

# e-clustering – an innovative approach for economic policy

Dr. Ute Hansen - 1204

Paper - 650

## Abstract

*In the State of Schleswig-Holstein the strategy of economic policy is based on a concept which is known as “cluster building”. An economic cluster initiates the networking of all participants in a value-added chain. The objective is to bundle the potentials and competences for increasing the innovation power and competitiveness of the partners in a cluster. Because of internet-technology, business and government networking in a rural area will obtain a driving force.*

*Internet-technologies, like infrastructure, applications, platforms, broadband, enable the business processes between companies, research institutes and government to be networked. E-business and e-government will cause a fundamental structural change of the private and public sector. Owing to this development, there is a new demand for economic policy and technology policy. With the strategy of e-clustering this demand is taken into account. The partners in an e-cluster are networked by standardised processes, which are supported by online-applications. An e-cluster needs a central infrastructure and services. E-knowledge management, e-learning, and e-government are the main processes and services of an e-cluster to accelerate the innovation processes. Funding activities focuses on innovative e-clustering-projects in the State of Schleswig-Holstein: They should on the one hand increase the demand for broadband infrastructure and services and therewith for the regional development of times (telecommunication, information technology, multimedia, entertainment, security) and on the other hand support networking and e-business.*

# Content

1	The importance of times-technologies for an innovative economic policy .....	3
2	The concept of cluster building .....	4
3	The e-clustering strategy .....	9
3.1	Balanced scorecard as strategic instrument .....	9
3.2	e-clustering: vision, mission and strategy.....	13
3.3	The perspectives of an e-cluster .....	14
3.3.1	The cluster perspective: economic output.....	14
3.3.2	The cluster perspective: partner and cooperation .....	15
3.3.3	The cluster perspective: processes .....	16
3.3.4	The cluster perspective: improvement and development .....	20
3.3.5	The cluster perspective: organization and policy.....	23
3.4	Cause-effect-chain .....	24
4	Case Study: e-clustering strategy Schleswig-Holstein.....	25
5	Conclusions .....	26

# 1 The importance of times-technologies<sup>1</sup> for an innovative economic policy

The times-markets are an important motor for the change of the industrial into the information society. Developing rapidly and causing innovations in all industries the times-technologies are an accelerator for the economic and technological development of a region.

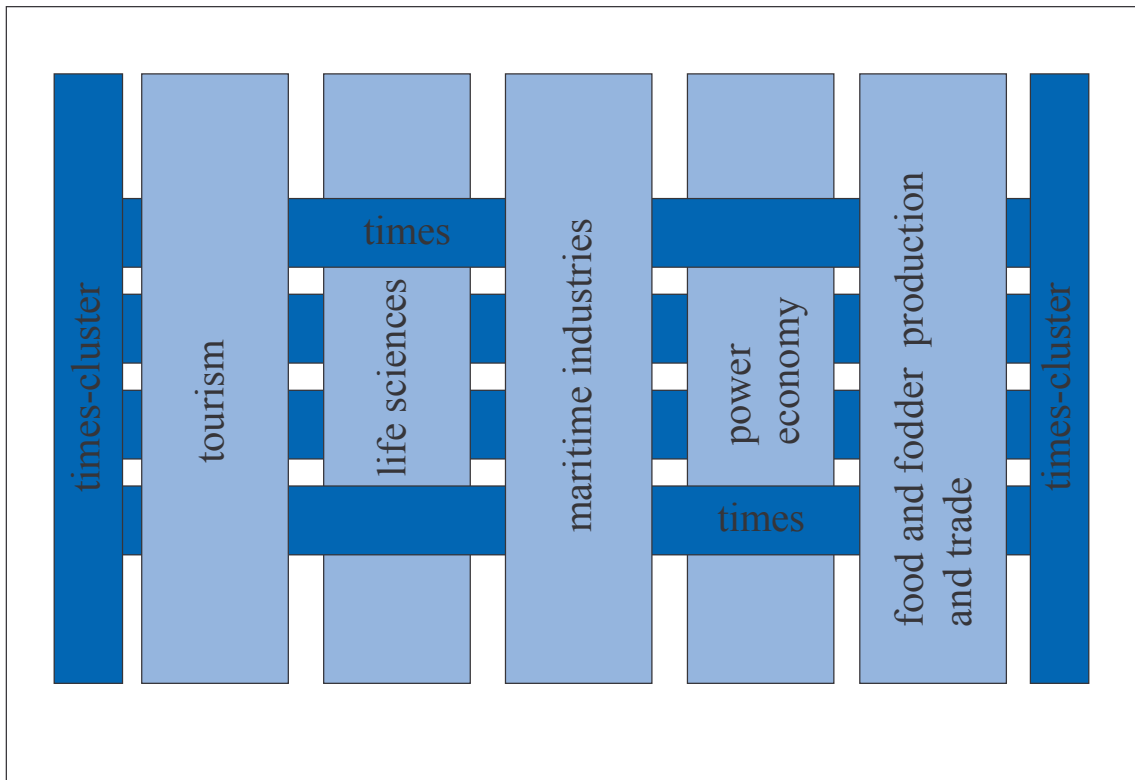
The digitalization and networking, especially caused by the development of broadband-infrastructure and broadband-applications, push the convergence of different media, information technology and telecommunication industries. Changing business processes, new integrated value-added chains, different organisational structures and innovative products will result in positive effects on employment and growth.

