how the sustainability of the total picture can be assured. Are there more or less universally applicable sustainability principles that could help us to frame our approach, and help stakeholder to frame their approach? The aim of the guiding perspective is to help stakeholders and policy makers to prevent mistakes and avoid injuries, to develop options, and to strengthen communication. It is about options to learn, repair mistakes; and 'do better'.

3.4.2 Principles of sustainable development

This brings us to a second approach to deduce a framework on the basis of which stakeholder participation for sustainability assessments can be performed. Sustainable development means balancing social economic and ecological issues, questions and solutions. We must make sure that all three pillars are treated fair, and that there are no undesirable trade-offs between the three pillars. This requires an all-encompassing perspective, a perspective that makes it possible to balance different requirements, interests, claims, wants, needs and deeds, of different stakeholders.

Precisely because of this balancing-act, we need some kind of overall principles (Hacking, 2005; (Dobson 1996). Justice (or fairness), resilience and efficiency are often mentioned as basic concepts in the literature on sustainable development (Costanza 1997; Langhelle 2000; Rotmans 2001; SFSO 2002; Thin 2002; Haarmann 2004; Hermans 2005).

It is not difficult to understand this choice. Sustainable development is about fair deliberations, about fair access to opportunities and about the fair distribution of profits and liabilities. This makes justice, defined as fair distribution, a core principle of sustainable development, irrespective of the particular circumstances or particular preferences (Rawls, 1971).

Another commonly mentioned notion is resilience. The whole idea behind sustainable development can be described as an effort to balance the claims of different subsystems – the social, economic and ecological subsystems - in such a way that the system they form as a whole is strengthened, or at least over-stretch is avoided. The commonly accepted idea of resilience is based on the idea that systems do not necessary move towards a stable equilibrium. A system is capable of self-organization, and it can adapt and learn (Holling 1973, Holling 1996; Carpenter 2001).

14 Some argue that the economic domain is part of the social domain. But that is not what this discussion is about. In our society the economic pillar is seen as a more or less independent functioning system (in the sense of Luhmann. Luhmann, N. Soziale Systeme. Grundriss einer algemeinen Theorie. Suhrkamp, Frankfurt.). A central cornerstone of the dominant economic thinking of that 'system', is that preferences of people are given. The object of the economy is not to reflect about the nature or coming into being of preferences. Economy is the question whether and how they can be fulfilled, in a world where the means are scarce.

A third element is efficiency. Efficiency in needed as an extra principle, next to justice and resilience, to deal with the allocation and distribution of scarce resources. Efficiency comes from the notion that trade-offs between competing goals are inevitable and time and resources are limited. Efficiency is about the allocation of scarce resources but also about choosing the appropriate means to an end. (Costanza 1997; RIVM 2004).

The main question now it how to use these abstract notions in such a way that they contribute to and give direction to stakeholder discussions. We still have to determine how the principles relate to each other, and how they can be used, with regard to the interactions in and between the three pillars (Hermans 2005). What we do know is that the three mentioned principles refer to systemic characteristics. Justice is about fairness in a societal system. Resilience is about adaptation and regeneration of a system or systems, and efficiency is about the working of a system. So we can use the principles to describe and assess the condition of different systems and the quality of their interactions. We also can use them to ameliorate the quality of those systems and their interactions. Moreover, we more or less know about what systems (or domains) we are talking, when we speak about sustainable development: the social-cultural, the economic, and the ecological system/domain.

An interesting approach might be to combine this principle based approach with the treatment of certain minimum norms, and the guidance of the stakeholder-interaction. To find an answer to this multiple dilemma poses one of the main challenges for the future. The answer might not be as complex as it seems, as long as the concrete context is localized. The principles then frame the perspectives of stakeholders, whereas the concrete context, and the stakeholders give content to the formulation of norms and goals. This is why rural regional development will provide an excellent opportunity to study possibilities for the development of interactive, proces-based sustainability assessment approaches.

4 Conclusions

This position paper set out to explore the existing methods to assess regional rural sustainable devleopment. We have shown that regional developments in the Netherlands in recent years have attracted a lot of new stakeholders, with different views and aspirations for the future. This results in a complex environment where the idea of ‘rational planning’ is no longer valid. Steering becomes more difficult and new ways to develop and assess proposed policies in relation to sustainability become necessary.
We have seen that this implies monitoring and assessment as a process with a focus on stakeholder participation. The development of a process-based approach, should take into account the issues mentioned by Duke and Geurts of reducing complexity and increasing communication, creativity, consensus, and commitment to action.
We have shown that traditional assessment methods like EIA, and SEA can provide elements for a new assessment tool, but are not comprehensive and integrated enough to be labeled as true sustainability assessments. We have looked at Participatory Integrated Assessment as a solution to overcome some of the problems regarding the comprehensiveness and integratedness of the results.
Participatory integrated assessment involves stakeholders in the setting of norms and goals on rural regional development. However stakeholderparticipation runs into several problems: there is a need to reach some general consensus, accommodating concerns of future generations is not guaranteed; tendencies towards self interest are difficult to counter, and people do not necessarily understand the long term consequences of their choices, or make rational decisions.

This means that ideas of sustainable development must provide a framework from within which stakeholders preferences and views have to be directed towards goals and away from thresholds. The further development of tools for sustainability assessment of rural regional development should therefore focus on:

- A process-based approach
- The further development of a principle-based framework, usable to help stakeholders involved in sustainable regional development with formulating and fine-tuning their perspectives, discourses, and actions.
- The combination of this framework with existing norms and goals within each of the three pillars.

The main question that needs to be addressed is how sustainability can be incorporated in policy and decision-making in rural regions. The challenge is to combine sustainability principles, geographical scales and stakeholder participation in policy-making for rural regional areas in such a way that complexity is reduced and creativity, communication, consensus and commitment is strengthened.

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www.iaia.org	International Organization for Impact Assessment

Strategic Alliance Networks and Innovation

A Deterministic and Voluntaristic View Combined

Victor A. Gilsing and Charmianne E.A.V. Lemmens, Eindhoven Centre for Innovation Studies (ECIS), P.O. Box 513, 5600 MB Eindhoven, The Netherlands.
v.a.gilsing@tm.tue.nl and c.e.a.v.lemmens@tm.tue.nl

1. Introduction

Over the past decades we have witnessed a tremendous growth in the number of strategic technology alliances in the high-tech sectors. Especially, the number of alliances aimed at technological learning and knowledge creation, has grown rapidly since the mid 1980s (see figure 1). We define strategic technology alliances as 'cooperative agreements for reciprocal technology sharing and joint undertaking of research between independent actors that keep their own corporate identity during the collaboration' (see e.g. Hagedoorn and Schakenraad, 1994; Vanhaverbeke et al., 2002). They are strategic in the sense that they affect the long-term goals of the companies such as knowledge acquisition and technology development. To obtain these goals, strategic alliances and interfirm networks are effective organizational forms that enable to combine and integrate complementary knowledge and capabilities from a diversity of actors (Porter, 1990; Hamel and Prahalad, 1990; Grabher, 1993; Smith Ring and Van de Ven, 1994; Hagedoorn, 1993; Hagedoorn and Schakenraad, 1994; Spekman et al., 1995; Uzzi, 1997; Nooteboom, 1999, 2004; Ahuja, 2000; Rowley et al., 2000).

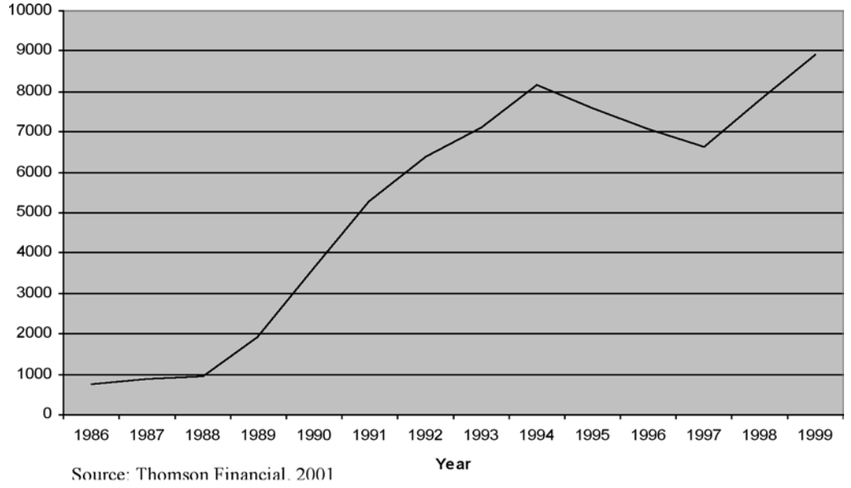

Figure 1 Growth in the number of alliances

The increasing costs of R&D in combination with a shortening of product and technology lifecycles and blurring industry boundaries in a dynamic technological environment have made it almost impossible to develop technology on a stand-alone basis. Firms use these technology alliances to reduce costs of R&D, to transfer technology in order to improve innovative performance, to reduce time-to-market or to search for new technological opportunities (for a more elaborate overview, see e.g. Hagedoorn, 1993). In addition, they are also considered to be efficient vehicles for external knowledge acquisition (see e.g. Duysters and Hagedoorn, 2000). Following this, research on alliances has focused for over a decade now on the question of why and when alliances are formed (Duysters et al., 2001; Kogut and Zander, 1993; Powell and Brantley, 1992). In other words, the focus has been on the so-called exogenous factors that cause alliance formation. Interdependence and complementarities have been addressed here as the most common explanation for firms forming inter-organizational ties (Richardson, 1972; Pfeffer and Nowak, 1976; Nohria and Garcia-Pont, 1991). These resource dependency perspectives (Pfeffer and Salancik, 1978; Wernerfelt, 1984) posit that external resource scarcity is the most important reason for engaging in collaborative agreements (Park et al., 2002). As a consequence, networks increasingly provide an alternative to a more self-contained form of organisation or to 'standard' market transactions (Koput and Smith-Doerr, 1996; Powell, 1996; Kogut, 1997; Ebers, 1997; Grandori, 1999). Particularly in high-tech sectors, alliances have become the dominant strategy and the empirical studies have produced evidence that they positively affect corporate performance in terms of growth (Powell et al., 1996), speed of innovation (Hagedoorn, 1993), organizational learning (Hamel, 1991) and reputation (Stuart , 1998; Stuart et al., 1999).

More recently, the strategic alliance literature has made progress in advancing our understanding of how inter-alliance dynamics – the so-called endogenous factors - affect the intent of creating, building and sustaining collaborative advantage through alliance formation (for example Gulati, 1995a, 1998; Walker et al., 1997; Gulati and Gargiulo, 1999; Chung et al., 2000). This endogenous dynamic refers to with whom specifically alliances are formed (Gulati, 1995a; Gulati and Gargiulo, 1999). It involves two perspectives on what drives the alliance formation process: the embeddedness perspective and the perspective of competitive tension among alliances.

The first perspective of embeddedness treats alliance networks as networks of social relations. This social network perspective on alliances explains the collaborative behaviour of actors in terms of their position and embeddedness in networks of relationships (for example Nohria, 1992; Gulati, 1998). Embeddedness refers to the structure of a network of social relations that can affect the firm's economic action, outcomes and behaviour and that of its partners to whom it is directly or indirectly linked (for example Granovetter, 1992; Gulati, 1998). The fact that firms are embedded in a network of relations and have access to several qualified and resource-complementary partners influences their decision on whom to tie up with. This stream of research thus focused on the role of embeddedness as an important driving factor that is

endogenous to the alliance formation process (for example Gulati, 1995a; Walker et al., 1997; Gulati and Gargiulo, 1999; Chung et al., 2000). In this context alliance formation is based on building preferential relationships characterized by trust, stability and rich exchange of information between partners (Dore, 1983; Powell, 1990; Gulati and Gargiulo, 1999). It asserts that network formation proceeds through the formation of new relationships, building on the experience with existing firm ties. By investing in these social relations through the replication of their existing ties, firms build up social capital (Burt, 1992). So, embeddedness and the social capital derived from that are thus by their very nature dependent on history (Chung et al., 2000). Social capital generates returns as it enables firms to access and capture the embedded resources in their social relations (Lin, 1999). In this way the network becomes a growing repository of information on the availability, reputation, competencies and reliability of prospective partners (Walker et al., 1997; Gulati, 1995a; Powell et al., 1996).

The second viewpoint that drives alliance formation and the advantages derived from that, is formed by the internal competitive tension among alliances. Here the focus in the literature has largely been on bilateral (dyadic) alliances. In examining the relationship between competition and cooperation, research has largely focused upon the internal characteristics of the alliance, arguing that it is important to acknowledge the mixed-motive nature of 'competition plus cooperation (coopetition)' of alliances and its implications for dependence, trust, and mutual benefit (Singh and Mitchell, 1996). In dealing with the internal competitive implications of alliances, research has either focused on the performance/financial benefits of alliance formation (Berg et al., 1982; Hagedoorn, 1993) or examined the implications of trust, opportunism, partner rivalry, and sustained cooperation as a means of achieving competitive benefits (Gulati, 1995; Hill, 1990). Although this approach has served to advance our understanding of the internal competitive implications considerably, it ignores the external competitive implications of alliance relationships. In other words, despite its insightful focus on the alliance itself, this line of research has been primarily introspective. It has not yet begun to incorporate the external competitive environment of alliances in its research domain. The rapid proliferation of strategic technology alliances has not only ushered in a new era of cooperation among companies big and small, but has also induced a new era of external technology competition among networks of multiple alliances. Cooperative technology agreements have become an integral part of competitive strategies. 'Competition through cooperation' has become the mainstay of a firm's attempt to gain innovation and learning advantages. The virtual explosion of cooperative agreements on a worldwide basis has led to a new form of competition where networks of multiple alliances compete against each other in groups (Gomes-Casseres, 1994, 1996). It is now commonplace to observe technological competition between one group of firms linked via alliances against another alliance group. Research by Gomes-Casseres (1996) and by Doz and Hamel (1998) is among the first to have explored the increasing frequency of technology collaboration as a reflection of a fundamental shift from the traditional form of competition (firm vs. firm) to a new form (group vs. group). These scholars have provided a foundation for this largely unexplored and critical field of study. However, as global competition continues to intensify, a more thorough understanding of this new form of group-based technological rivalry is required (Gomes-Casseres, 1996; Das and Teng, 2002; Silverman and Baum, 2002; Lemmens, 2004). To further address this we propose to include a new research domain, namely the external competitive environment in which alliances compete, by empirically investigating the competitive effects of alliance network formation processes on partners and competitors at the group level. Understanding these issues is important as they have substantial implications for the competitive dynamics of technology-based industries.

In sum, a key message conveyed from the literature until now is that embeddedness and competition in alliance networks drive the formation of alliance networks and affects firms' innovative performance (Granovetter, 1992; Gulati 1998). The empirical evidence indicates that firms can indeed take advantage from their embeddedness in alliance networks and from occupying certain positions in these networks (e.g. Podolny and Stuart 1995, Stuart and Podolny 1996, Stuart 1998, Ahuja 2000, Rowley et al., 2000; Gulati et al., 2000; Gargiulo and Benassi, 2000). This strong focus on embeddedness and competition reflects a structuralist view of how a set of interrelationships between firms drives their behavior and innovation performance. This approach has brought the important insight to the fore that social relations matter for economic and innovative action. However, it has two important shortcomings. One is that it entails a rather deterministic stance as if firms are subject to an exogenous network structure that unilaterally directs their behavior and performance. Another shortcoming is that it reflects a static view and ignores change in alliances networks and the antecedents that cause this change. In this paper we aim to address these shortcomings.

To do so, we aim to explore the possibilities to develop a more voluntaristic view of how firms shape their networks with the aim to provide a more favorable social structural context for achieving their strategic aims. Whereas the deterministic view has focused on the question, in terms of Chandler (1962), how strategy follows structure, a more voluntaristic view aims to understand this causality the other way around, namely how structure follows strategy. This latter question is still unexplored territory in the literature (Stuart, 1998). Such a more voluntaristic view may enable us to understand how alliance networks change caused by specific firms' actions. Understanding such dynamic processes in alliance network may require the use of different perspectives. One such perspective is that of the 'micro-level of organizational action' (Bae et al., 2003; Beerkens et al., 2004), that aims to understand how local actions of a focal firm and the local actions of its partners affect the network structure and its functioning. Relevant questions here are for example how firms can be pursuing brokerage or closure advantages in terms of tying behavior, and how such strategies shape their networks and possibly affect the competitive bases of the industry. Another perspective could be evolutionary that may bring a more in-depth understanding how and why inter-organizational firm networks change over time, and to what extent such change is attributable to more endogenous net-

work dynamics, to more exogenous industry factors or to combinations of both (Madhavan et al., 1998; Meeus et al., 2002a, 2002b).

