Lessons from Learning Regions: Policymaking in an Evolutionary Context

Research Memorandum 2002-34
Lessons from Learning Regions: Policymaking in an Evolutionary Context

Research Memorandum 2002-34

Marina van Geenhuizen
Peter Nijkamp
Lessons from Learning Regions: Policymaking in an Evolutionary Context

MARINA VAN GEENHUIZEN* AND PETER NIJKAMP**

*Faculty of Technology, Policy and Management, Delft University of Technology, PO Box 5015, 2600GA Delft, The Netherlands
**Department of Economics and Management Sciences, Free University, de Boelelaan 1105, 1081HV Amsterdam

This paper serves to clarify conditions that hamper the learning capability of regional (local) actors and to identify how this capability can be improved, given a number of distinct evolutionary constraints. First, we discuss policymaking in an evolutionary context. This is followed by an analysis of circumstances that hamper the design of learning policies by governments, including shortages in conceptualisation and empirical research of the learning region paradigm. The focus of the paper then moves to some broad lessons that can be drawn at the strategic level and at the project level for regional (urban) policymakers. Finally, the paper discusses the dilemma of incremental change versus system change - or co-evolution versus co-revolution - to improve the learning capability of regions or cities.

Learning capability, learning regions (cities), networks, policy design, evolutionary development

PN064MvG
INTRODUCTION

Since the early 1990s concepts of learning regions, smart cities, creative cities, etc. have received increased attention among regional economists, economic geographers and regional policymakers. This development marks the recognition that factors determining economic growth of regions (cities) are increasingly intangible, like institutions and culture, and increasingly mobile, like capital, codified knowledge, and partly human capital. It also marks the recognition that innovation by companies is not a linear process, running from invention and commercialisation to market introduction, but a cyclic and interactive process within networks of many different actors. In this view on innovation emphasis is increasingly put on diversity of the networks and boundary-spanning activity of the network actors.

The attention for learning regions also reflects the awareness that improving the regional economy is a medium- to long-term process, particularly a process based on the willingness and consensus among regional actors involved. Learning in this context not only means to adapt to new circumstances, like a stronger competition, but also to reflect critically on the own institutions and learning processes. In policies for learning regions, a crucial place is given to learning in regional (local) networks. In an ideal situation, these networks consist of loosely coupled relations that enable openness and integration, and create perspectives for action. Thus, the quality of the relations matters. In a negative case, networks become conservative and inward-oriented preventing any action, or they become subject to confusion leading to high transaction costs and inefficient adaptation (see also NIJKAMP et al., 2002).

Seminal work underlying the learning regions paradigm was done by AYDALOT (1986), CAMAGNI (1991), MAILLAT (1991), and some others, while the paradigm was fertilised from different angles in regional studies, like studies of national innovation systems, studies of regional technology complexes, including knowledge spillovers, Post Fordism and clusters, studies on local institutions in global markets, and studies of regional technology...
policy (e.g. MORGAN, 1997; COOKE, 1998). First, the focus was relatively narrow in investigating innovative behaviour of companies in a network setting. Later, the focus has broadened to include sustainability as a leading value alongside innovation and competitiveness (e.g. MASKELL and MALMBERG, 1999; GEEHUIZEN and RATTI, 2003). This broadening also increased the complexity in understanding learning regions, creative cities, etc.

Despite its popularity, the paradigm of learning regions has remained poorly conceptualised, and poorly tested in empirical studies. This holds for innovation by companies and for policy learning by regional (local) actors, and is one of the main reasons why current policymaking faces difficulties in drawing lessons from learning regions. A poor conceptualisation is also true for the development of learning regions over time (e.g. BOEKEMA et al., 2000). A conceptual framework that can be used, is given by evolutionary economics. We adopt this framework in this paper, because it allows for explanation of qualitative change, radical uncertainty, and variation between organisations and technology, and provides notions for understanding policymaking under such circumstances (SAVIOTTI, 1997; BERGH and FETCHENHAUER, 2001).

This paper serves to clarify conditions under which the learning capability of regional (local) actors is hampered and under which conditions this capability can be improved. Accordingly, the paper is structured into six parts. Following this introduction, there is a brief discussion of evolutionary conditions that set limits to policymaking (section 2). This is followed by an outline of critical conditions for learning and difficulties in the design of learning policies (section 3), particularly shortages in conceptualisation and empirical research of the learning regions paradigm (section 4). In a fifth part, broad lessons are drawn for improving the design of policies to enhance the capability to learn, addressed to regional
(urban) policymaking organisations (section 5). The paper concludes with the dilemma of incremental change versus system change to improve the learning capability (section 6).