The strategy of economic and technology policy, which focuses on clusters, ensure innovation, growth and employment in a region. The times-cluster has two important functions for the processes of innovation. Because of the cross-function technologies the times-cluster accelerates innovation and therefore the technological and economic development of the application-clusters, like the cluster life sciences and tourism. Moreover the times-cluster itself is an application-cluster. This double function of the times-cluster provides for a high potential of innovation and growth, so that the region will become competitive and dynamic.

The realization of the strategic e-clustering-approach means an interlocking of the regional times-clusterpolicy and the user-clusterpolicy.

---

<sup>1</sup> times = telecommunication, information technology, multimedia, entertainment, security



**Figure 1: times-technologies as cross-section-technologies**

## 2 The concept of cluster building

The strategy of a policy which is aimed on cluster building is to support regional networks of competitive and cooperative actors in a cluster. An economic cluster initiates and pushes the networking of all participants in a value-added chain, which are companies, institutions, such as universities and research institutes, customers, supplying industries, employees, representations of interests and the public sector. A cluster consists of independent organizations which strive for economic growth and efficiency. In accordance with the concept of cluster building it is the intensity of the interaction of the actors and not the individual actors which has a positive effect on the competitiveness of a regional cluster.

The focus of cluster analysis is the regional or geographic agglomeration of networked organizations and individuals. Porter explains the effects of efficiency and specialization: „Geographic concentration of firms in internationally successful industries often occurs because the influence of the individual determinants in the

“diamond“ and their mutual reinforcement are heightened by close geographic proximity within a nation. A concentration of rivals, customers, and suppliers will promote efficiencies and specialization. More important, however, is the influence of geographic concentration on improvement and innovation” (Porter 1990: 156-157).

The concept of cluster building gets a new dimension because the innovative times-technologies provide for new technological possibilities to support the process of cluster building. Independent of time and location the actors of a cluster are able to take part in processes of information, communication and transaction with internal or external partners of a cluster. Whether the cluster is able to meet competition depends on its capacity to digitalize the internal cluster processes and the processes between different clusters.

The competitive advantages of a regional and therefore local cluster building are enforced by the digitalization of the cluster processes. The concept of the local and geographic clustering has to be extended by the concept of e-clustering.

Porter describes a paradox concerning the regional clustering and the process of globalization and underlines implicitly the e-clustering-approach: “While classical factors of production are more and more accessible because of globalization, competitive advantage in advanced industries is increasingly determined by differential knowledge, skills, and rates of innovation which are embodied in skilled people and organizational routines. The process of creating skills and the important influences on the rate of improvement and innovation are intensely local. Paradoxically, then, more open global competition makes the home base more, not less, important” (Porter 1990: 158).