In this paper we consider both perspectives: -1- we build on the existing literature that considers how networks constrain and shape action (strategy follows structure) where network structure at the network level of aggregation influences the actors' network positioning strategies at the firm level, and -2- we examine how network positioning strategies at the firm level of aggregation constrain and shape network structures at the network level of aggregation (structure follows strategy). By considering both perspectives, we aim to shed new light on the debate between Burt (1992) and Coleman (1988) on the effectiveness of network structure and the efficiency of network ties. [15] Until now, the literature has focused on how both views differ, not so much on how they may also possibly complement each other. As we will argue throughout this paper, the question is not 'who is right', but 'who is right under which conditions'. Based on the existing literature, we develop an attempt in this paper to explore where these views conflict as much as where they can be seen as complements, and how this is conditioned by the role of context. This understanding is important as the debate forms a leading thread for this paper in addressing the two main existing literature gaps as delineated above (figure 2): group-based competition and the dynamics of alliance networks.

The aim of this paper is to provide an overview of the most recent literature on interfirm networks and innovation and to stress the importance of further research into the two literature gaps we identified above. Given the vast body of literature dealing with networks, we limit ourselves to the academic literature that deals with strategic alliances, networks and interfirm relations in relation to learning and innovation. In order to structure our overview of recent literature on networks and innovation, we propose a conceptual model that enables to discern among four relevant and interrelated levels of aggregation: the firm level, the group level, the network level and the industry level. When reviewing the literature, we position the various themes along these aggregation levels, which can increase our understanding of how these levels interact (figure 3).

This paper is structured as follows. In section 2, we discuss group-based competition and cooperation.
Increasingly, firms are engaged in dense groups of partners characterized by strong within-group cooperation and substantial between-group competition. This adds the group level as a new level to the analysis, in between the firm and the network level, and raises the question

15 Burt stresses that efficiency that can be reached through the benefits of brokerage advantages through non-redundant weak ties that give access to new information. Coleman focuses on the benefits of closure advantages in densely connected networks through strong and redundant ties. In his view closure induces possibilities for joint innovative efforts through trust-based governance and social control.

how it affects opportunities for learning and innovation. In section 3, we discuss the role of conditions. Following the literature, we differentiate between exploration and exploitation and how these different contexts condition the relation between networks and innovation. In this respect, section 2 and 3 reflect the more deterministic view that follows from the structuralist perspective that dominates the literature. Section 4 then takes the reverse perspective by considering the dynamics of networks, where we treat network structural properties now as the dependent variable. We discuss how exploration and exploitation build on each other and the consequences of this evolutionary process for network structural properties and their dynamics. Here we abstract from the role of firms, a perspective that we further elaborate in section 5. In section 5 we examine how the dynamics of network structural properties are affected by acts and strategies of firms. This connects with a 'local action' perspective (Bae et al., 2003, Beerkens et al., 2004) of how networks are shaped and constrained by endogenous acts of firms. In this respect, we move beyond the network level to the firm level by discussing the need for relating the literature on alliance networks to literature on entrepreneurship, corporate venturing, external venturing and other types of knowledge acquisition methods. In this respect, section 4 and 5 reflect a more voluntaristic view that complements the structuralist perspective. Finally, in section 7, we conclude and define a number of research projects.

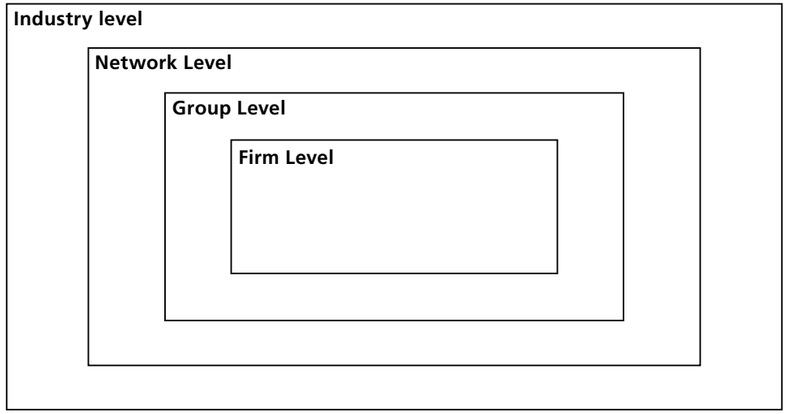

Figure 3 Conceptual model for differentiating between various levels of analysis

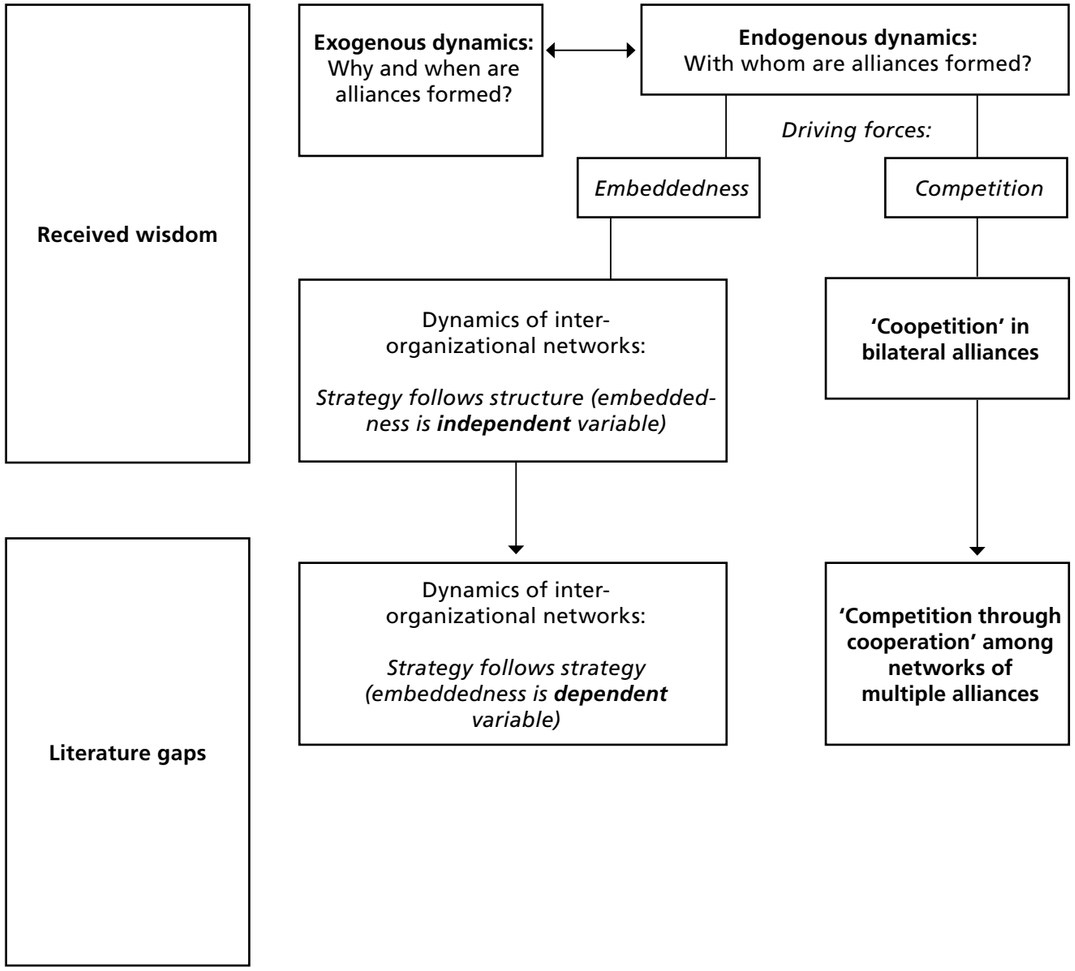

Figure 2 Identifying the literature gap

2. Introduction to group-based competition

As argued in the introduction of this paper, the strategic alliance literature has recently made progress in advancing our understanding of how inter-alliance dynamics affect the intent of creating, building and sustaining collaborative advantage through alliance formation (Gulati, 1995a, 1998; Walker et al., 1997; Gulati and Gargiulo, 1999; Chung et al., 2000). This entails the endogenous factors that condition with whom specifically alliances are formed (Gulati, 1995a; Gulati and Gargiulo, 1999). As we argued, it involves two perspectives on what drives the alliance formation process: the perspective of competitive tension among alliances and the embeddedness perspective. In this section we focus on the former, namely on the competitive effects of alliance network formation on partners and competitors at the group level. In doing so, we focus on the group level as the level of analysis and abstract from the other three levels (industry-, network and firm), as also indicated in figure 3.

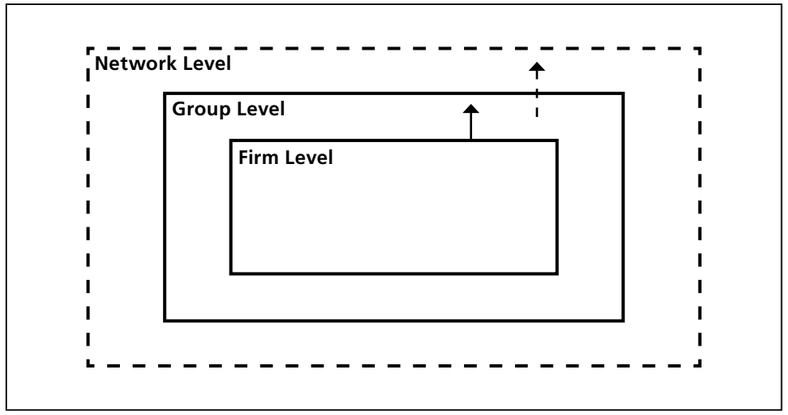

Figure 3 Focus on group-level

This section is structured as follows. In section 2.1 we provide some general background to the topic and discuss some recent, converging insights from the literature. In section 2.2., we discuss a number of unsettled issues and derive a number of hypotheses. In section 2.3 we conclude.

2.1 General background and converging insights

The rapid increase of strategic technology alliances has set in a new era of external technology competition among networks of multiple alliances. It is now commonplace to observe technological competition between one group of firms linked via alliances against another alliance group. Research by Gomes-Casseres (1996) and by Doz and Hamel (1998) is among the first to have explored the increasing frequency of technology collaboration as a reflection of a fundamental shift from the traditional form of competition of dyadic alliances (firm vs. firm) to a new form of multiple alliances (group vs. group). These scholars have provided a base for this largely unexplored and important field of study. However, as global competition continues to intensify, a more comprehensive understanding of this new form of group-based technological rivalry is necessary (Gomes-Casseres, 1996). Research so far has largely focused on the mixed motives of 'competition plus cooperation (co-opetition)' in alliances and its implications for dependence, trust, and mutual benefit (Singh & Mitchell, 1996) or examined the implications of trust, opportunism, partner rivalry, and sustained cooperation as a means of achieving competitive benefits (Gulati, 1995; Hill, 1990). Despite its insightful focus on the alliance as a vehicle for co-opetition, this line of research has not yet begun to incorporate the external competitive environment in which alliances compete. Then, 'competition through cooperation' has become the foundation of a firm's attempt to gain innovation and learning advantages through technology competition among networks of multiple alliances. This implies that research has to go beyond the firm level and has to focus on the competitive effect of an increase in the number of alliances with partners and rivals on the competitive pressure experienced by a focal firm (Silverman and Baum, 2002).
The strategic technology alliances, through which companies acquire R&D-related knowledge, are expected to help them differentiate their innovative performance from other companies (Hagedoorn and Duysters, 2002). Hagedoorn and Schakenraad (1994) found a positive relation between technology-based alliances and their innovation rates [16]. Concerning the usefulness of engagement in technology alliances to improve innovative performance, Duysters and Hagedoorn (2000) found that strategic technology alliances should be used as a vehicle for developing core competences related to innovation to complement capabilities in the long run, as they can be used as monitoring devices to scan the most promising technologies. Then because of

16 The relevance of this topic, as for instance demonstrated by the growing importance of strategic technology alliances as a major element in the external linkages of companies, has been documented in many publications (Hagedoorn, Duysters, 2002). See Hagedoorn (1996) and Osborn and Hagedoorn (1997) for an overview of the literature.

the globalization of markets, the increasing complexity of technologies and rapid technological change and the increasing costs of R&D, technology alliances enable firms to both explore several technological developments as well as exploit the most promising ones internally at the same time (Duysters and Hagedoorn, 2000).
Apart from engaging in these collaborative agreements to foster innovative renewal, firms increasingly adopt multiple collaborative arrangements for competitive gains (Guidice et al., 2003). Then, in the alliance network formation process, the technological positioning in the network depends very much on the competitive forces that shape the industry. Globalization of competition and the deepening industry convergence force firms to engage in global scale production and acknowledge the cross-linking of industries through new technologies (Gomes-Casseres, 1996). Especially in high-tech sectors where technology positioning is crucial to firms' survival chances, "competition through cooperation" (Gomes-Casseres, 1994, 1996; Doz and Hamel, 1998) has become a cornerstone of the firms' competitive strategy.
By establishing multiple collaborative agreements, firms tend to compete intensely with each other in several areas they are active in, resulting in 'co-opetition' behavior (Gnyawali and Madhavan, 2001). Thus, a firms alliances can be instruments to withstand competition –by making enemies partners– but can also impose stronger competition on others, as winning the alliance race entails access to better partners, resources or patents (Silverman and Baum, 2002). As these cooperative technology agreements among competitors proliferate (Gomes-Casseres, 1996; Gnyawali and Madhavan, 2001) technology competition becomes indispensable in the technology positioning strategy of the firms involved. This actual explosion of collaborative agreements has led to a new form of competition: group versus group rather than company versus company (Gomes-Casseres, 1996; Guidiceet al., 2003) (see figure 4). The driving forces behind the formation of these technology-driven constellations are typically related to technology competition. Technology competition takes the form of multiple partner firms linked with each other through strategic alliances in groups or constellations (Das and Teng, 2002) "competing against other such groups and against traditional independent firms" (Gomes-Casseres, 1996: 3). Through multiple R&D collaboration in alliance blocks, innovators can capture the full benefit of their innovative activity through spillovers and externalities, as they now are able to share the costs and revenues of R&D projects, which can serve as an incentive to conduct further R&D (Sakakibara, 2002). Other important driving forces that incur group formation involve establishing industry standards as a result of standard battles between firms and entail (re)positioning strategies of companies (Gomes-Casseres, 1996; Das and Teng, 2002). A common theme behind these motivations is taking advantage of economies of scale and scope (Gomes-Casseres, 1996).

Figure 4: Alliance blocks in the microelectronics industry (CGCP)
However, as global competition continues to intensify, a more thorough understanding of this new form of group-based technological rivalry is required (Gomes-Casseres, 1996). This un-

derstanding has to go beyond the research at the firm-level addressing the competitive effect of an increase in the number of alliances with partners and rivals on the competitive pressure experienced by a focal firm (Silverman and Baum, 2002). Group-versus-group competition does not however decrease the importance of the competition that takes place at the firm-level. Then, a firm's alliances can be considered instruments to defend against competition –by making enemies partners– but can also impose stronger competition on others, as winning the alliance race entails access to better partners, resources in the form of R&D capabilities (Gulati, 1995) or patents (Silverman and Baum, 2002). This implies that firms in groups have to move quickly, not only to pursue newly emerging opportunities

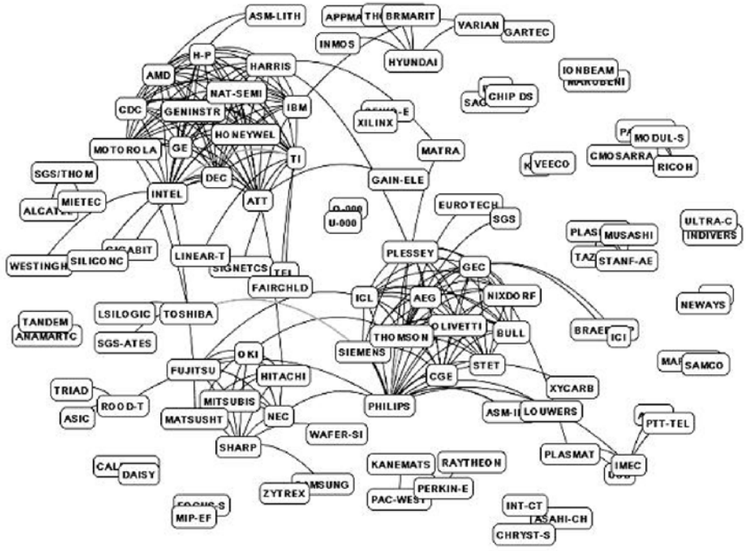

Figure 4: Alliance blocks in the microelectronics industry (CGCP)

but also to secure resource-complementary partners and hence foreclosing the competitors' partnering opportunities (Gomes-Casseres, 1994; Silverman and Baum, 2002).
The relevance of the debate on social capital (e.g., Rowley et al., 2000; Gargiulo and Benassi, 2000) lies therein that the basic arguments of Coleman (1988) suggest that being part of a dense and redundant network is advantageous for innovative performance, since it involves trust and cooperation among its members in their joint innovative efforts. Relying on other players in the group gives better chances for innovative renewal as a result of spillover effects, which enables block members to tap into each other's knowledge base. In this way block members exploit and deepen their existing capabilities by linking up with firms in their own technology cluster to improve their innovative performance. On the other hand, firms that follow an individual innovation strategy outside of alliance blocks cannot take advantage of network externalities and knowledge spillovers that the multiple strong ties provide for alliance group members. These non-block members lack this densely connected web of strong ties that constitutes a learning environment founded on trust-based governance, which is required for technological learning.