With regard to the territorial unit of analysis we take both regions and (smaller) metropolitan areas into consideration, and avoid to link exclusively with localised production systems. As the perspective of this paper is on policymaking, it is necessary to realise that most localised production systems do not coincide with regional or urban policymaking units.

POLICYMAKING IN AN EVOLUTIONARY CONTEXT

According to modern evolutionary views on social phenomena, all organisations - be it governments, companies, non-profit institutions, etc. - suffer from bounded rationality in their adaptation to external changes. Bounded rationality rests on the inability of actors to collect all relevant information and to process this information adequately in a decision-making process. For governments this limited rationality causes in fact a limited potential for policymaking. In this context, it is increasingly acknowledged that there is co-evolution of regional (local) governments together with the organisations in their territory (BERGH and FETCHENHAUER, 2001). Governments and policies change as a part of and in interaction with these organisations. A second point is that most learning leads to incremental adjustment of organisations. Such patterns are reinforced by the phenomenon of sunk costs and the related phenomenon of increased returns. Thus, if once one route (investment, strategy or policy) has been taken, it is less likely that alternative routes are adopted, even if these are theoretically more attractive. Learning is thus strongly path-dependent (GRABHER, 1993; ARTHUR, 1994). Only in a few cases, learning leads to the use of untried possibilities and completely novel behaviour causing a new development trajectory. An ideal situation that prevents path-dependency would be one in which regional (urban) actors are permanently critical on their own institutions and institutional arrangements underlying learning, and
continuously feed back (forward) to preserve this attitude. This capability is also named adaptability (e.g., BENZ and FÜRST, 2002) or, alternatively, resilience (see REGGIANI and NUKAMP, 2002).

Given bounded rationality and path-dependency as "rules", the efficiency of regional (urban) policymaking as independent (top-down) steering seems relatively small. This awareness has led to a greater reluctance in imposing policymaking and has favoured the introduction of participatory forms of policymaking and steering on networks. In this context, the evolutionary idea of self-organisation has been forwarded. In self-organisation actors adapt themselves autonomously to new situations, including their networks. Accordingly, new types of policymaking acknowledge the importance of interdependent networks, voluntary cooperation of relevant network actors, and new process design that matches with specific situations and needs for flexibility (BRUIJN and HEUVELHOF, 2000).

DIFFICULTIES IN DESIGNING LEARNING POLICIES

Learning forms a basic element in evolutionary views on regional (urban) development, because it provides the input for adaptation of actors and networks to changes in their external environment, such as an increased competition from other regions or a collapse of a dominant industrial activity. Learning can be created using different sources, such as trial and error, repetition, borrowing from others (copying), and reflection on own routines (MASKELL and MALMBERG, 1999; HASSINK and LAGENDIJK, 2001). In order to be effective and not stuck in path-dependency or lock-in situations, learning by regional (urban) governments, companies and other organisations needs to satisfy various critical conditions, as displayed in Table 1 (e.g., SENG, 1994; HEALY, 1997; HERTOG and HUIZENGA, 1997; MORGAN, 1997; JIN and STOUGH, 1998). One of these conditions is trust between the actors in a network. Trust can be seen as the mutual confidence that no party in an exchange will exploit...
the vulnerability of the other, and as such it facilitates a smooth information flow and cooperation within the network. Trust is often mentioned together with reciprocity, the latter meaning the mutual understanding that a given action will be returned in kind. Two other conditions are openness and integration; these determine the way new information is gained, handled and absorbed in the organisation, e.g. using system thinking in understanding problems and using critical reflection on the own performance and underlying institutions, eventually leading to institutional change. Openness and integration can only be achieved if the learning networks are loosely coupled. This means that each network actor can adapt to a certain degree without affecting the entire network. It also means the maintenance of different individual capacities in the network, which reinforces the sensing power towards the external environment and potentials to generate novel solutions (e.g. GRABHERR and STARK, 1997; BRUIJN and HEUVELHOF, 2000).

If we focus on the learning capability of regions (cities) including the above conditions, it can be concluded that the design of learning policies by regional (urban) governments is comprehensive and complex by nature. A number of factors can be advanced to explain this situation (MORGAN, 1997; JIN and STOUGH, 1998; GEEHUIZEN and NIJKAMP, 1998, 1999; BENZ and FÜRST, 2002). These will now concisely be presented here.