The processes of knowledge management and learning are more and more supported by information and communication technology, so that it will be important for the competitiveness of a regional cluster in the global market, to what extent for the cluster specific processes of knowledge management and learning are standardised and digitized. The use of e-knowledge management- and e-learning-applications will allow the cluster to concentrate on for the cluster specific and regional competitive factors,

which Porter describes in his paradox to be of vital importance for competitiveness of the cluster.

The e-clustering-approach of a regional economic and technological policy means on the one hand a digitized network of the actors of a process oriented cluster organization, and on the other hand a digitized network of different clusters. Therefore a difference is to be made between internal and external processes.

A cluster is characterised by a critical mass of actors in a value-added chain. These value-added-chains can be focused on technology, processes or industries.

The e-clusters will produce the following positive effects:

a. e-clusters accelerate the distribution of knowledge

The dynamical development of times-technologies produces an increasing importance of the resource knowledge. The processes and products are more and more knowledge intensive, so that the resource knowledge becomes an important production factor. The systematic and organized use of the factor knowledge has a decisive function for the competitiveness of a company in a knowledge intensive economy. (Probst et al.1999: 19-32).

An e-cluster organizes the knowledge management processes. Therefore, the small and middle-sized companies are able to use the resource knowledge effectively and efficiently in their business processes and for their development of products. Therefore the acceleration of innovation processes and the power of competitiveness are improved sustainedly.

b. Transaction costs are reduced by e-clusters

Processes of information, communication and transaction, in which the actors of an e-cluster are involved, result in transaction costs. The categories of cost include costs of information, of decision and costs of controlling (Richter and Furubotn 1996: 35). The actors of an e-cluster have positive transaction costs because of imperfect information.

The foresight of the actors is uncertain, which means, that the actors do not know, what will happen in the future. In addition, there exists asymmetrical information between partners, because one actor knows more than the other one (Richter and Furubotn: 1996, 18).

In an e-cluster, the overlapping processes of information, communication and of transaction are organized and supported by times-technologies. The actors of an e-cluster are able to realize positive cost effects being incurred by the optimization of their business processes.

c. e-clusters provide for an infrastructure

A further positive effect results on the one hand from the possibility to use a common supply of resources, like information and communication platforms or learning institutions, and on the other hand from the opportunity to bundle the demand of the actors. Preissl and Solimene draw the following conclusion: „One of the essential features that make clusters attractive is the sharing of resources and the aggregation of demand for resources. This affects infrastructures, such as traffic systems, schools and universities, energy and water supply systems as well as telecommunication facilities that are used jointly by many firms and organisations” (Preissl and Solimene 2003: 46).

The demand of an e-cluster for infrastructure can be bundled and therefore increased. The supply can be on the one side public or private. On the other side the provision can be organized by the e-cluster itself.

d. The processes of e-clusters produce economies of scale

The processes of an e-cluster are collaborative and overlapping, like the knowledge management processes and the logistic processes, so that they produce increasing economies of scale.

- e. The e-cluster causes external economies

The actors of an e-cluster cooperate in processes with the consequence that external economies caused by this networking occur. Positive externalities of cooperation and of networking emerge from the increasing value of a good the much more it is used. The externality can be direct, for example resulting from the use of the knowledge management, or it can be indirect because of increasing economies of scale.

- f. The e-cluster produces economies of specialization

All partners in an e-cluster are organized in overlapping and collaborative processes. Consequently, the standardisation of the processes allows for a business-process-outsourcing. Therefore the partners in an e-cluster are enabled to concentrate on their main competences to accelerate the innovation processes. The e-clusters produce economies of specialization which result in positive effects on productivity and innovation capacity of the cluster-actors and therewith of the whole cluster.

- g. An e-cluster stimulates competition and cooperation

The e-cluster is organized by collaborative processes, so that cooperation between the actors is stimulated. According to this effect in an e-cluster positive competitive situations develop. Preissl and Solimene describe this phenomenon: „In this sense, clusters are ideal incubators for innovation. Close cooperation in technological development stimulates the creation of the next generation technology. Competition pushes technological inventions towards product and process innovation” (Preissl and Solimene 2003: 50).