2.2 Unsettled issues

As argued, in section 2.1, allying for competitive gains becomes increasingly important (Guidice et al., 2003). As a consequence, we need to increase our understanding of this competitive effect of these alliance group formation patterns on rival groups in a global high-tech industry setting. This means we have to include a new research domain, namely the external competitive environment in which alliances compete, by empirically investigating the competitive effects of alliance network formation processes on partners and competitors at the group level. Group-based competition thus alters the nature of competition as it increases the significance of a firm's alliances (Silverman and Baum, 2002) as tools to withstand competition or strengthen the competitive pressures on rival groups. Yet the implications of this phenomenon are crucial for understanding the competitive dynamics of technology-based industries, as well as for managers competing in such environments. Therefore, we would like to empirically and theoretically build further on previous work in this field concerning alliance-based competitive dynamics (Silverman and Baum, 2002), the group-based competition research of Gomes-Casseres (1996) and the work of Duysters and Lemmens (2003), who established that alliance group formation processes are dynamic and very much depend on the social capital and embeddedness of actors in alliance networks at the group level.
Concerning our theoretical considerations, we believe that in order to explain the group-based competition phenomenon in inter-organizational networks in relation to innovative performance, one has to go beyond the static resource-based view (Dyer and Singh, 1998) towards a more dynamic perspective in order to explain competitive advantage and to incorporate the ability of responsiveness of firms. This is the point of departure in the behavioral and dynamic capabilities theories that take a dynamic perspective (Kogut, 1988; Teece and Pisano, 1994). Furthermore, in order to explain the group versus group dynamics in the formation of alliance groups, the resource-based view has to be addressed from a group-level perspective or even from a network level of aggregation instead of the firm-level (see figure 3). Ecological

perspectives (Hannan and Freeman, 1977) on the technological environment's carrying capacity would be helpful to legitimate alliance behavior as this behavior increases the availability of resources to the population as a whole, due to spillover effects. This helps all firms in the industry, even if the allying firms benefit more than their competitors (Baum and Oliver, 1992; Silverman and Baum, 2002). In order to increase our understanding of the competitive effect of alliance group formation patterns on rival groups in global high-tech industries, we have to address how alliance group formation induces a competitive effect on rival groups and what these effects mean.
To answer this question we would like to make a clear distinction between the kind of competitive moves and the competitive effects these moves induce.

Competitive moves and consequences for competitive intensity in the industry
The competitive effect of alliance group formation patterns on rival groups has to be linked to the various factors that cause this competitive pressure such as the number and kind of alliances rival groups have and the rivals' network positions in the network. Initially, this question implies that we have to investigate when a firm's alliances are likely to increase competitive intensity and when they are likely to decrease it. Research of Calabrese, Silverman and Baum (2002) and Silverman and Baum (2002) found that incumbents' upstream, downstream and horizontal alliances yielded different effects on the likelihood of entry into subfields of the Canadian biotechnology. Then, these types of alliances differ in the degree to which they foreclose rivals' alliance opportunities. Furthermore, they differ in the way they contribute to expanding the resource base available to industry participants. These types of alliances thus have different effects on the competitive dynamics in technology-based industries and on the carrying capacity of an industry (Silverman and Baum, 2002).

Downstream alliances link firms in technology-based industries to sources of complementary assets downwards in the vertical value chain, e.g. for commercialization of knowledge. These can be biotechnology firms' downstream alliances with pharmaceutical or marketing companies to provide access to distribution channels or marketing expertise. These types of alliances typically do not pose a high foreclosure risk to its rivals. Then, large pharmaceutical firms often maintain alliances with lots of different biotech firms simultaneously. Then, these marketing and distribution activities are very scale- and scope intensive (Calabrese et al., 2002), which implies that for economic feasibility reasons these downstream firms have to work together with multiple players in the industry. Hence, due to spillovers these alliances increase the resources available to partners and rivals in the industry. Thus if an alliance block extends its alliance portfolio with downstream alliances in order to commercialize technology or increase accessibility to distribution channels, this is likely to have little effect on the competitive intensity in the industry.

Hypothesis 1: *If an alliance block extends its alliance portfolio with downstream alliances in order to commercialize technology or to increase accessibility to distribution channels, this is likely to have little effect on the competitive intensity in the industry*

Upstream vertical alliances with universities or other research institutions link technology-based firms to sources of cutting-edge technological expertise. This results in an infusion of scientific input into the industry. However, due to lack of scale and scope economies in research projects, universities often do not collaborate with more than one biotech firm at a time. In this way, partners of the allying firms can benefit from the knowledge available; however is not likely that spillovers occur to the rivals of the allying firms. Biotech firms' exclusive alliances with upstream partners (e.g. universities) foreclose rival biotech firms' access to those partners, which increases the competitive dynamics in the industry (Silverman and Baum, 2002). Thus, if an alliance block extends its alliance portfolio with upstream alliances (research institutions) in order to get access to leading edge technology, this is likely to have a moderate effect on the competitive intensity in the industry.

Hypothesis 2: *If an alliance block extends its alliance portfolio with upstream alliances (research institutions) in order to gain access to leading-edge technology, this is likely to have a moderate effect on the competitive intensity in the industry*

Horizontal alliances link firms to other firms in the industry horizontally across value chains. In comparison to the vertical alliances mentioned above, these alliances do not tap resources outside of the focal industry. Horizontal alliances thus have no productive effect on the resource available to the industry (Silverman and Baum, 2002). As the number of horizontal alliances with the same partner type increases, this may lead to a situation of strategic gridlock (Gomes-Casseres, 1994, 2001; Garcia-Pont and Nohria, 2002) where the number of eligible partner diminishes as a result of overcrowding in this field (Gomes-Casseres, 2001). Rivals thus face a rapidly shrinking pool of eligible and desirable partners, which increases the competitive dynamics in the industry (Silverman and Baum, 2002). Therefore, if an alliance block extends its alliance portfolio with horizontal alliances (competitors), this is likely to have a major effect on the competitive intensity in the industry.

Hypothesis 3: *If an alliance block extends its alliance portfolio with horizontal alliances (competitors), this is likely to have a major effect on the competitive intensity in the industry*

2.3 In conclusion

In this section, we have considered group-based cooperation and competition. We have focused on the embeddedness at the group level and its effect on rival groups and on firms' innovation performance. In terms of figure 3, the focus here has to be on the group level as the level of analysis. More specifically, we have discussed the competitive tensions among alliance groups and its effects on group formation. As we argued, to understand this phenomenon we have to enrich the resource-based perspective in two ways: we have to take a more dynamic perspective to explain the external competitive environment in which alliance groups compete and we have to move to a group-level of aggregation to explain this. Understanding these issues is important as they carry substantial implications for the competitive dynamics of technology-based industries. There is a general lack of relevant literature and empirical work in this field and therefore there is a clear need to fill this gap by further theorizing and empirical testing. Furthermore, we are interested in analyzing the factors that induce competitive effects (e.g. number and kinds of rivals' alliances) and the consequences (e.g. increased intensity of competition which can result in increasing exit rates in the industry (Silverman and Baum, 2002) or dissolution of alliance groups).

3. Role of context: exploration and exploitation

In this section we discuss the role of the industry context by differentiating between exploration and exploitation. More specifically we are interested how these conditions affect network structural properties. In terms of figure 3, the focus here is on the industry level and on how it affects the network level. In this respect we abstract from the group and firm level, as also indicated in figure 5.

Industry level

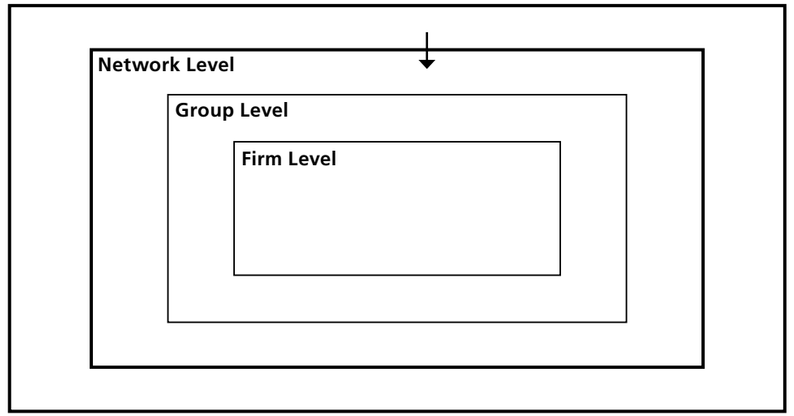

Figure 5: Focus on the industry level

This section is structured as follows. In section 3.1 we provide some general background to this topic and discuss some recent, converging insights from the literature. In section 3.2 we discuss a number of unsettled issues with regard to exploration and develop a new hypothesis. In section 3.3 we discuss some unsettled issues for exploitation and also propose two new hypotheses. In section 3.4 we conclude.

3.1 General background and converging insights

In the social capital literature there is an ongoing debate on the advantages and disadvantages of social embeddedness with regard to learning in networks. In this debate on social capital (e.g., Rowley et al., 2000; Gargiulo and Benassi, 2000) the basic arguments stem from Burt's (1992) structural hole argument versus Coleman's (1988) closure argument. Burt (1992) suggests that firms embedded in sparsely connected networks will enjoy brokerage advantages based on access to new and non-redundant information (Rowley et al., 2000). Hence, strategic opportunities are raised as firms form bridges between densely connected, i.e. redundant, parts of the network and other, non-redundant, parts of the network (Burt, 1992; Walker et al., 1997). Such strategies enable these firms to access knowledge or information that has a high yield.
From a managerial perspective, the firms occupying structural holes the so-called spanners have the advantage that they have to coordinate only few alliances. The risks regarding their small amount of partnerships are rather limited, as these relations are characterized by low levels of integration as a result of the weak type of ties they hold. On the other hand, spanners envisage less commitment and trust in these relationships. As a result, sensitive information is not exchanged, as the alliances are not founded on trust-based governance. Due to the constant search for new information and partners and the lack of reputation effects, the partner turnover can be high.
Coleman (1988) argues that being part of a dense and redundant network is advantageous for innovative performance, since it involves trust and cooperation among its members in their joint innovative efforts. Empirical evidence indicated that members in redundant and closed networks (for example alliance groups) innovatively outperform non-group members, as they are able to take advantage of the network externalities in their group, as these solid relationships are a means to transfer tacit knowledge in this learning environment based on trust-based governance (see e.g. Lemmens, 2003; Duysters et al., 2003). Within the closed networks, partners are reliable and trustworthy and members enjoy learning opportunities that are based on access to sensitive and tacit information. Shared norms and the fear of reputation effects prevent opportunism within these networks. Partners enjoy close collaboration among multiple partners, which enables them to reach economies of scale, scope and skill. However, operating in these closed networks also has some disadvantages, such as the high level of mutual dependence and the large number relations with partners with different interests that have to be managed and coordinated.

Burt's argument for reducing redundancy through the creation of structural holes is based on the criterion to maximize efficiency in one's network. In contrast, Coleman stresses the benefits of dense networks as such a structure facilitates the functioning of social norms and reputation effects. Apart from the question 'who is right', we can observe a rather universalistic tone in these normative implications, irrespective of any context. Some recent studies have tried to shed more light on this and have indicated that the optimality of the network structure is strongly dependent upon the environmental context (Rowley et al., 2000; Ahuja, 2000; Duysters and Hagedoorn 2002; Gilsing 2003; Nooteboom, 2004). This echoes the argument as advanced in evolutionary economics that processes of learning and innovation are subject to selection forces by the institutional environment, and that selection is assumed to take place in relation to the distinctive structure of this institutional environment, reflecting the assumption of local optimality instead of universal optimality (Nelson, 1987; McKelvey 1997; Meeus and Oerlemans, 2000). So, the question on the debate between Burt and Coleman is not 'who is right', but 'who is right under which conditions'? Hence, to understand the relation between networks and innovation or learning, we need to clearly examine the role of context. One perspective to deal with the role of context, and increasingly being used in the literature, is the distinction between exploration and exploitation (Holland, 1975; March, 1991). Exploitation entails improvements with respect to established practice, while exploration entails the development of new practices. This is related to the distinction between first and second order learning (Bateson, 1972), and between single and double loop learning (Argyris and Schön, 1978). An important issue now is to further elaborate on this distinction between exploration and exploitation by studying their differential effects on the optimality of network structural properties.
Increasingly, the literature provides indications on how the optimality of network structural properties differs between exploration and exploitation. Following Ahuja's distinction (2000) between direct and indirect ties, the larger the number of indirect ties of a firm in its alliance network, the greater the effect on both exploitation and exploration, with the impact of the number of indirect ties on exploration being significantly larger (Ahuja, 2000; Vanhaverbeke et al., 2004). Moreover, there is increasingly evidence that the benefits of redundancy versus non-redundancy are also highly contingent on the context (Ahuja, 2000). For exploitation, replication of existing ties and redundancy is most effective as put forward by Coleman's closure-argument. Whereas for exploration the use of non-redundant ties is most effective as put forward by Burt's structural hole argument. Moreover, past involvement of a firm in strategic alliances has a stronger positive impact on exploration than on exploitation (Vanhaverbeke et al., 2004).

3.2 Exploration: unsettled issues

As indicated in section 3.1, Burt's structural hole argument seems to have most relevance for exploration. However, we claim that this is only part of the story. In fact, in exploration companies are faced with a dual task. On the one hand, they need to get a first, quick understanding on which different alternatives are available and develop a general feel what these alternatives entail. This has been stressed in the literature thus far. On the other hand though, firms need to make sure that such novel knowledge, once accessed, is evaluated and when proven

to be valuable, is transferred and absorbed in an adequate way. This requires a dense structure that enables firms to 'triangulate' among their multiple sources and thus better assess their value, and to better absorb knowledge from them (Duysters and Hagedoorn 2002). In our view, this combination of existing, redundant ties and new, non-redundant ties for exploration is overlooked in the literature thus far. Ahuja (2000) and Rowley et al. (2000) measure the extent in which non-redundant ties add value, but ignore in how far this is in combination with and in addition to (some of) the existing, redundant ties firms have. In other words, Ahuja (2000) and Rowley et al. (2000) measure the effect of non-redundant ties, however, without taking into account how the existing strong ties condition this effect. Rowley et al. (2000) do measure the effect of strong ties in exploration (but again without a joint consideration of the non-redundant ties) and hypothesize that "…in high levels of exploration, the number of strong ties a firm has with its strategic partners is negatively related to its performance" (p. 375). Interestingly enough, the authors do not find support for this hypothesis nor are they able to explain this satisfactorily. At the same time though, Rowley et al. (2000) find amongst others support for the weak tie argument, i.e. "In exploration the number of weak ties the firm has is positively related to its performance" (p. 375).
In our view, this implies that there is only an effect of non-redundant ties in exploration when a firm also disposes of 'sufficient' existing, redundant ties; indicating that in exploration it is the combination of existing, redundant ties and new, non-redundant ties that pays off. [17] Apparently, there is not only a Burt-rent in exploration, but there is also a Coleman-rent at work. Once external knowledge is accessed, density (closure) brings two benefits in a setting of exploration: it enables a rapid diffusion of knowledge so that it can then be readily evaluated and absorbed. Moreover, such a structure creates a potential for social control, based on informal mechanisms such as social norms, reputation and so on, to prevent opportunistic behavior. This brings the following hypothesis to the fore:

Hypothesis 4: *If a company intends to broaden its technology base the use of non-redundant ties will be more effective in combination with redundant (direct and indirect) contacts.*

Now, to tackle this hypothesis we should understand that there are different degrees of exploration, ranging from incremental adaptations to radical changes created through novel combinations (Nooteboom and Bogenrieder, 2004). Some exploration tasks may put more weight to accessing external knowledge whereas other tasks may emphasize the role of triangulation and evaluation. This differentiation in degrees of exploration and the implications for network structural properties is an unstudied issue thus far, and may well differ per sector as per time

17 In a way, indirect empirical evidence for this position is found in the paper of Vanhaverbeke et al., (2004). Past involvement in alliances, indicative for strong ties in terms of durability is positively associated with exploration, whereas over the same period, also evidence is found for the weak tie argument for exploration.

period. In other words, they may be a strong industry effect in how exploration and exploitation settle in different industries. For example, Ahuja (2000) found a positive relationship between redundancy and innovation performance in the chemical industry. In this industry, the dominant design is in the production process and exploration takes place through experimenting with incremental changes in this process, either focused on cost reduction or on the production of new chemicals (e.g. through the use of new raw materials or a new type of catalyst). So, we may associate this with a limited degree of exploration that seems to require triangulation and absorption, enabled by redundancy. Industries such as ICT and biotechnology may be characterized by more radical exploration and, intuitively, we then expect a larger role of non-redundancy vis-à-vis redundancy. In other words, it seems to be useful to study networks in exploration in different industries over time and to try to determine in how far the 'optimal mix' of redundancy and non-redundancy is conditioned by the industry and its associated level of exploration.