First, we witness often a multi-actor situation in policymaking. The qualification of a multi-actor situation refers to the fact that many different actors are involved in the learning system, like universities and higher educational institutes, research institutes, consultant firms and think tanks, supplier firms, customers, transfer institutes, brokers in network contacts, venture capital firms, and various governments. These actors often have diverse and
sometimes conflicting interests, whereas some of them perform different roles simultaneously. Complexity from the multi-actor situation is the more true if the learning is concerned with sustainability issues. A general trend is also the move of actors to participate in an increasing number of networks to support their different roles (e.g. ETZKOVTZ, 2002). To increase efficiency in learning these networks tend to be non-hierarchical and highly open in external relationships. In such a situation it is rather difficult and time-consuming for policymakers to identify the most relevant networks, to create consensus, commitment and reciprocity, and to gain sufficient support for particular policy decisions.

In the past few years, we have seen a gradual change in the context and orientation of learning, contributing to complexity. There has been a shift from hierarchical, disciplinary and division of labour-based knowledge production to a mode in which research problems are set across disciplinary boundaries, with a strong focus on application and with new benchmark criteria such as flexibility and response time (GIBBONS et al., 1994; NOWOTNY et al., 2001). At the same time, the number of actors involved is increasing outside universities and established research centres, with a growing emphasis on teams (consortia) working on a temporary (project) basis. Particularly in the case of science, there is also a higher democratic content and an increasing need for legitimating and public responsibility of science. As a consequence of all this, there is a trend for knowledge creation to become more volatile within fast shifting network configurations, and to become more uncertain and complex.

Complexity in policymaking also follows from the specific policy (management) framework of learning, because it is multilevel and (preferably) multi-sector. Multilevel means that (policy) decisions are taken at different spatial levels, from local to global, leading to situations in which decisions at higher levels influence conditions at lower levels. A multilevel situation also means the impact from policies in adjacent regions (cities) at the same level. A multi-sector situation means the need for involvement of many different sectors.
(departments) in an integrated policymaking for learning, including e.g. education, housing policy, labour market policy, telecommunication policy, town planning and architecture, and policy for arts and culture. However, it is difficult to satisfy this need, because policymaking institutes are traditionally organised on a mono-disciplinary basis and policymakers have often a mono-disciplinary background, such that their problem perception and frame of reference are somewhat biased (one-sided) which hampers an integrated system approach. It is also difficult in these circumstances to create conditions that favour reflective openness among regional (urban) actors, including policymakers themselves.

A further complicating factor in policymaking is the fact that, despite the many actors involved and despite a serious situation, there is seldom a “problem owner” for the task of improving learning capability. This means that there is no clearly defined actor to push the issue of learning into the policy arena in a systematic and coherent way. As a result, a sense of urgency which is needed to activate actors and have them committed to improve the situation, is often missing. Moreover, learning policies have a “handicap” in the policy arena because they only yield results in the medium- to long-term. Thus, when seeking support for learning policies, there tends to be competition from those socio-economic policies that yield immediate and clearly visible results, like job creation schemes and physical infrastructure improvement.

A final point that needs to be mentioned is that policymaking for learning is hampered by a shortage of conceptual and empirical knowledge derived from solid research. The knowledge that is available is often fragmentary and misses a systemic view. Although particular policy strategies can cope with uncertainty from a shortage of system knowledge, policymaking organisations themselves are often not sufficiently equipped (staffed) to adopt such strategies. The knowledge gaps will be discussed in the next section.

SHORTAGES IN CONCEPTUALISATION AND EMPIRICAL RESEARCH
Despite the popularity of the learning regions paradigm, various key processes of this paradigm are poorly conceptualised. We mention the most important of them. The crucial mode of learning in the paradigm is conceived of as localised learning with transfer of tacit knowledge and maintenance of trustful relationships as key processes. Localised learning is, however, poorly conceptualised in terms of the need for proximity and the relation with learning over distance. There is also no differentiation between types of learning involved, e.g. technological and organisational (e.g. OINAS, 2001). Also, conceptualisations of how learning networks develop over time are sparse, in terms of e.g. openness, network co-operation, innovative output and sustainable development. There may be weakly learning regions, not yet successful in innovation and sustainability, but improving in the next future; and there may be regions that have learned successfully in the recent past but are now captured in negative processes that cause a decrease of innovation and sustainability; however, the dynamic aspect of learning and its influence on economic performance of regions (cities) over time have been modelled only in a few cases. After some initial attempts (e.g. BRAMANTI and SENN, 1997; CAMAGNI and RABELOTTI, 1997; RATTI, 1997), modelling of long-term development of regions from a learning perspective is now increasing (e.g. BERTUGLIA et al., 1999; ACS et al., 2002; REGGIANI and NIJKAMP, 2002).