3.3 Exploitation: unsettled issues

Here we focus on exploitation. In exploitation, the focus is on the refinement and strengthening of its existing technology base and competencies. In general, in exploitation dominant designs have emerged and technological and market uncertainty have decreased (Abernathy and Utterback, 1978). This enables the codification of product knowledge that diffuses more widely across the industry (Malerba and Breschi, 1997). This makes process innovation an important way to achieve competitive advantage, leading to a focus on more incremental, process-based innovations (…). For that firms need specific and more fine-grained information that will provide a deeper knowledge of the particular process technology. Such process innovations generally entail more tacit knowledge that is best exchanged within more durable relations and trust-based relations (Uzzi, 1997; Larson, 1992; Nooteboom, 2000). Such partners have to be trusted before they can touch the 'heart' of the company, especially in the case of core technology. Moreover, in exploitation there is generally a stronger focus on competition so that partners may also be potential competitors. So, this favors Coleman's closure argument, stressing the benefits for redundancy as it provides a potential for trust-building and social control. Therefore we hypothesize:

Hypothesis 5a: *If a company intends to strengthen its existing technology base (core technologies) the replication of existing ties in a redundant network is most effective as put forward by the network closure theory of social capital.*

Thus, Coleman's closure argument seems to have most relevance for exploitation. Again however, this is only part of the story. In exploitation, considerations of efficiency are crucial, since competition has shifted to competition on price, with new entrants in the emerging market.

As argued by Burt (1992), there are costs associated with maintaining contacts. Therefore, the drive for efficiency in exploitation requires the elimination of redundant relations. In other words, there is a need for a less dense structure. The increased codification of knowledge furthers diffusion without the need for relation-specific investments of mutual understanding. This enables a less dense structure, since now one can identify what competencies are and will remain relevant, who has those competencies, and who is likely to survive in the industry. Investments shift to large-scale production, distribution systems, and brand name, which are all long-term, and increase in size and economic life. In view of such large and often sunk investments, with a long economic life, and to maintain an efficient division of labor, the network structure is likely to be stable. Therefore, we hypothesize:

Hypothesis 5b: *If a company intends to strengthen its existing technology base (core technologies) a non-redundant and stable network is most effective as put forward by the structural hole theory of social capital.*

So, hypothesis 5a and 5b are contradictory. Hypothesis 5a stresses the benefits of redundancy in view of tacit knowledge exchange and trust-building, conform Coleman. Hypothesis 5b stresses the benefits of non-redundancy in view of efficiency, which is in line with Burt's efficiency considerations. Which of the two hypotheses holds better is difficult to tell upfront. In exploitation, evidence has been found both for the benefits of redundancy (Rowley 2000, Vanhaverbeke e.a. 2004) as well as for non-redundancy (Hansen e.a. 2001, Roijakkers 2003, Nooteboom and Gilsing 2004). So, although the distinction between exploration and exploitation has proven to be useful to understand the differential role of social capital, it might be too general. There may also be an industry effect at work, in how exploration and exploitation 'settle' in specific industries. So, to verify these two hypotheses it may be useful to bring in such an industry perspective to study in which industries firms generally favor redundancy over non-redundancy, or put differently, favor social control over efficiency.

3.4 In conclusion

In this section we have stressed the importance to consider the role of context in understanding the relation between networks and innovation. In terms of figure 3, the focus here is on the relation between the industry level and the network level. More specifically, we have introduced the role of the industry context, based on the exploration-exploitation dichotomy, and studied how it affects the optimality of the network structure in terms of Burt versus Coleman. Although this distinction between exploration and exploitation has proven to be useful, it may still be too general. There may be a stronger sectoral effect in how exploration and exploitation settle in network structural properties and how this affects firms' innovation performance than anticipated in the literature thus far. In view of this, subsequent studies need to build further on this contingency approach (Bae and Gargiulo, 2003) and investigate how possibly relevant environmental conditions in other industries such as ICT, biotechnology and agriculture condition the relation between networks and firms' innovation performance. Such a contingency-approach is increasingly being used in the literature and has delivered promising results (see e.g. Podolny and Baron 1997; Rowley et al, 2000; Ahuja, 2000, 2001; Podolny, 2001; Hagedoorn and Duysters, 2002). Based on this, we can then study and understand how firms can combine exploitation with exploration most effectively.

So, we plea to study exploration and exploitation in combination with other relevant contingencies, which prevents us from embracing the same universalistic tone in the literature that we criticized, and that we wish to get away from. Still, in doing so, we have abstracted from the process along which alliance networks move from a context of exploitation towards exploration and vice versa. This will be considered next in section 4.

4. The dynamics of networks: moving beyond local search

In this section we examine how alliance networks move from a context of exploitation towards exploration and in doing so, may give rise to changes in the industry context. In terms of figure 3, the focus here is on the relation between the industry level and the network level but now in the reverse order in comparison with the previous section: how the network level affects changes at the industry level. In doing so, we abstract again from the other two levels (group and firm), as also indicated in figure 6.

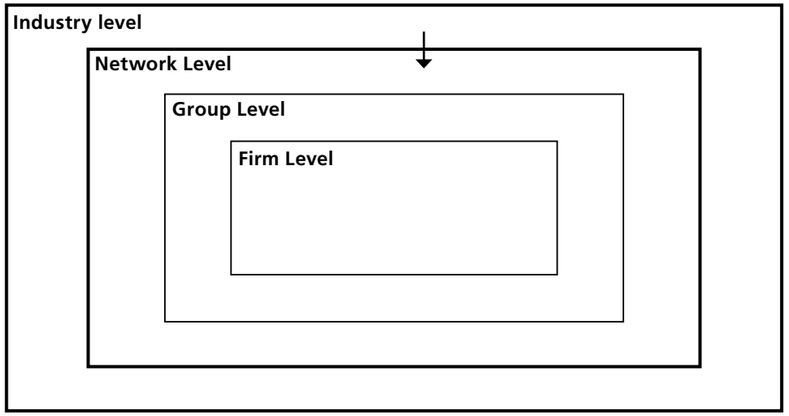

Figure 6: Focus on industry and network level

This section is structured as follows. In section 4.1 we provide some general background to this topic and discuss some recent, converging insights from the literature. In section 4.2 we discuss an unsettled issue, namely the move away from exploitation to new exploration and how this is conditioned by network structural properties. In section 4.3 we conclude.

4.1 General background and converging insights

In section 4 we have considered networks and their context as the independent variables that condition firms' behavior and their innovation performance. Regarding the role of context, we make use of the common distinction between exploration and exploitation. However, until now the literature has treated exploration and exploitation in a rather dichotomous way and has abstracted from how both types of learning are related. In reality of course, a context will seldom be characterized by either full exploration or exploitation, but rather contain elements of both. Moreover, when taking more of an evolutionary perspective, we argue that networks will generally move from a context of more exploitation towards more exploration and vice versa. This then provides the fundamental challenge for firms how to combine them, echoing March's original argument (1991).

Exploitation is generally seen to start when technological variety that emerges from exploration is reduced, in consolidation into a dominant design (Abernathy, 1978; Abernathy and Utterback, 1978; Abernathy and Clark, 1985). The establishment of such a dominant design lowers technological uncertainty substantially. It leads to the emergence of a new technological regime in which radical technological development is substituted by more focused, incremental and cumulative improvements along a specific technological trajectory (Dosi et al., 1988; Duysters, 1996), which is competence enhancing (Tushman and Anderson, 1986). This 'supports' the way the industry is functioning and the bases of competition, increasingly reinforcing the existing status quo (Tushman and Anderson, 1986; Madhavan et al., 1998). Basically, this transition from exploration to exploitation can be considered as a 'structure reinforcing process' (Madhavan et al., 1998) with major consequences for the formation and functioning of alliance networks. Such a structure reinforcing process at the industry level increasingly provides pressures to conform to the status quo, in 'organizational isomorphism' (Dimaggio and Powell, 1983) with major consequences for the dynamics within these alliance networks.

In most alliances, firms select partners based on prior positive experience, where they rely on their embedded relations. Partnering is thus influenced by the network of prior ties (Gulati and Gargiulo, 1999) and depends on the embedded social relations the firm is already engaged in (Granovetter, 1985; Gulati, 1998). Members of closed networks develop strong, cohesive ties through frequent interaction. Strong ties (Granovetter, 1973) are solid, reciprocal and trustworthy relationships. They tend to create a large basis of trust and intimacy between the partners (Granovetter, 1973; Brass et al., 1998). Since trust is an important basis for knowledge sharing and joint learning, firms are expected to be more productive in joint innovative activities. As those firms invest a substantial amount of time and energy to establish these strong relationships, changing transaction partners in the short run is not likely, since it involves substantial switching costs and implies the risk that existing relationships will dissolve (Chung et al., 2000). Thus, when trustworthy partners are readily available, searching for or switching to new partners is difficult and costly (Chung et al., 2000). Firms rather replicate their existing ties

within their technological community than search for new ones (Gulati, 1995a, 1998; Walker et al., 1997).
Furthermore, this repeated alliance formation in alliance groups based on strong ties through local search (Duysters and Lemmens, 2003), causes the densely connected firms to act similarly and to develop similar preferences (Knoke and Kuklinski, 1982). Similarity can encourage interaction and can be the cause of attraction. Scholars refer to this process as "interaction breeds similarity" and "similarity breeds attraction" (Brass et al., 1998). So, in this process social capital drives the network to self-organize, self-transform and self-reinforce. The network actually becomes a growing repository of information on the availability, reputation, competencies and reliability of prospective partners (Walker et al., 1997; Gulati, 1995a; Powell et al., 1996). The driving forces that cause the network to evolve thus relate to the fact that network structuring and technology development happen simultaneously in a co-evolutionary way: networks and technology development constantly shape each other along a trajectory or path, with a focus on exploitation (Kash and Rycoft, 2000). However, the enabling effect of embeddedness in alliance formation that is based on replication of preferential relations can turn into a paralyzing effect as those firms become locked-in these closed parts of the network. They only rely on partners in their own closed social system (Duysters and Lemmens, 2003) or technological community. Then, over time those firms may start to suffer from relational and technological "over-embeddedness" (Uzzi, 1997), caused by relational inertia and the increasing similarity of firms' knowledge bases within the closed parts of the network.

4.2 Unsettled issues: from exploitation to exploration

The interesting question now is how one gets away from such over-embeddedness as well as from the existing dominant designs in technology and prevailing dominant logics of organization and competition. In other words, how can firms make the transition from a sole focus on exploitation towards a (increasing) focus on exploration. This is an (almost) unstudied issue in the social network literature so far. Innovation theory still tends to focus on the working out of novelty, towards a 'dominant design', and in doing also neglects this transition process from exploitation to exploration and vice versa. In other words, it focuses on the carrying of invention into innovation rather than how a new invention builds on existing knowledge and routines.[18]
Following March's original argument (1991), the key challenge facing firms is to combine exploitative and explorative learning. However, until now the literature has treated the two types of learning as distinctive categories and analysed how the optimality of network properties differs between both contexts (Ahuja, 2000; Rowley et al., 2000; Rothaermel and Deeds, 2004; Nooteboom and Gilsing, 2004; Vanhaverbeke et al., 2004). By focusing on the opposed characteristics of these two contexts, these studies tend to dichotomise explorative and exploitative learning processes and ignore the transitional process of moving from exploitation to exploration, i.e. of moving beyond local search. It is here that the notion of 'moving beyond local search' may have appealing value as it bears more of the transitional process from exploitation to exploration in it. In various strands of literature there is still a strong focus on the role of 'local' search for organizational knowledge. Evolutionary theory strongly emphasises this path-dependent search for organizational knowledge that closely relates to past R&D outcomes and activity (e.g. Nelson and Winter, 1982; Stuart and Podolny, 1996). In relation to this, Cohen and Levinthal's (1990) notion of absorptive capacity points to the importance of past R&D in order to be able to absorb new technological knowledge. The resource-based view of the firm stresses the importance of these firm-specific competences as a key-source for competitive advantage (Penrose, 1949; Wernerfelt, 1984). In some recent studies however, it has been stressed that firms need to move beyond local search in order to stay competitive in the long run (Stuart and Podolny, 1996; Teece et al., 1997; Rosenkopf and Nerkar, 2001; Rosenkopf and Almeida, 2003; Ahuja and Katila, 2004). These studies address the importance of creating access to distant and heterogeneous sources of knowledge but have ignored how such access can be created and in how far this is affected by a firm's alliance network.
So, an urgent issue now is to develop an attempt to go inside the 'black box' of this transition process and to study how alliance networks move beyond local search, i.e. from a setting of exploitation towards a setting of exploration. We propose to develop an understanding of this process in terms of its main characteristics, the driving forces underlying it and the implications for the structural properties of alliance networks and their dynamics. As a general idea one can argue that firms in exploitation need to move away from these core rigidities in groups under disruptive technological changes, alliance group members should actually engage in ties that provide access to non-redundant and novel information (Walker et al., 1997; Rowley et al, 2000). Engaging in non-redundant ties outside the existing alliance group may be important to create access to the needed heterogeneous sources of knowledge (Rosenkopf and Nerkar, 2001; Ahuja and Katila, 2004). In this respect, alliance group members that line up with such outsiders may potentially generate higher rewards in terms of opportunities for learning and innovation than when they keep replicating ties within their own technological community. We therefore hypothesize:

Hypothesis 6: *When moving beyond local search, firms that create ties that are non-redundant with their existing network will be more innovative than firms that replicate existing ties.*

18 In evolutionary terms, innovation theory focuses on selection and retention rather than on the creation of new variety. So, the notion that outcomes of such learning and innovation can also substantially affect the institutional environment and causing it to change from within as it were, is seriously neglected. In terms of the three evolutionary mechanisms, most of these studies strongly focus on how selection processes take place but do not investigate how this relates to variety, nor how variety affects selection again. We consider that to be a major limitation in the innovation literature thus far.

A related question now is to what extent the possibilities to create non-redundant ties are equally spread across firms in the alliance network. To study this we focus on the role of a specific network position. Following Burt's argument (1992), one's network position importantly conditions the possibility to profit from one's social capital such as opportunities for information and control. Now, according to one view, a move beyond local search instigates a structure-loosening process in which a more peripheral position would be more beneficial (Madhavan et al, 1998). This idea that a peripheral position may be more beneficial when moving beyond local search can be argued as follows. A peripheral position may create more possibilities for all kinds of leeway to experiment with ties outside the group. The basic underlying idea here is an evolutionary one, namely that the selection forces exerted by the existing network such as the expectation of loyalty and shared norms of reciprocity in the alliance group are less stringent at the periphery than in the group core (Eldredge and Gould, 1972; Nooteboom, 2000). Peripheral firms may have less economic, psychological and social commitments to the existing technology and to the core of the group. More central firms may not always have this option, as social pressure and loyalty to the existing group may preempt this. Such firms need to make an explicit trade-off between moving beyond their existing network to access new technology that can enhance their innovative performance versus the disadvantage of negative reputation effects from leaving the network. This may be especially difficult for more centrally positioned firms given their commitments to existing partners, which may be generally less the case for more peripheral firms. In this way, peripheral players may more easily create access to new information, which implies new opportunities for learning. As a consequence, we may expect that the peripheral players are more innovative than their core group counterparts, when moving beyond local search towards exploration. We therefore hypothesize:

Hypothesis 7: *When moving beyond local search, there is a positive relation between a peripheral alliance group position and the formation of non-redundant ties.*

Hypothesis 8: *When moving beyond local search, peripheral alliance group members will have a higher innovative performance than their core counterparts.*

4.3 In conclusion

In this section we have discussed the process along which alliance networks move from exploitation to exploration, or put differently, move beyond local search. In terms of figure 3, the focus here has been on the relation between the industry level and the network level but now in the reverse order in comparison with the previous section: how the network level affects changes at the industry level. In our discussion here we have already touched upon the role of firms in this process, a perspective that we further elaborate in the next section.