However, conceptualisations of the way localised learning contributes to a stronger competitiveness (performance) of companies at the micro level and of how regional (local) networks contribute to a better policy learning and better performance of regions (cities) remain sparse (BENZ and FÜRST, 2002).

With regard to empirical research, there is a shortage of studies that allow for comparison and empirical testing. There are many good case-studies of regions but few comparative studies based on a common research design, e.g. including similar types of regions, similar definitions and indicators, similar time-periods, etc. With similar types of
regions we mean regions endowed with broadly similar natural resources, with comparable levels of urbanisation, etc. There is also a shortage of causal modelling approaches in empirical research. This means that many causal factors are forwarded as relevant for learning and innovation, but their relative importance remains obscure. A point that worries is that some empirical research suggests the absence of localised relations where these could be expected, while other research indicates a reduced viability of companies located in close proximity of other companies (e.g. STABER, 2001). Results like these could have been used to approach the learning region as a differentiated phenomenon, but attempts to such an approach are sparse to date.

The above circumstances not only cause a limited system understanding (cause and effect relationships), but also a modest and perhaps biased problem diagnosis in policymaking for learning and a limited insight into adequate policy measures given particular system conditions. In addition to a shortage of conceptual and empirical testing, a few important areas have been largely overlooked, i.e. the role of “soft” aspects of infrastructures and the role of financial systems. In the remaining section we will briefly illustrate why these areas deserve more attention in studies of learning regions.

It is a basic assumption of much regional economic analysis that the competitiveness of the regional (urban) economy depends partly on infrastructures located in the area and connecting that area with the larger world. However, from the viewpoint of learning sparse attention has been paid to the design and management of infrastructures and innovative developments in these aspects that support the regional economy. Learning and innovative solutions, like new network concepts, a robust legislation and flexible arrangements, are necessary because of important new trends, including convergence of infrastructures, e.g. of transportation systems and information infrastructure, an increased use of information technology (IT) in all layers of conventional infrastructures, like of water, energy and waste
removal; a re-positioning of public and private roles leading to new organisational patterns and application of new modes of competition and regulatory arrangements; the need for flexibility, and adaptability of infrastructures, and — for a limited number of infrastructures — a trend for decentralised operation like in energy provision and waste water treatment (THIISSEN and HERDER, 2002). In a learning region’s approach the application of innovative design and management (operational and strategic) of infrastructures would be questioned, including factors that hamper and factors that enhance the application of innovations. In addition, the question would be raised as to how innovative design and management of infrastructures contribute to a better performance of regions (cities).

In various studies of learning regions, the financial sector is briefly discussed as part of the regional innovation system (e.g. BRAMANTI and SENN, 1997; BRACZYK et al. 1998). There are only a few studies in which the focus is explicitly on the financial sector as a key factor in innovation in a regional context (e.g. LERNER, 2001; ANTONELLI and QUERE, 2002; POWELL et al., 2002). In the latter studies it is acknowledged that in many high-technology fields learning activity includes long-lasting and very expensive development and testing programs, like for new (smart) materials, biotechnology, and laser technology. Accordingly, financial actors are as important as scientific actors and play prominent roles in the relevant networks. Due to the fact that high-risk investment is involved, financial actors learn and innovate in dealing with high risks, both inside the organisation and in interaction with their clients. Such processes may lead to a redesign of financial products like venture capital and services surrounding initial public offerings (IPO’s). On the other hand, financial markets play a key role as filters and screeners of newly established companies and new business ideas. Loans, initial public offerings, etc. are only provided if specialised experts have expressed a positive assessment on the venture. From a learning region’s perspective,
relevant questions would address the match between supply and demand of financial services, including implications for the performance of high-technology companies.