5. Firm-level perspective: the role of alliance networks in balancing exploration and exploitation

The transitional process from exploitation towards exploration, as discussed in section 4, can be considered as driven by new variety creation. According to this evolutionary view, such variety creation forms a response to the selective pressure of the existing selection environment in exploitation, and is brought about by actions of (individual) firms. This brings us to the role of firms and how their actions and strategies may potentially affect alliance networks. The focus here is on the firm level and we abstract from the other three levels (figure 7). In doing so, we further elaborate on the voluntaristic perspective as also discussed in section 4.
This section is structured as follows. In 5.1 we provide some general background to the topic and discuss some recent insights in the literature. In section 5.2 we introduce some unsettled issues by discussing the role of alliance networks in balancing exploration and exploitation. In section 5.3 we conclude.

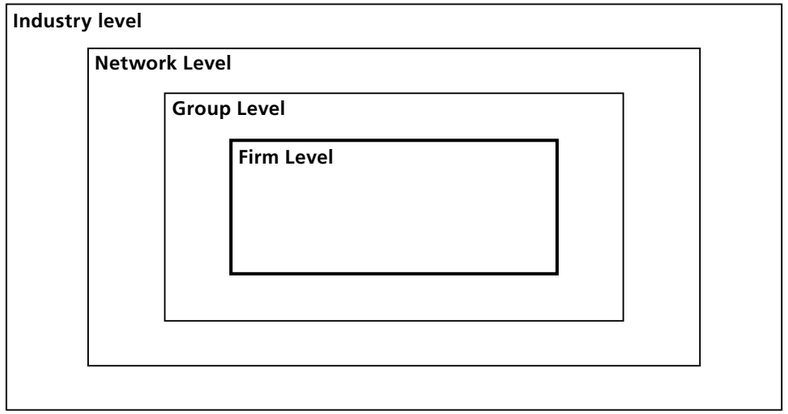

Figure 7: Focus on the firm level

5.1 General background and converging insights

As discussed in section 3 and 4, exploitation and exploration present two different approaches to organizational learning. This distinction was made by March's and his original argument (1991) was two-fold: firstly, these two categories call upon profoundly different resources and capabilities held by firms, and secondly, both should be balanced somehow in order to survive on the short and long term. In the literature until now, the dominant focus has been on his first claim. As a consequence, the literature on alliance networks has followed his dichotomization and studied how much these categories differ (Rowley et al., 2000; Hagedoorn and Duysters 2002; Vanhaverbeke et al., 2004; Gilsing, 2005). His second claim has received much less attention as little research has focused on the interaction between the two and how they can best be balanced. In this respect, Tushman and O'Reilly (1996) advanced the 'ambidexterity premise': the idea of an ambidextrous firm that pursues a combination of explorative and exploitative learning, both of which are required to innovate successfully in turbulent technological environments: exploitation of existing capabilities is needed to explore new capabilities and exploration of new capabilities enhances the firm's existing knowledge base. In this respect, exploration and exploitation, when jointly employed, form a dynamic path of absorptive capacity (Katila and Ahuja, 2002; He and Wong, 2004). The question now is in how far a firm's social capital enables to balance both types of learning.

5.2 Unsettled issues: 'networking ambidexterity'

Given the focus of this positioning paper on alliance networks we are especially interested in the role of a firm's alliance network in creating an 'ambidexterous' organization. In this respect, we propose to introduce the notion of 'networking ambidexterity', following Noorderhaven (2004), as the capacity of a firm to balance exploration and exploitation through its alliance network. Two important issues need to be addressed here. How can firms make use of their network in such a way that it enables them to balance exploration and exploitation and what trade-offs are to then be made among the broad spectrum of knowledge acquisition mechanisms?

Due to the rapidly increasing speed of technological changes, technology-based new business development can no longer be achieved through internal growth based on exploitative learning only. A systematic scanning of the available technologies and ideas outside the company through exploration is crucial. These types of learning often take place simultaneously, which means that companies have to install mechanisms to support these dual business opportunities and competencies. These trends are forcing firms to develop knowledge internally and to acquire knowledge externally through licensing, technological alliances, acquisitions (Lambe and Spekman, 1997; Hagedoorn, ….; Duysters,….) and the spinning-in of promising technology start-ups they have invested in earlier (corporate venturing). These governance modes can thus no longer be considered as separate sources of knowledge acquisition, but as complementary ones. This implies that in order to explain organizational learning in terms of exploration and exploitation, there is a need for combining the literature on alliance networks with the literature on corporate venturing and on alternative types of knowledge acquisition methods (e.g. licensing, acquisitions etc.). However, the literature streams on internal knowledge generation and external knowledge acquisition in terms of alliance networks and corporate venturing have been kept separate so far. Integrating these streams of literature is crucial to understand the organizational learning strategies of companies. Therefore future research should open up a possibility to frame this literature about alliances into the broader framework of knowledge acquisition strategies of technology-based companies. Next to these conceptual issues, further research should also provide empirical evidence on how companies make trade-offs between internal venturing, joint ventures and external ventures as alternative knowledge acquisition methods, and should address the effects on innovation performance.

5.3 In conclusion

In this section we have addressed the importance for firms to use their alliance network in combination with other types of knowledge acquisition modes in order to balance exploitative and explorative learning strategies and innovation. Then to increase innovative performance in turbulent environments firms are increasingly required to employ a portfolio of governance modes to acquire external knowledge. However, the academic literature is lacking to explain this phenomenon so far, as the literature streams on internal knowledge generation, alliance networks and corporate external venturing have been kept separate so far. There is a clear need to conceptually as well as empirically demonstrate how companies make trade-offs between internal ventures, joint ventures and external ventures as alternative knowledge acquisition methods, and how this affects their innovation performance.

6. Conclusion

After well over a decade of study, consensus has grown in the literature that strategic alliances form an efficient mechanism to effectuate the potential for learning and innovation brought about by resource heterogeneity across firms (Porter, 1990; Hamel and Prahalad, 1990; Grabher, 1993; Smith et al., 1994; Hagedoorn, 1993; Hagedoorn and Schakenraad, 1994; Spekman et al., 1995; Uzzi, 1997; Nooteboom 1999, 2004; Ahuja, 2000; Rowley et al., 2000). In this respect, network embeddedness, as an important means to access heterogeneous sources of knowledge, is considered as the key driving factor why and when alliances are formed (Duysters et al., 2001; Kogut and Zander, 1993; Powell and Brantley, 1992). In this respect, the dominant focus in the literature has been on the exogenous factors that cause alliance formation. This strong focus on exogenous embeddedness reflects a structuralist view of how a set of interrelationships among firms drives their economic behavior and innovation performance. This approach has brought the important insight to the fore that social relations matter for economic and innovative action, and that they positively affect corporate performance in terms of growth (Powell e.a. 1996), speed of innovation (Hagedoorn, 1993), organizational learning (Hamel, 1991) and reputation (Stuart, 1998; Stuart et al., 1999). In section 2 and 3 of the paper, we have built on this structuralist view by considering two topics in more detail, namely group-based competition and the role of context.

Section 2 elaborates on the role of embeddedness at the group level and its effect on rival groups and on firms' innovation performance in group-based collaboration and competition. In terms of figure 3, the focus here is on the group level as the appropriate level of aggregation. This implies that the inimitability of the combined resources in the alliance group, instead of on the resources of separate members have to be preserved. To further address this we need to empirically investigate the resources that contribute to the success of alliance groups and the competitive effects these groups induce. Understanding these issues is important as they carry substantial implications for the competitive dynamics of technology-based industries. There is a general lack of relevant literature and empirical work in this field and therefore there is a clear need to fill this gap by further theorizing and empirical testing.

In section 3 we discussed the role of context in how it affects the relation between network structural properties and innovation. In terms of figure 3, the focus here is on the relation between the industry level and the network level. We have discussed the role of industry context in terms of the exploration-exploitation dichotomy and argued how it may affect the optimality of the network structure in terms of Burt versus Coleman. Although this distinction between exploration and exploitation has proven to be useful, it may still be too general. There may be a stronger effect of other relevant contingencies that affect in how exploration and exploitation settle in network structural properties, and how this affects firms' innovation performance, than anticipated in the literature thus far. In view of this, a future research program needs to build further on this contingency approach (Bae and Gargiulo, 2003) and investigate how relevant environmental factors condition in how far firms may obtain a Burt-rent or a Coleman rent in exploration and exploitation. An interesting approach here may be to compare high-tech industries such as ICT and biotechnology with food and agriculture. Such a comparison prevents us from embracing the same universalistic tone in the literature that we criticized, and that we want to get away from. Moreover, this enables us to better understand the food-and agricultural industries by taking one or two high-tech sectors as the benchmark.

In section 4 and 5 we attempted to go beyond the structuralist view, with its deterministic stance, by developing a more voluntaristic perspective on the relation between innovation networks and innovation. Here we consider two topics, namely the move beyond local search and a firm's perspective.

In section 4 of this paper we propose to develop a more voluntaristic perspective by considering how firms and alliance networks move from a context of exploitation towards exploration. In terms of figure 3, the focus here is on the relation between the industry level and the network level but now in the reverse order: how changes in the network structure induce changes at the industry level. In doing so, we abstract again from the other two levels (group and firm). The key question here is how one gets away from the risk of over-embeddedness in exploitation. In other words, how can firms make the transition from a sole focus on exploitation towards a (increasing) focus on exploration. This connects with the growing literature that study how firms can move beyond local search (Rosenkopf and Almeida, 2003; Rosenkof and Nerkar, 2001; Ahuja and Katila, 2004). In view of this, a future research program needs to develop an attempt to go inside the 'black box' of this transition process and to study how alliance networks move beyond local search. An interesting approach here may to be study how network positions condition this process as well as how such favourable network positions may be created deliberately.

In section 5 we further elaborate on this voluntaristic view by taking a firm perspective. In terms of figure 3, the focus here is on the firm level of aggregation and we abstract from the other three levels. We introduce the notion of 'networking ambidexterity', following Noorderhaven (2004), as the capacity of a firm to balance social networks to enable exploration and exploitation. We addressed how firms make use of their network to acquire knowledge that enables them to balance exploration and exploitation and we focused on the trade-offs they have to make among the broad spectrum of knowledge acquisition mechanisms, in view of balancing exploration and exploitation. Firms are increasingly required to employ a portfolio of governance modes to acquire external knowledge. However, the academic literature is lacking to explain this phenomenon so far, as the literature streams on internal knowledge generation, alliance networks and corporate external venturing have been kept separate so far. There is a clear need to conceptually as well as empirically demonstrate how companies make trade-offs between internal ventures, joint ventures and external ventures as alternative knowledge acquisition methods, and how this affects their innovation performance.

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A multi-level analysis of historical transitions in agriculture and food

Frank Geels, Johan Schot, and Geert Verbong
Sub-department on History, Philosophy and Technology Studies
Department of Technology Management
TU/e

Summary

This position paper describes the background of a research project that will be submitted to TransForum. The position paper deals with agri-food systems in their entire complexity. We conceptualise them as socio-technical systems, i.e. heterogeneous clusters of organisations, artefacts and knowledge. The entire food chain will be taken into account. This position paper provides the background for a scientific project that aims to analyse 7 historical transitions in (parts of) the agri-food system in the last 150 years through elaborate case studies. These analyses will be of help to improve the understanding of possible pathways and pitfalls in future transitions towards sustainable agri-food systems. A second aim is to further elaborate and refine the multi-level perspective, thus contributing to a more general understanding of transitions (thus providing a link to the KSI program). The position paper describes this multi-level perspective on transitions, and its backgrounds, and positions it in different literatures, e.g. evolutionary economics, innovation studies, sociology of technology, history of technology. This perspective makes network analyses at the aggregate level of all social groups involved in the agri-food system e.g. universities, firms, engineers, capital suppliers, public authorities, users and societal groups. So the networks involve supply and demand. The position paper explains how both stability and change can be understood, through interactions between three levels (technological niches, socio-technical regimes, and socio-technical landscape).
The position paper

- fits in International Agri-food Networks
- has a link with IP Fokkerij in de Keten
- has a link with KSI (Knowledge network on System Innovation)

1. Introduction

Topic of analysis: Socio-technical agri-food systems

The agri-food system is a complex system, which encompasses sub-systems such as primary production (agriculture, farming), food processing, distribution and retailing, and consumption. The agri-food system is made up of social and organizational elements (organisations, firms, suppliers, universities, policy makers, consumers, retailers), as well as technical elements, both artefacts and knowledge (e.g. seeds, genetic knowledge, fertilizer, food conservation technologies, food preparation technologies, refrigerators etc). In sociology of technology such systems are called socio-technical systems (Geels, 2004). Based on his landmark study into electricity systems, Hughes (1983; 1987) gives the following example of components of such a 'seamless web':

"Among the components in technological systems are physical artefacts, such as the turbogenerators, transformers, and transmission lines in electric light and power systems. Technological systems also include organizations such as manufacturing firms, utility companies, and investment banks, and they incorporate components such usually labelled scientific, such as books, articles and university teaching and research programs. Legislative artefacts, such as regulatory laws, can also be part of technological systems. (...) Natural resources, such as coal mines, also qualify as system elements" (Hughes, 1987: 51).

This socio-technical perspective can also be applied to the agri-food system. Figure 1 gives an indication of the main elements of the modern agri-food system, showing its complexity in terms of organisations, artefacts and knowledge.
On the one hand, the agri-food system is stabilised by massive political subsidies, a strong farmers lobby, sunk investments from farmers, seed companies, and chemical companies in competencies, machines and process technologies. Also consumers contribute to stability, because they buy the cheapest food products (despite food safety concerns), which tend to be produced by the existing food system (benefiting from scale economies). On the other hand, there are tensions in modern agri-food systems, which create instability. Environmental problems (e.g. manure surplus, ammonia emissions, pollution of surface waters) have given agriculture a negative symbolic meaning, and led to emission regulations. Spatial problems are also pressing, especially in small countries such as the Netherlands, where cities and leisure activities are expanding. Scandals and diseases (e.g. BSE, foot and mouth, dioxin) have created concern with consumers about food safety (although this does not yet translate into consumption patterns).

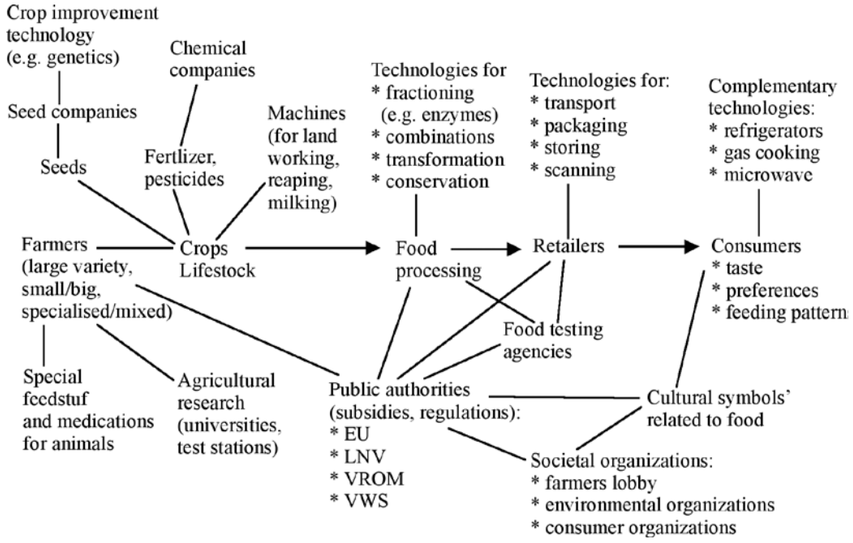

Figure 1: The socio-technical system for agriculture and food

Retailers play a crucial role in the agri-food system, because of their mediating position between consumers and producers. Retailers have implemented some changes in their product assortment, creating some space for organic and biological products. This means that alternative agri-food systems (e.g. organic farming, health food shops) have become somewhat more acceptable for the wider public. Niches have emerged for experimenting with new (aspects of) agri-food systems (Wiskerke and Van der Ploeg, 2004). At this point these niches do not yet form a threat for the established agri-food system in the Netherlands. But in other countries (e.g. Switzerland), a new agricultural practise such as organic farming is already practiced by around 9% of the farmers (Belz, 2004).

Because of the problems and tensions in the agri-food system, there is currently substantial interest in transitions and system innovations towards more sustainable agri-food systems. But there is uncertainty about the precise direction of such transitions, and about transition paths. And there are also stabilising forces that may hinder substantial transformations. To understand possible future transitions, it is useful to look in the past, and see how historical transitions and system innovations occurred. That is the aim of this project.