LESSONS FOR POLICYMAKING TO INCREASE THE LEARNING CAPABILITY

Although it is very popular to discuss learning regions, studies of policymaking for learning regions are sparse. Their number is however increasing, e.g. based on experiences in the European Union innovation programmes (Regional Innovation Strategy, Regional Innovation and Technology Transfer Strategies and Infrastructures). The lessons to be presented here are drawn from a variety of sources, i.e. comparative regional studies (e.g. HASSINK and LAGENDIJK, 2001; LANDABASSO and MOUTON, 2003), from historical analysis (e.g. HALL, 2000) and from case studies of individual companies (e.g. SENGE, 1994; HERTOG and HUIZENGA, 1997).

One lesson tells us that not all favourable conditions can be shaped by policies. For example, almost all creative cities in history were undergoing rapid and radical economic and social transformation, introducing new forms of organisation and production. Another salient feature is the steady flow of migrants from adjacent areas, but also from a distance bringing cultural diversity and new competence into the city (HALL, 2000).

Other lessons can be addressed to policymakers because they have a role to play. The lessons that call for policymaking on the strategic level and for certain roles for regional (urban) governments are summarised in Table 2. As previously mentioned, at this stage of the research it is impossible to give a rating of importance to the different critical conditions. Further, it needs to be realised that governments as parts of the learning networks can shift roles and exchange them with private actors in the network. As an example we take the critical conditions of the networks to preserve openness and integration, i.e. autonomy, loose coupling, heterogeneity and equality of actors in the networks. Such structural conditions
cannot be brought about automatically and overnight. It requires the consistent management of networks over a considerable period of time. Managers of networks are often found in intermediary organisations like the chamber of commerce, or in universities. However, if the territorial size of the networks coincide with regional or urban administrations it stands to reason that government agencies perform the role of network managers, like in Germany the regional districts (BENZ and FÜRST, 2002). What seems exclusive for government agencies are roles that ensure that learning networks function effectively and remain oriented to publicly endorsed goals.

Different from the past, the success of policies cannot be evaluated merely in terms of goals achieved, cost efficiency, etc. Behaviourally and process-oriented criteria need to be added to measure other desirable policy outcomes, like the strengthening of the regional research and technology development, and the creation of a bottom-up and transparent policymaking process.

On the project level we may identify measures that enhance creative thinking and, if innovative solutions are found, to provide action perspectives. Measures that enhance creativity include to add a number of creative people (unconventional thinkers) to the organisation, to put a high premium on creativity, and to add some staff members oriented towards new trends in the outside world (“gatekeepers”). Serendipity may be promoted by arranging the meeting of people that normally do not see each other (e.g. arts and science). On a more practical level serendipity may be stimulated by daily management styles that enable to pose questions like: why is this development a success and the other not, and what happens if we turn a routine upside down (like starting with the end and starting broad instead of
narrow), and what happens if the organisational structure changes fundamentally, like from vertical to horizontal, and from linear to circular?

A further set of measures follows from the need to support action-oriented networks that are committed to bring innovative ideas towards reality. There are different models for supporting such networks outside the command-and-control regulatory tradition (RIP et al., 1995). We may briefly introduce two of them that matches with the critical conditions on the strategic level, i.e. strategic niche management (SNM) and public entrepreneurship networks (PEN) (e.g. LAWS et al., 2001). The former has a focus on the development of a viable technology and questions what protection is necessary from the government to foster experimentation that yields technologies with viable prospects in the market. Thus, it takes the market as an evolutionary environment. The PEN model has a stronger focus on societal learning and the development process itself, and views the government as a direct participant in this process using different roles. In addition, PEN focuses on the ecology of roles, like a pioneer and mediator, supporting the development network.

We may conclude with the observation that the above lessons for policymaking reflect the critical conditions for learning, as indicated in Table 1. It is geared towards the creation of commitment, consensus, and trust, to openness and integration and it is action-oriented. In fact, it is far away from traditional, command-and-control types of policymaking. After all the latter types of policymaking would not have matched with the networks that are favourable to learning.

FROM CO-EVOLUTION TO CO-REVOLUTION?

It is a policy dilemma whether the above conditions need to be brought about incrementally or as a set of radical, long-term and comprehensive system changes, in other words, a system innovation. This dilemma is particularly true for regions (cities) that learn at low levels but
fail to improve, and for regions that learn at good levels but tend to fall back. Bringing about a system innovation requires, however, specific kinds of policymaking, i.e. transition management. In transition management, various key characteristics of the learning system need to be profoundly transformed. Therefore, it needs a long-term view, dealing with concomitant uncertainty, and a high degree of integration between the different policy areas and concomitant measures (e.g. ROTMANS, 2002). In current policy relationships in Europe and North America, it is not possible to impose system changes from above because of resistance from actors that prefer to preserve the current situation, and because of lack of knowledge of the system. Rather, a series of experiments on long-term perspectives may be carried out, from which the most promising ones are selected in a bottom-up process in order to be realised partly driven by self-organisation (e.g. STACEY, 1992). What seems important is that policy measures precisely impact on those networks actors (factors) that reverse unfavourable processes and accelerate favourable developments, in other words to prevent a downturn and accelerate an upturn in learning and concomitant innovation.