Historical transitions in the agri-food system

The modern agri-food system is the outcome of historical development processes that go back around 150 years. Around 1850 food production and processing was localized, with several functions often performed by the same actor (e.g. farmers who did both primary production and food processing). Products were sold at nearby markets, because transportation, cooling and preservation technologies were not yet developed. Since then the network of organisations and social groups has expanded and differentiated. Dedicated actors have emerged in all sub-systems of the agri-food system. Primary production in agriculture, for instance, not only encompasses farmers, but also universities, seed companies, biotech companies, chemical companies (pest control), farm equipment manufacturers, banks, public authorities etc. (see Figure 1). The social network has also become more complex in other parts of the agri-food system. In the last 150 years, several transitions have occurred in different sub-systems of the agri-food system. Some examples of such system innovations are given below, along with some main characteristics.

1. First round of mechanization in agriculture and crop improvements (1860-1920). The crucial guiding principle was to increase land productivity. Crop improvements and mechanisation were means to achieve this goal (De Widt, 1955; Van der Poel, 1983; Priester, 2000a). But tools such as mechanical reapers (to facilitate crop harvesting) were only affordable for farms above a certain size. Hence, there was a shift from peasants to large farms. This reorganisation was also stimulated by the agricultural crisis of the 1890s in Europe, as steamships facilitated large-scale imports of grain from the US. Many small European farmers could not compete with American farmers (who had bigger and cheaper land plots), which triggered consolidation. This period also witnessed the emergence of a national agricultural policy, and the emergence of agricultural research (e.g. test stations). In the Netherlands a close network between Research, Information Provision to Farmers, and Education was set up, the OVO-network. The system innovation led to improvements in agricultural productivity, lower food prices and changes in feeding patterns of population (more calories, more meat, fruit, vegetables).
2. Mechanization in food processing (1870-1920). In this period food products were increasingly treated mechanically and chemically. A range of process techniques was developed, e.g. fractioning (dividing rough food sources in useful parts), putting together new products, stabilisation and conservation, and transformation (Van Otterloo, 2000: 244). In a period when many sections of the population still experienced food shortage, the guiding principle was to increase the quantity of food and lower the price. There was a beginning of the industrialisation of food production (e.g. bread factories). The lengthening of food distribution networks led to problems with food quality (in particular with meat, fish, milk, cheese, butter, fruits). Food regulations were created, as well as inspectorates and public authorities. There was also some systematic application of science to food preparation. First, science was applied to food technologies. This involved organic chemistry, biosciences, medical and physiological science,

chemical-analytical science. Second, science was used to determine food regulations and set up food testing laboratories. Food science and technology became institutionalised.

3. Standardization of feeding patterns (1920-1960). Feeding patterns used to have high local variety (depending on soil conditions and local agriculture). In the period 1920-1960 a standard national (Dutch) diet emerged: two bread meals and one hot meal a day; the hot meal often involved potatoes, vegetables and some meat (Van Otterloo, 1990). The standardization of feeding patterns was related to: a) increase of scale in food processing, b) better transport infrastructures, c) modernization process of working class families (housewife organizations taught that there was one best way to cook and prepare meals)
4. Transition towards mass production in agriculture and a shift towards high-input agriculture (pesticides, fertilizer) (1940-1970). In this period an important guiding principle was to increase labour productivity. This led to large-scale mechanization and the emergence of mass production in agriculture (Rutten, 1989; Van der Ploeg, 1991). Although tractors had existed before, this period witnessed a large-scale replacement of animals as power source (Figure 2).

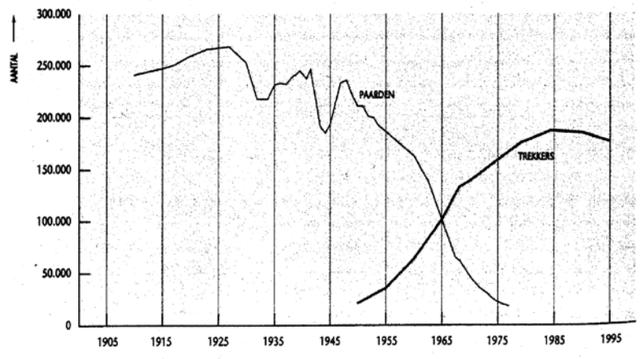

Figure 2: Transition from horses to tractors in the Netherlands (Priester, 2000b: 78)

The mechanisation also led to a strong decrease of the proportion of population that worked in agriculture, and there was a specialisation of farms. The expansion of machines required adjustments in the soil (large flat areas that were not too wet). Massive land-moving machines were used to flatten the country and increase the availability of agricultural land. Drainage-technologies were implemented to improve the carry off of rainwater. Productivity was also enhanced through an expansion in the use of fertilizer (Figure 3).

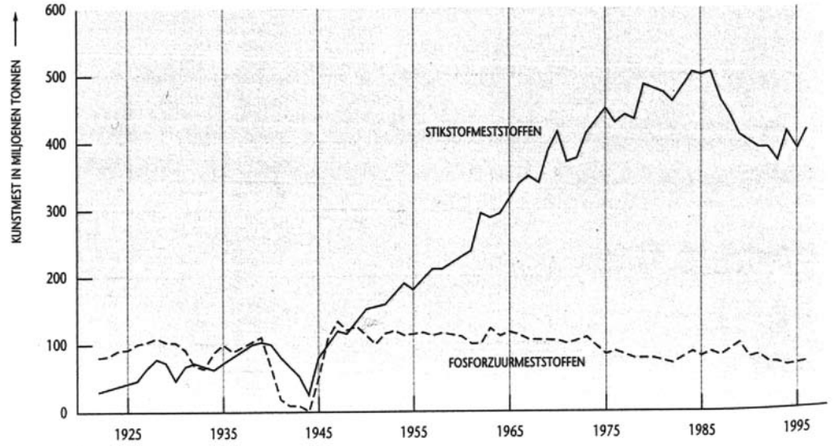

Figure 3: The use of fertilizer in the Netherlands in millions of tons (Priester, 2000a: 128).

The postwar period was also characterised by institutional change in ownership: a redistribution of land ('ruilverkaveling'), leading to an increase of farm size and a decrease in the number of farms. The post-war period also saw the emergence of an EU agricultural policy, with enormous subsidies to guarantee food production. The overall result was a major productivity increase (Rutten, 1992).

5. Transition in retailing: from small, local shops (butchers, green groceries) to supermarkets (1950-1980). The expanding amounts of foodstuffs were accompanied by changes in the distribution networks of foodstuffs, in particular the rise of super markets. This change was enabled by a range of technical and social factors: a) diffusion of the automobile, making it easier for people to travel longer distances to supermarkets, b) new technologies in packaging, preservation, cooling, c) new electronic technologies (e.g. for coding products, scanning them at the cash desk), d) increasing numbers of freight trucks and the expansion of road networks, facilitating goods distribution, e) rise in consumer spending in the economic boom of the 1950s and 1960s, f) new consumer practice in shops (from being served to self-service), g) differentiation of food products by food producers, leading to a growing assortment of products, h) lower prices because of scale advantages.
6. Differentiation in feeding patterns (1960-1990). The uniform, standard Dutch diet eroded after 1960. The feeding pattern differentiated. Eating outdoors emerged, and new feed-

ing patterns emerged such as snacks (Van Otterloo, 1990). Food processing companies (e.g. Unilever) put more money in R&D for developing new types of food (e.g. snacks), and tried to change user behaviour through advertising. Also supermarkets put much energy in advertising and marketing (creating new markets with higher added value). These changes were enabled by wider changes, such as rise in economic welfare, more money for households, new cultural patterns (leisure, consumption, enjoyment), professional advertisement via new media such as television.

7. The rise and recent decline of the cattle farming and the bio-industry (1970-2000). In this period there was a shift towards mass-production of chicken, pigs, cows. Figure 4, 5 and 6 show the rise of the number of cows, pigs and chicken in the Netherlands and some decline in recent years. One guiding principle was to increase the number of animals per square meter, leading to new stables and battery cages for chicken. Another guiding principle was to increase output per animal (meat, milk etc.). To stimulate rapid growth, animals were fed dedicated feedstuff (sometimes enhanced with illegal growth-enhancing hormones). Medications were added to the food to suppress and prevent disease. In terms of productivity the bio-industry was very successful (Figure 5). But the success turned sour because of problems with overproduction in the mid-1980s (e.g. milk pool, butter mountain) and manure-problems. There were also increasing protests from animal welfare groups, giving the bio-industry a negative symbolic image. The increase in food-related problems in the 1990s (e.g. BSE, foot and mouth disease, swine fever) led to societal unrest about food production and to pressure for reform. In response, the cattle farming sector has begun a reorientation, which may possibly result in a transition.

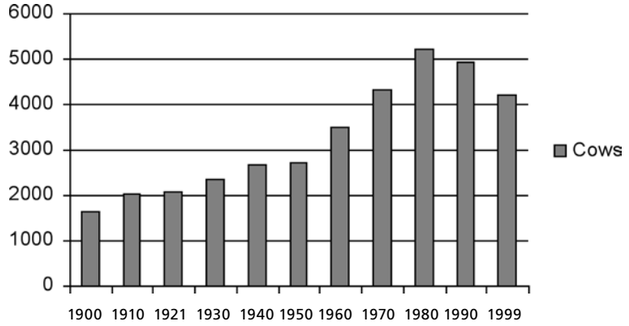

Figure 4. Increase in number of cows in the Netherlands between 1900-1999 (Source: CBS)

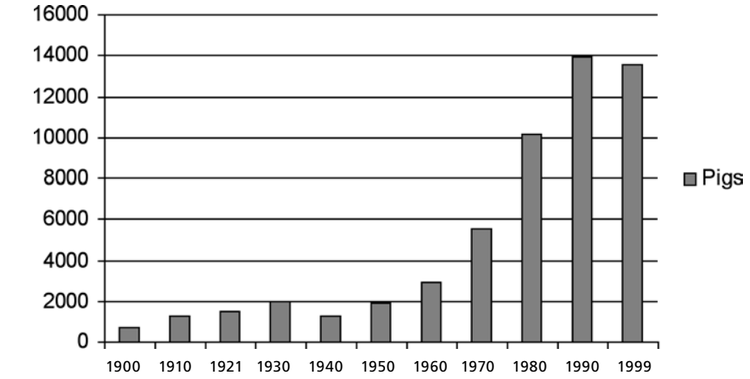

Figure 5. Increase in number of pigs in the Netherlands between 1900-1999 (Source: CBS).

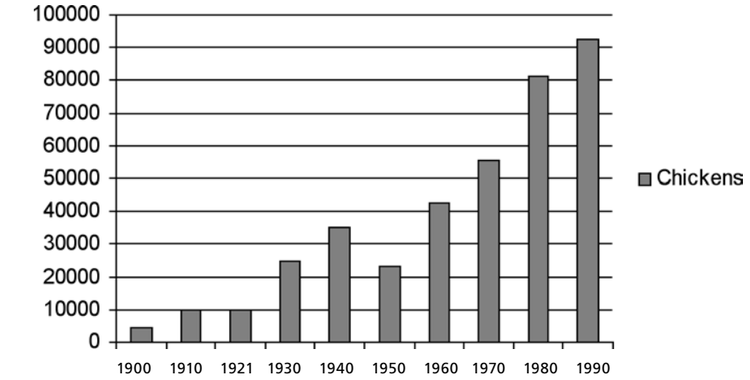

Figure 6. Increase in number of chickens in the Netherlands between 1900-1999 (Source: CBS).

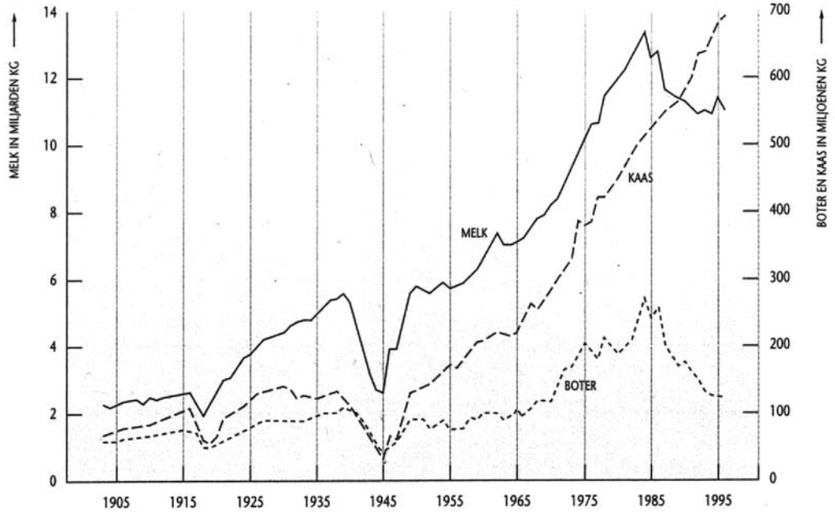

Figure 7: Total production of milk, butter and cheese (Bieleman, 2000: 136); milk in billions of kg (left axis); butter and cheese in millions kg (right axis)

Research aims

The research project, for which this position paper sketches the background, aims to analyse these transitions through elaborate case studies, working from a combination of sociology of technology, evolutionary economics, and history of technology. The level of analysis is socio-technical systems. This means we will not only look at changes in technical products, but also at policy, user practices, infrastructure, industry structures and symbolic meaning etc. To analyse transitions, we will use the multi-level perspective (see section 2).

2. Level of analysis and conceptual perspective

Levels of analysis in network analyses

Actors and their social networks are obviously important in transition processes. They may hinder transitions and defend aspects of existing systems, because of sunk investments, cognitive and organizational commitments. Actors are also important to develop new novelties, new products and knowledge, as well as the social constituencies behind it. Networks have become a popular topic in several disciplines, e.g. business studies, evolutionary economics and sociology of technology. Since networks can be studied at different levels, it is good to be clear about one's point of entrance. We distinguish four levels of network analysis, and position ourselves at the fourth level.

Individual firms and their networks form the first analytical level. The focus is on dyadic relationships, strategic firm networks (e.g. Gulati et al., 2000; Hite and Hesterly, 2001). These networks are studied primarily in business studies and management studies. Networks form strategic assets for firms, because they provide access to resources such as money, new ideas, people, and reputation.

The second level is formed by industry networks, i.e. relationships between firms (e.g. Utterback and Suarez, 1993a,b; Klepper, 1997; Dosi et al., 1997). These networks are studied in evolutionary economics and business studies. The focus in this literature is on entry and exit of firms, the structure of the industry, often in relationship with technology life cycles.

The third level is formed by networks between firms, universities and public authorities. These networks are studied under several headings, e.g. technological community (Van de Ven and Garud, 1989; Van de Ven, 1993; Rosenkopf and Tushman, 1994), sectoral innovation system (Breschi and Malerba, 1997; Malerba, 2002), Triple Helix (Leydesdorff and Etzkowitz, 1998; Leydesdorff, 2000). These networks involve mainly the supply side of innovations and new knowledge. They are studied primarily in evolutionary economic and innovation studies, but also in sociology of technology. The focus is on linkages between heterogeneous organizations. Dynamic approaches analyse how the elements are gradually linked into a stable configuration. Rosenkopf and Tushman (1994), for instance, distinguish two phases in technological development: a fluid phase or 'era of ferment', and an 'era of incremental change'. In the era of ferment, the inter-organisational network is fragmented. Few linkages exist and spanning organizations such as professional societies and standards bodies are not institutionalised. Different design variants are carried by different networks of organisations. The emergence of a dominant design signals a period of closure and stabilisation, leading to an era of incremental change. During the era of incremental change, a broad inter-organisational network is formed.

Practitioner communities develop industry-wide procedures, traditions and problem-solving modes that permit focused, incremental technical puzzle solving. Critical problems are defined, legitimate procedures are established, and community norms and values emerge from interaction among independent actors. As competencies are deepened they become routine and institutionalised (see Figure 8).

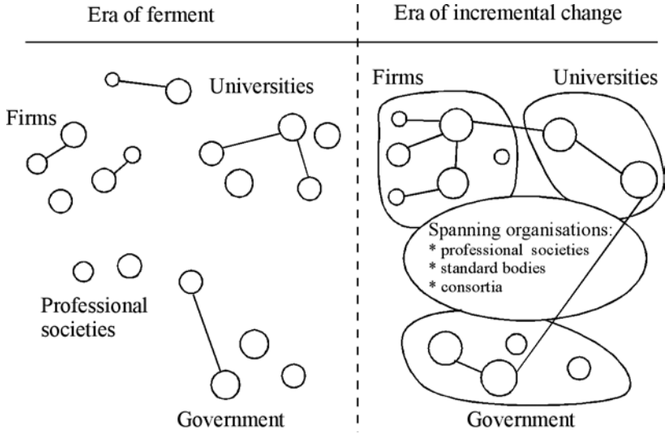

Figure 8. Technological community in era of ferment and incremental change (Rosenkopf and Tushman, 1994: 416)

The fourth level is formed by networks which involve supply and demand. These networks are studied primarily in sociology or technology, but also in innovation studies. The demand side is no longer taken for granted (as an independent selection environment), but included in the analysis. Especially for radically new technologies this is necessary, because users and markets may not readily exist. Both markets and user practices need to be articulated for such new technologies. There is a growing body of literature about the co-construction of technology, users and markets (e.g. Lundvall, 1988; Green, 1992; Lie and Sørensen, 1996; Coombs et al, 2001; Oudshoorn and Pinch, 2003; Schot and Bruheze, 2003). More broadly, the process of societal embedding of new technology involves a wide range of social groups, such as universities, firms, engineers, designers, capital suppliers and public authorities, but also users and societal groups. Figure 9 gives an impression of kinds of social groups involved in these networks. The historical case studies in this project will be studied at this network level.

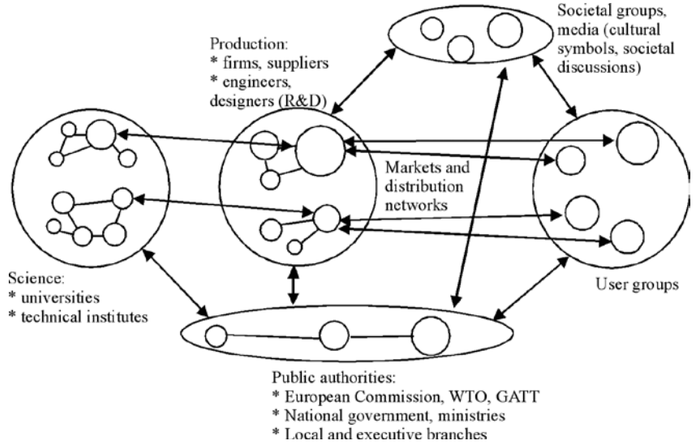

Figure 9: Social network involved in socio-technical systems (Geels, 2002)

These social groups have relative autonomy. Each social group has its distinctive features. Members share particular perceptions, problem-agendas, norms, preferences, etc. They share a particular language ('jargon'), tell similar stories of their past and future, meet each other at particular forums, often read the same journals etc. In short, there is coordination within groups. But different groups also interact with each other, and form networks with mutual dependencies. Although groups have their own characteristics, they are also interdependent. Stankiewicz (1992) proposed the term 'interpenetration' to characterize groups, which overlap in some manner without loosing their autonomy and identity. Because of the interdependence, activities of social groups are aligned to each other. This means there is also inter-group coordination. Below I will propose the concept of socio-technical regimes, to conceptualise this meta-coordination.

Change and stability in socio-technical regimes

To conceptualise transitions and system innovations, we build upon Nelson and Winter's (1982) concept of technological regimes. Engineers and designers use cognitive routines (e.g. search heuristics, exemplars, problem agendas) to guide their activities. This means that engineers and R&D managers do not search in all possible directions, but typically expect to find better results in certain directions. As far as firms differ in their organizational and cognitive routines,

there is variation in their technological search directions and the resulting products. But when different firms share particular routines, these routines make up a technological regime. Because engineers in different firms work in similar directions, the result is technical trajectories on a sectoral level. Technological regimes create stability because they provide a direction for incremental technical development. We can thus make a distinction between regime optimization (incremental innovation within regimes along technical trajectories) and regime change (radical innovation which leads to new trajectories). System innovations and transitions are conceptualised as shifts to a new regime.

To understand changes in socio-technical systems, we will widen the concept of technological regimes in two ways. First, we follow Rip and Kemp (1998) and use the wider sociological concept of rules instead of Nelson and Winter's cognitive routines. "A technological regime is the rule-set or grammar embedded in a complex of engineering practices, production process technologies, product characteristics, skills and procedures, ways of handling relevant artefacts and persons, ways of defining problems; all of them embedded in institutions and infrastructures" (Rip and Kemp, 1998: 340). While the cognitive routines of Nelson and Winter are embedded in the practices and minds of engineers, Rip and Kemp's rules are embedded more widely in the knowledge base, engineering practices, corporate governance structures, manufacturing processes and product characteristics. As a further differentiation, one may distinguish formal, normative and cognitive rules (Geels, 2004). The second widening concerns the social network. Although engineers and firms are important actors, other social groups are also important for the creation and maintenance of socio-technical systems (Figure 9). So there are not only technological regimes, but also scientific regimes, market/user regimes, policy regimes and cultural regimes. While these groups have relative autonomy, their activities are also aligned, resulting in inter-group coordination. This meta-coordination is indicated with the concept socio-technical regimes (Figure 10). In this project, we understand transitions as a shift from one socio-technical regime to another.

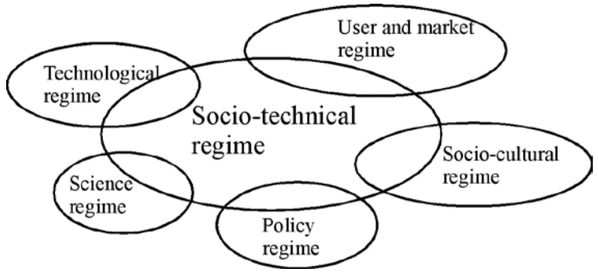

Figure 10. Meta-coordination through socio-technical regimes (Geels, 2004: 905)

While we are interested in changes in socio-technical regimes, several authors have argued that existing regimes and systems are characterized by lock-in, stability and path dependence (Unruh, 2000; Jacobsson and Johnson 2000; Walker, 2000; Araujo and Harrison, 2002). There are many sources, which contribute to stability of existing regimes. Cognitive routines make engineers and designers look in particular directions and not in others (Nelson and Winter, 1982; Dosi, 1982). This can make them 'blind' to developments outside their focus. Core capabilities can turn into core rigidities (Leonard-Barton, 1995). Competencies, skills, knowledge also represent a kind of 'cognitive capital' with sunk investments. It takes much time to acquire new knowledge and build up competencies. It is often difficult for established firms and organisations to develop or switch to competence destroying breakthroughs (Tushman and Anderson, 1986; Christensen, 1997). Important cognitive rules are expectations, which orient perceptions of the future and hence steer actions in the present. As long as actors expect that certain problems can be solved within the existing regime, they will not invest in radical innovations and continue along existing paths. Other important cognitive rules are perceptions of user preferences (Akrich, 1995). As long as firms think that they meet user preferences well, they will continue to produce similar products (Christensen, 1997). Another source of stability is that actors and organisations are embedded in interdependent networks and mutual dependencies. Once networks have formed they represent a kind of 'organizational capital'. Organizations are resistant to major changes, because they develop "webs of interdependent relationships with buyers, suppliers, and financial backers (...) and patterns of culture, norms and ideology" (Tushman and Romanelli, 1985: 177). The stability of organizations stems from 'organizational deep structures', i.e. a system of interrelated organizational parts maintained by mutual dependencies among the parts and "cognitive frameworks which shape human awareness, interpretation or reality, and consideration of actions" (Gersick, 1991: 18). Organizational commitments and vested interests of existing organizations in the continuation of systems are an other factor (Walker, 2000). Powerful incumbent actors may try to suppress innovations through market control or political lobbying. Industries may even create special organisations, which are political forces to lobby on their behalf, e.g. professional or industry associations, branch organisations (Unruh, 2000). Artefacts and material structures are another source of stability. Complementarities between components and sub-systems are an important source of inertia in complex technologies and systems (Rycroft and Kash, 2002; Arthur, 1988). These components and sub-systems depend on each other for their functioning. This system interdependence is a powerful obstacle for the emergence and incorporation of radical innovations. The stability is often formalised in compatibility standards. Material artefacts are also stabilised because they are embedded in society; hence the term socio-technical systems. People adapt their lifestyles to artefacts, new infrastructures are created, industrial supply chains emerge, making it part of the economic system dependent on the artefact. Thus, technological momentum emerges (Hughes, 1994). There may also be sunk investments in infrastructure, production lines, skills. Because shifting to a new technological path would destroy these sunk investments, firms tend to stick to established technologies as long as possible.

Niches as location of radical novelty

Because there are so many sources of lock-in and stability in socio-technical regimes, it is an interesting question how transitions and system innovations come about. Scholars in sociology of technology and evolutionary economics have highlighted the importance of niches as the locus of radical innovations. Because the performance of radical novelties is initially low, they emerge in 'protected spaces' to shield them from mainstream market selection in the regime. Niches may have the form of small market niches with selection criteria that are very different from the regime (Levinthal, 1998) or of technological niches, which are often played out as experimental projects (Hoogma, 2000; Van Mierlo, 2002). The importance of small market niches to nurture radical innovation is mentioned by some evolutionary economists (e.g. Saviotti, 1996; Windrum and Birchenhall, 1998; Levinthal, 1998; Frenken et al., 1999; Tisdell and Seidl, 2004). But market niches are not always readily available for radical innovations or there may be no direct interest from users (as in the case of many sustainable energy technologies, electric automobiles etc.). In such cases, technological niches function like a 'proto-market', where subsidized experimental projects allow learning processes and network building to take place. Technological niches are played out as societal experiments, which differ from firm-internal experiments, because they explicitly involve actors from the selection environment, e.g. users, policy makers, societal groups. Technological niches form a tentative space, where variation and selection are brought together. This means that learning, articulation and alignment can take place on the following dimensions (Kemp et al., 1998: 190): 1) technical aspects and design specifications, 2) market and user preferences, 3) government policy, institutional structure and legislation, 4) cultural and symbolic meaning, 5) production and supply network, 6) infrastructure, maintenance, and complementary technologies, 7) societal and environmental effects. Societal experiments with new technologies projects are not only subsidised by public authorities. Firms also contribute and participate, because they see such experiments as important learning mechanisms (e.g. Christensen, 1997; Thomke, 2003). For radical innovations, firms engage in what Lynn et al. (1996) call a 'probe and learn process'.

"These companies developed their products by probing initial markets with early versions of the products, learning from the probes, and probing again. In effect, they ran series of market experiments, introducing prototypes into a variety of market segments. (...) The approach at work in these cases might best be described as probing and learning. (...) Probing with immature versions of the product only makes sense if it serves as a vehicle for learning about the technology, and whether and how it can be scaled up, about the market, (...) and about government regulations and the need for regulatory approvals. (...). Probing and learning is an iterative process. The firms enter an initial market with an early version of the product, learn from the experience, modify the product and marketing approach based on what they learned, and then try again. Development of a discontinuous innovation becomes a process of successive approximation, probing and learning again and again" (p. 15-19).

In technological and small market niches, rules are unstable and not well articulated. There is much uncertainty and actors may have different ideas, beliefs and expectations, leading to the exploration of a variety of directions. Some projects strike out in the wrong direction, and fail. Others may prove to be relatively more successful, leading to replication and elaboration of their rules. While early rules are rough, these may be gradually refined through a sequence of projects. A sequence of experimental projects thus constitutes a learning trajectory, based on trial and error, enabling the articulation of cognitive rules.

Niches are important, because they act as 'incubation rooms' for radical novelties. In the approach of strategic niche management, three kinds of internal niche-processes are distinguished (Schot et al., 1994; Kemp et al., 1998; 2001; Hoogma et al., 2002). The first niche-internal process is learning. This involves technical learning (R&D by firms, academic research projects), but also learning with regard to user preferences, public policies, symbolic meanings etc. The second niche-internal process is the development of social networks and constituencies that carry and invest in the novelty. This involves strategic alliances (e.g. between firms, and between firms and universities), but also networks with user groups and policy makers. Innovation studies have often argued for the importance of outsiders or new entries to develop radical innovations. But regime-actors may also participate, either for defensive reasons (to monitor niche-developments, free-ride on learning experiences, or possibly frustrate them) or for reasons of hedging and diversification. Especially when regime-actors are convinced that the existing regime is faced with serious problems, they will invest resources in exploring alternative directions. The participation of regime-actors in niches can accelerate developments, when they bring in many resources and competencies. It may also stimulate the perceived 'legitimacy' and trust in niches. The third niche-internal process is the articulation of expectations and visions, which give direction to the learning processes. The role of expectations and future orientation in technological development has been highlighted by sociologists of technology (e.g. Van Lente, 1993; Van Lente and Rip, 1998; Brown et al., 2000; Brown and Michael, 2003). These expectations may have the form of 'diffuse scenarios', sketching a future world in which the product can be sold. Expectations and diffuse scenarios indicate directions for further R&D, as they are translated into search heuristics. They can also be used strategically and rhetorically. Product champions make promises about future worlds, profits and societal benefits to attract attention and resources from other actors, e.g. managers in a firm, policy makers, or possible partners with complementary assets. Actor-network theorists have emphasised this use of stories and language to convince other actors (see Akrich et al., 2002a, b for clear descriptions of actor-network theory). By telling promising stories about new innovations, actors hope that other actors will be attracted and join the project, expanding the social network.

The three niche-internal processes are interrelated through positive feedbacks (Figure 11). Actors, embedded in networks, are willing to invest resources (money, people) in projects, if they have a positive future outlook, e.g. a shared expectation that a particular new technology has a bright future. The future outlook not only influences the willingness to invest, but also provides direction to formulation of projects. Projects provide space for learning processes. If the

outcome of learning processes is positive (e.g. steep learning curves), the future outlook may be validated and become stronger. Positive outcomes also make it easier to attract new actors and expand the social network, which makes it easier to raise more money for further learning processes. So, if the niche-internal processes positively reinforce each other (in the course of several years), the niche becomes stronger.

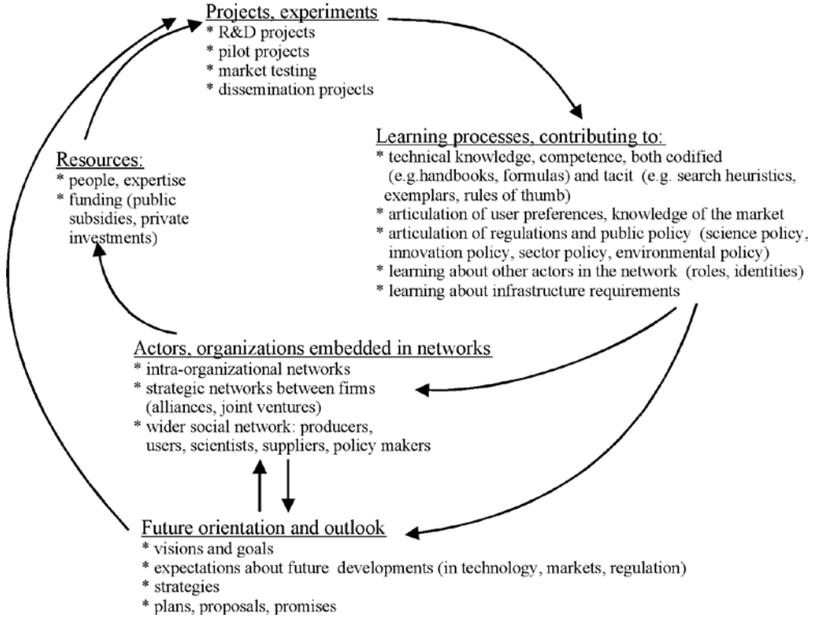

Figure 11. Positive feedbacks between internal niche-processes

But the success of a niche does not only depend on niche-internal processes. The further breakthrough of a niche may be hindered by the stability of the regime. If regime-actors do not support a niche, it lacks sufficient mass (experience, distribution networks, capital). A radical niche may also experience a mismatch with dimensions of the existing regime (Freeman and Perez, 1988), e.g. with regard to regulations, infrastructure, markets.

Conceptual multi-level perspective

In the multi-level perspective, socio-technical regimes form the meso-level and niches for the micro-level. To understand regime shifts, we introduce a third level, the socio-technical landscape. This level refers to the wider exogenous environment, which cannot be influenced at will by actors in regimes and niches. The metaphor 'landscape' is used because of the literal connotation of relative 'hardness' and to include the material aspect of society (e.g. the material and spatial arrangements of cities, factories, highways, and electricity infrastructures). The three levels refer to different degrees of structuring of activities in local practices. At the niche-level there is limited structuring. The cognitive rules, knowledge base, user preferences, and regulations have not yet crystallized and actors face much uncertainty. The social networks are small, and frequently change composition. At the regime-level there is much structuring. Networks are large and relatively stable (organizational capital), there are stable cognitive rules, policy regulations and user preferences, which provide a clear frame for innovative action, resulting in technical trajectories. Sociotechnical landscapes provide even stronger structuration of activities than regimes. Material environments, shared cultural beliefs, symbols and values are hard to deviate from. They form 'gradients' for action. The three levels form a nested hierarchy (Figure 12).