Aside from a lack of knowledge about turning points, we face a couple of practical obstacles. First, the staff of regional (local) policy agencies needs to be qualified for such activities, which is often not the case. Secondly, innovative experiments do not fit the current policy culture which is based on goal-efficiency and accountability. These obstacles perfectly indicate the need for policymaking agencies to quickly become a learning organisation by themselves. In addition, there are research questions that need to be clarified urgently. These questions can be summarised as follows: What causes a reversal of trends in learning systems and how can this be identified? How can once achieved adaptability (resilience) be preserved? Which policy options are available to enhance a desirable reversal of trends, preventing a downturn, causing an upturn, and to enhance desirable acceleration, preferably within the context of modern network-based policymaking? What counterforces may be expected
aiming at prevention (delay) of systemic change? What are wise strategies to “fight” the actors involved, e.g. can such actors be incorporated in the transition process in a positive way? What is the role of the public and the private sector in “co-revolution”?

We cannot be conclusive about what is the best for a region; there is no best practice, but a number of good practices. What the latter have in common and what contributes to many of the previously indicated strategies and operational measures is a key role for Human Resource Management at the regional (urban) level. Qualification of staff and high professional levels are crucial in bringing about system changes using experimentation and certain degrees of self-organisation. These are also crucial in causing a sufficient level of creativity and alertness in the daily operations of policymaking organisations. Thus, Human Resource Management does not merely mean to increase educational levels. For policymaking organisations it also includes changing the mind-sets, e.g. improving lateral thinking to cross organisational boundaries, increasing abilities to signal new trends, to deal with uncertainty in a creative way, and to act as a process manager of transition. It seems that co-revolution in improving learning capability is still far away from most current situations, not at least because of the huge educational tasks, the still weak structural position of learning policies, and the many questions that need to be clarified.
References


LANDABASO, M. and MOUTON, B. (2003) Towards a different regional innovation policy: eight years of European experience through the European Regional Development Fund innovative actions, in GRENHUIZEN, M. van, GIBSON, D. and HEITOR, M. (Eds)


<table>
<thead>
<tr>
<th>Conditions</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consensus and Commitment</td>
<td>Actors involved have a sense of a <em>mission</em>, and support shared ambitions and visions</td>
</tr>
<tr>
<td>Trust</td>
<td>Trust is <em>basic</em> for information exchange and <em>co-operation</em></td>
</tr>
<tr>
<td>Openness</td>
<td>There is communication and absorption of new information</td>
</tr>
<tr>
<td></td>
<td>There is <em>reflective openness</em> to critically view own performance, learning and underlying institutions</td>
</tr>
<tr>
<td></td>
<td>Situations are being created that facilitate <em>serendipity</em></td>
</tr>
<tr>
<td>Integration</td>
<td>There is <em>interactive</em> learning in and between networks</td>
</tr>
<tr>
<td></td>
<td>Problems are viewed through system thinking, including modelling but also experimentation and evaluation</td>
</tr>
<tr>
<td>Action-orientation</td>
<td>The new knowledge is applied through <em>action</em></td>
</tr>
<tr>
<td>Conditions for Learning</td>
<td>Critical Conditions on the Strategic Level</td>
</tr>
<tr>
<td>-------------------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td>Consensus and Commitment</td>
<td>Bottom-up approaches, Existence of trust, Reliance on self-organisation</td>
</tr>
<tr>
<td>Trust</td>
<td>Policy design under amendment (participation)</td>
</tr>
<tr>
<td>Openness and integration</td>
<td>Autonomous networks, Loosely coupled networks, Heterogeneity of participants, Open (egalitarian) structures, Conditions to increase serendipity, Conditions to prevent path dependency</td>
</tr>
<tr>
<td>Action-orientation</td>
<td>Conditions to link innovations with action</td>
</tr>
<tr>
<td>General</td>
<td>Conditions that improve efficiency and preserve orientation to public goals</td>
</tr>
</tbody>
</table>

25