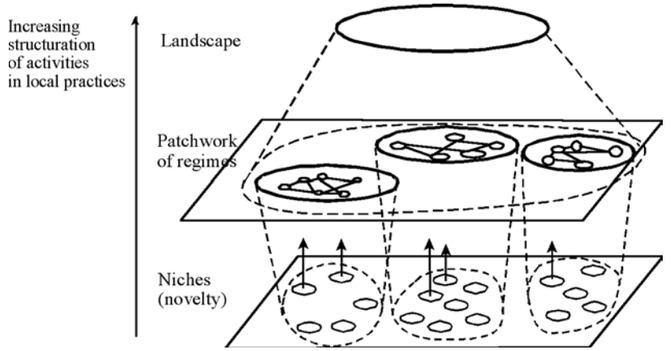

Figure 12. Multiple levels as a nested hierarchy (Geels, 2002: 1261)

The work in niches is often geared to the problems of existing regimes (hence the arrows in figure 12). Niche-actors hope that the promising novelties are eventually used in the regime or even replace it. This is not easy, however, because the existing regime is entrenched in many ways (e.g. institutionally, organizationally, economically, and culturally). As long as so-

cio-technical regimes are stable and aligned, radical novelties have few chances and remain stuck in particular niches. Niches may also face a mismatch with the markets, regulations, user preferences, or infrastructure in the existing socio-technical regime (Freeman and Perez, 1988). Nevertheless, niches are crucial for system innovations, because they provide the seeds for change.

The key point of the multi-level perspective (MLP) is that transitions and system innovations come about through the interplay between dynamics at multiple levels. This may occur in several phases (see also Rotmans et al., 2001). In the first phase, novelties emerge in niches, often directed towards specific problems, rules and capabilities in existing regimes and landscapes. In niches, actors improvise, engage in experiments to work out the best design and find out what users want. In the second phase the novelty is used in small market niches, which provide resources for technical specialization. Engineers gradually develop new rules, and the new technology gradually improves, as a result of learning processes. The third phase is characterized by a breakthrough of the new technology, wide diffusion and competition with the established regime. This requires two kinds of complementary dynamics. On the one hand, internal momentum in the niche is important, created by positive feedbacks between niche-internal processes (see Figure 5) and improvements in price/performance. Another internal driver is when actors with interests push for further expansion of the technology. On the other hand, breakthrough depends on external circumstances, i.e. 'ongoing processes' at the levels of regime and landscape that create tensions, which lead to 'windows of opportunity'. There may be different reasons for such tensions and misalignment:

- Changes on the landscape level may put pressure on the regime and cause internal restructuring. Climate change, for instance, is currently putting pressure on energy and transport sectors, triggering changes in technical search heuristics and public policies. But climate change also leads to pressure on agriculture, for instance because CH4 emissions from manure and livestock are a strong climate forcing gas. Broad cultural changes in values and ideologies, or change in political coalitions may also create pressure. The increasing cultural attention for health, for instance, increases people's concerns about food safety. And increased cultural sensitivity about animal welfare has created pressure on mass production of chicken and pigs. Another example is that the political election of the Purple Coalition in the Netherlands created opportunities for more drastic policy measures in agriculture, since the CDA, which traditionally protected farmers, was kept out of the government. Minister Brinkhorst, having no strong ties with agriculture, was more willing to take drastic measures. So wider political changes can be important to open up changes in existing regimes.
- Internal technical problems and negative externalities may trigger actors (e.g. firms, engineers) to explore and invest more in new technical directions. Different terms have been proposed in the literature, e.g. 'bottlenecks' (Rosenberg, 1976), 'reverse salients' (Hughes, 1987), 'diminishing returns of existing technology' (Freeman and Perez, 1988), expected problems and 'presumptive anomalies' (Constant, 1980). Continuing problems can undermine the trust in existing technologies and alter expectations of new technologies. The tremendous increase in manure, a negative side effect of livestock mass production, is a clear example from agriculture. Over production of butter and milk is another example, where mass production in agriculture suffered from its own success.
- Changing user preferences may lead to tensions when established technologies have difficulties to meet them. User preferences may change for many reasons, e.g. concern about negative externalities, wide cultural changes, changes in relative prices, policy measures such as taxes. In the 1990s clear changes have occurred in the attitude of consumers and societal groups towards agriculture. Scandals with hormones in meat, BSE, dioxin in chicken have increased fears about food safety, pushing the issue high on the political agenda. And major diseases such as Foot and Mouth and chicken plague have changed the symbolic meaning of agriculture, making people sceptical about health and hygiene standards. These scandals lead to changes in consumer perception and political attitudes.
- Strategic and competitive games between firms may open up the regime. New technologies are one way in which companies (or countries) try to get a competitive advantage. That is why they make strategic investments in R&D. Because companies watch and react to each other's strategic moves, strategic games may emerge which suddenly accelerate the development of new technologies leading to 'domino effects' and 'bandwagon effects'. The changes in the agri-food system have created opportunities for new firms, ranging from organic farmers to high-tech food companies that offer extra healthy foods (e.g. foods with supplements that stimulate parts of the body).

When the regime opens up because of tensions and problems, a radical innovation may take advantage and break out of its niche and enter competition with the existing system. This may lead to a period of flux, restructuring and Schumpeter's 'gales of creative destruction'. Such breakthrough and replacement will be accompanied by wider changes in the regime (e.g. policies, infrastructures, user practices). Eventually a new system and regime is formed, carried by a new social network. The new regime may eventually also influence wider landscape developments (see Figure 13 for a schematic representation).

In the fourth phase the new technology replaces the old regime, which is accompanied by changes on wider dimensions of the socio-technical regime. The new regime may eventually influence wider landscape developments.

In sum, in the multi-level perspective it is the interplay between processes at different levels that explains how transitions and system innovations come about. So the multi-level perspective does away with simple causality in transitions. There is no simple 'cause' or driver. Instead, there are processes at multiple dimensions and levels simultaneously. System transformations come about when these processes link up and reinforce each other ('circular causality').

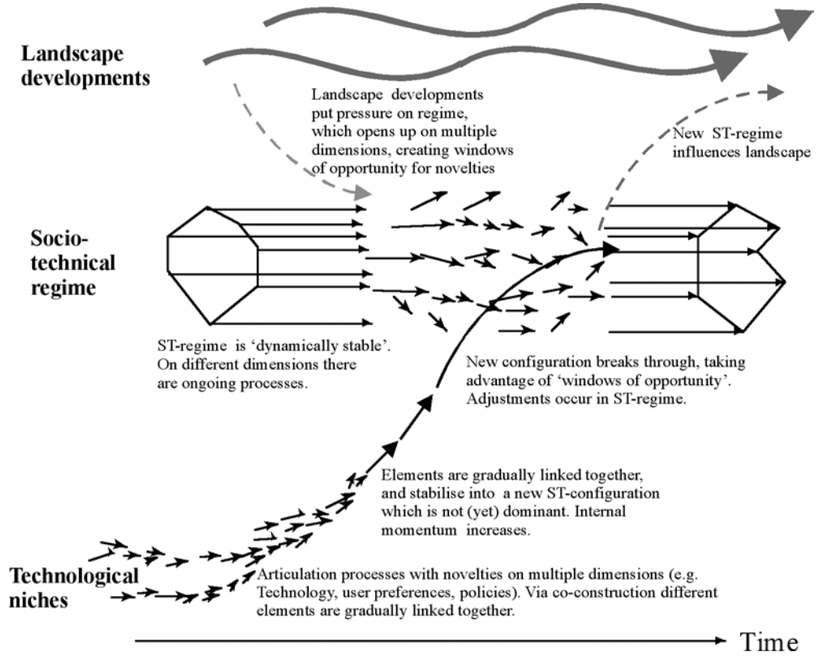

Figure 13. A dynamic multi-level perspective on system innovations (Geels, 2002: 1263)

At this point the multi-level perspective (MLP) is a generic framework to understand transitions and system innovations. Its usefulness has been illustrated with a few case-studies, e.g. about the transition from sailing ships to steamships (Geels, 2002), the ongoing transition in Switzerland (1970-2000) from industrialized agriculture to organic farming and integrated production (Belz, 2004), and the transition from horse-and-carriages to automobiles (Geels, 2005). So there is ample scope for further elaboration and refinement of the MLP, e.g. distinguish different transition routes or investigate the influence of particular variables. The agri-food system is particularly interesting in that respect, because of the following characteristics:

- It is a relatively distributed and complex system compared to other socio-technical systems. The land transport system, for instance, is organised around one dominant technology, the automobile. There are, of course, other technologies such as roads, traffic lights, and petrol stations, but these are more or less peripheral technologies that are organised around the car. There are many other examples of such sectors, e.g. aviation where aircraft form the dominant technology, visual home entertainment where television and video are dominant technologies. The agri-food system is an interesting contrast, because it functions through the interplay of multiple technologies. Agriculture, for instance, depends on the alignment of pesticides, fertilizer, irrigation and drainage technologies, seed improvement technologies, land working machines (tractor, plough), and harvesting machines. This difference is likely to have implications for the kind of transition pattern. In the former kinds of systems, the pattern may be that of technological substitution with knock-on effects, e.g. a change from horse-drawn carriages to automobiles. In socio-technical systems such as agriculture, transitions do not come about because one technology breaks through. Instead, transitions probably involve multiple innovations that may gradually link up and transform the system.
- Another characteristic of agriculture (at least since the beginning of the 20th century) is the way innovation is organised through close collaborations between universities, test stations, public authorities, farmers' organisations and farmers. In the Netherlands the OVO-network was influential in orchestrating innovation (Research, Information Provision and Education). In terms of social networks of Figure 3 it means there was a close alliance between supply-side actors, in particular science, production and public authorities. This alliance was formed early in the 20th century, so it is interesting to compare how transitions occurred before and after this period. In other words, how did the structure of the social network influence transition patterns? In the 1990s, it seems that users and societal groups have become more important in the social network as drivers of innovation. Especially food scandals and disease problems have led to substantial changes on the side of users and societal groups. It seems that the coalition of supply side actors has initially tried to downplay these problems or reforms to tackle them (see also chapter 2 in Kickert, 2002, about transformations inside the Ministry of Agriculture). So the relationship between the structure of social networks and transition processes is an interesting and important topic.
- Another aspect is the importance of local practices in agriculture, especially conditions of soil and climate. This means that there has probably always been a substantial degree of variety in agriculture. In many industrial sectors (e.g. transport), innovation studies have shown that the emergence of a dominant design lead to sharp reduction of variety. The concept of technological and socio-technical regime indicates that innovations in local practices share important rules and work in similar directions, leading to technical trajectories, stability and homogeneity. While this also occurred in agriculture, there has remained a substantial degree of local variety. It is interesting to investigate how this influenced transition patterns.

So the study of the agri-food system with the multi-level perspective has several innovative aspects with regard to previous case studies done with this perspective.

3. Some indications of the research project

Research aims

This position paper forms the background for a scientific project, with the same title: "A multi-level analysis of historical transitions in agriculture and food". The scientific project aims to analyse 7 historical transitions in (parts of) the agri-food system through elaborate case studies. These analyses will be of help to improve the understanding of future transitions towards sustainable agri-food systems. A second aim is to further elaborate and refine the multi-level perspective, to contribute to a more general understanding of transitions (link to the KSI program). The case studies will be compared to investigate the role of relevant variables and processes. A particular hypothesis is that there is not one single transition route, but multiple possible routes. That hypothesis can be tested in this project, because different historical system innovations are investigated in different time periods and for different parts of the agri-food system. If we can demonstrate that multiple transition routes existed in the past, this forms a reflexive mirror for thinking about future transitions.
Historical analysis is important for future transitions, because of path dependencies and deep structural trends. A future transition towards a sustainable agri-food system does not simply starts in the present. There are tensions, barriers and ongoing dynamics in existing agri-food systems with historical roots. The interaction of deep structural trends, path dependencies and ongoing processes is important to understand (im)possibilities of future transitions. Historical analysis plays a crucial role here. Secondly, an understanding of historical transitions in the agri-food system may serve as inspiration for thinking about future transitions (although one also needs to think about differences between different times; we cannot simply generalize from the past to the present). Detailed case studies of historical transitions may act as a reflexive mirror to think about pathways and pitfalls for future transitions. Historical examples can also be used in education, for courses and for competence development.

Position in TransForum

In general this project fits very well with the overall topic of the research program TransForum: transitions and system innovations in agri-food systems. This position paper and research project do not deal with small topics, but with agri-food systems in their entire complexity. Insights in pathways and pitfalls in historical agri-food transitions are crucial to think about future transitions.
More concretely this position paper and project fall within the Innovation Strategy of International Agri-food Networks. As indicated in section 2, networks can be analysed at different levels: a) individual firms and their networks, b) industry networks, i.e. relationships between firms, c) networks between firms, universities and public authorities, d) networks which involve supply and demand, e.g. universities, firms, engineers, capital suppliers, public authorities, users and societal groups. This project looks at networks at this last level. For each historical transition, the actions and interactions of a wide range of relevant actors, embedded in their networks, will be studied. The project thus fits well in the Innovation Strategy that looks at actors and networks.
In terms of Scientific Projects, the position paper and research project fit well with at least two areas: a) technical/system expertise, and b) societal/social. As our brief indications of historical transitions (see section 1) showed, technology played an important part. It was often an enabler and facilitator of transitions. But, in our view, technology was no exogenous driver. Technological development and implementation itself depends on actions and decisions of actors, as well as on wider institutional, economic and political conditions. The project explicitly studies the co-evolution of technology and society, mobilising insights from different disciplines (e.g. evolutionary economics, innovation studies, history of technology, sociology of technology, history of agriculture). This means we not only look at technology, but also at social and societal aspects. It is precisely the connection between both that is interesting.
The position paper and project make a contribution to design challenges of TransForum, in particular to "development and application of new knowledge and technology".
The scientific project is closely linked to an innovative practical project in TransForum, in particular to Fokkerij in de Keten. [19] One of the work plans in Fokkerij in de Keten (regime analysis of cattle farming) explicitly makes a link with the scientific project 'A multi-level analysis of historical transitions in agriculture and food'. In particular the scientific project will contribute to the following knowledge question in the workplan: "Which long term factors and trends are relevant for a transition process to a more sustainable agri-food system?" Especially the 7th case study indicated in section 1 (rise and recent decline of the bio-industry, 1970-2000) has a direct link to the Innovative Practical project Fokkerij in de Keten. The case study will deliver a long-term regime analysis that provides insights in deep structural trends and path dependencies. These insights can then be used in Fokkerij in de Keten to think about possibilities and impossibilities for future transitions. Explicit time will be reserved in the scientific project to translate insights to the practical project. This will be done early in the project to synchronize with the planning in the practical project.

19 In fact, the IP proposal (p. 8) already refers to Figure 1 about the socio-technical agri-food system in this position paper.

Link with KSI program

This position paper and the accompanying research project are strongly linked to the KSI program (Knowledge network System Innovation), both organisationally and in terms of content. This project will be housed at the Sub-department History, Philosophy and Technology Studies. Members of this department (in particular Johan Schot and Geert Verbong) are also involved as managers and coordinators in one of the three sub-programs of KSI ('Research on historical transitions'). [20] A project in this sub-program is the development of a database of historical transitions to test and further refine transition theory, in particular to test hypotheses about particular transition routes in the multi-level perspective. This database will consist of historical case studies from different domains (energy, transport, medical sector, music industry, water supply, factory production). The project on transitions in the agri-food system can contribute and benefit from research in this database project. In organisational terms, the project will be well embedded and clearly linked to the KSI program. In terms of content, there are also strong links with KSI. On the one hand, the agri-food system project can benefit from theoretical knowledge on transitions and experience with historical case studies that exist in the Sub-department. People at the Sub-department have a strong track record of publications about transitions and system innovations (see appendix). Fundamental transition knowledge (e.g. multi-level perspective) can be used and applied to the particular domain of the agri-food system. On the other hand, the agri-food system project contributes to the KSI program, especially through adding a substantial amount of case studies to the database of historical case studies. And, as indicated above, the agri-food system has several typical characteristics that make it different from other domains, forming a challenge for the conceptual perspective. Hence, the agri-food system project can contribute to an elaboration and refinement of the multi-level perspective, thus contributing to a more general understanding of transitions. In sum, this project has excellent links between the KSI program and TransForum.

20 KSI has three sub-programs:
- Subprogram 1: 'Research on historical transitions'. This sub-program is managed and coordinated by the sub-department History, Philosophy and Technology Studies at the TU/e.
- Subprogram 2: 'Research on current and future transitions'

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