- h. The internationalization of the economic and cluster-specific relations is enforced by e-clusters

Cooperation and networking are planned, initiated and controlled by the management of an e-cluster to bundle all innovative potentials and competences of the actors in a value-added chain. On the one side a networking within the cluster is necessary for improving the competitiveness, on the other side the networking of different clusters contributes to



the acceleration of the innovation processes. Especially for a regional cluster, which is innovative and therefore knowledge intensive, the cooperation with other clusters will generate knowledge spillovers which are a benefit for the innovation capacity. The application of times-technologies improves the internationalization of the economic and cluster relations. The coordination and control of these collaborative processes are the challenge and the potential of success for an e-cluster.

The focus of a cluster policy is the potential growth of a regional cluster. The acceleration of the innovation processes by cooperation and competition results in more employment and growth in a region. An all-embracing cluster strategy has to consider and to balance out business, economic, technological, employment and educational objectives so that a management instrument is to be applied, which meets these requirements.

Kaplan and Norton developed a management instrument, the balanced scorecard, which will be applied to make a concept for a comprehensive cluster strategy (Kaplan and Norton: 1997). The result will be a strategic frame for e-clustering, which is transferable to all regional cluster initiatives or strategies.

### 3 The e-clustering strategy

#### 3.1 Balanced scorecard as strategic instrument

With the balanced scorecard a strategic management system is available, which on the one hand is appropriate to develop and evaluate a strategy and which on the other hand has its main function during the realization of the strategy.

The balanced scorecard is keyed strictly to times-supported processes. A cluster organized by processes is so the condition for the application of the balanced scorecard to develop a cluster strategy.

The concept of the balanced scorecard is based on the assumption that the managers of the public and private sector have visions, develop a mission and deduce a cluster

strategy. The strategy will be translated into goals and will be realized with actions. „Die Balanced Scorecard schafft einen neuartigen Rahmen zur Integration von strategischen Maßnahmen. Sie enthält die finanziellen Kennzahlen vergangener Leistungen und führt gleichzeitig zukünftige finanzielle Leistungstreiber ein. Diese Kenngrößen, welche die Perspektiven Kunde, interne Geschäftsprozesse sowie Lernen und Wachstum umfassen, werden aus einer expliziten und kompromißlosen Übersetzung der Unternehmensstrategie in konkrete Leistungsziele und Maßnahmen abgeleitet“ (Kaplan and Norton 1997: 18). The process of developing a scorecard has the following stages:

1. stage: Evaluation of the strategy by taking the vision and mission into account
2. stage: Deduction of the strategic objectives
3. stage: Connection of the strategic objectives
4. stage: Determination of the measured values
5. stage: Determination of the assigned values
6. stage: Determination of the strategic activities
7. stage: Interconnection with the operational planning

The strategic objectives are linked with measured values which have a long-term focus. To realize the objectives and measured values strategic activities are planned. Finally milestones are specified which have to ensure the connection between strategy and the operational plan.

Therewith the balanced scorecard consists of the following elements: vision, mission, strategy, perspectives, objectives, activities, measured values and the cause-effect-chain.

The actors are often rather hazy about their visions and wishes. In the course of time these visions become more and more concrete and become a motor for activities. The vision of the balanced scorecard has the task to illustrate the partners of a cluster the long-term objectives. It is valid that the shorter the vision is the more it is accepted and translated into objectives and strategies.

The mission has the task to build up an image for the cluster. It describes how extern partners or customers should perceive the cluster.

Developing strategies need fundamental decisions which pertain to the whole cluster. Because of the existence of strategies the main intents of the cluster are realized. They express how the cluster constitutes its existing and potential strength to meet changing environmental conditions.

The strategic objectives are part of the balanced scorecard. They are necessary to realize the strategy. Through the activities the strategy reaches a concrete and operational frame.

According to the concept of Kaplan and Norton the basic perspectives are the financial perspective, the customer perspective, the perspective of internal processes and the perspective of improvement and development.

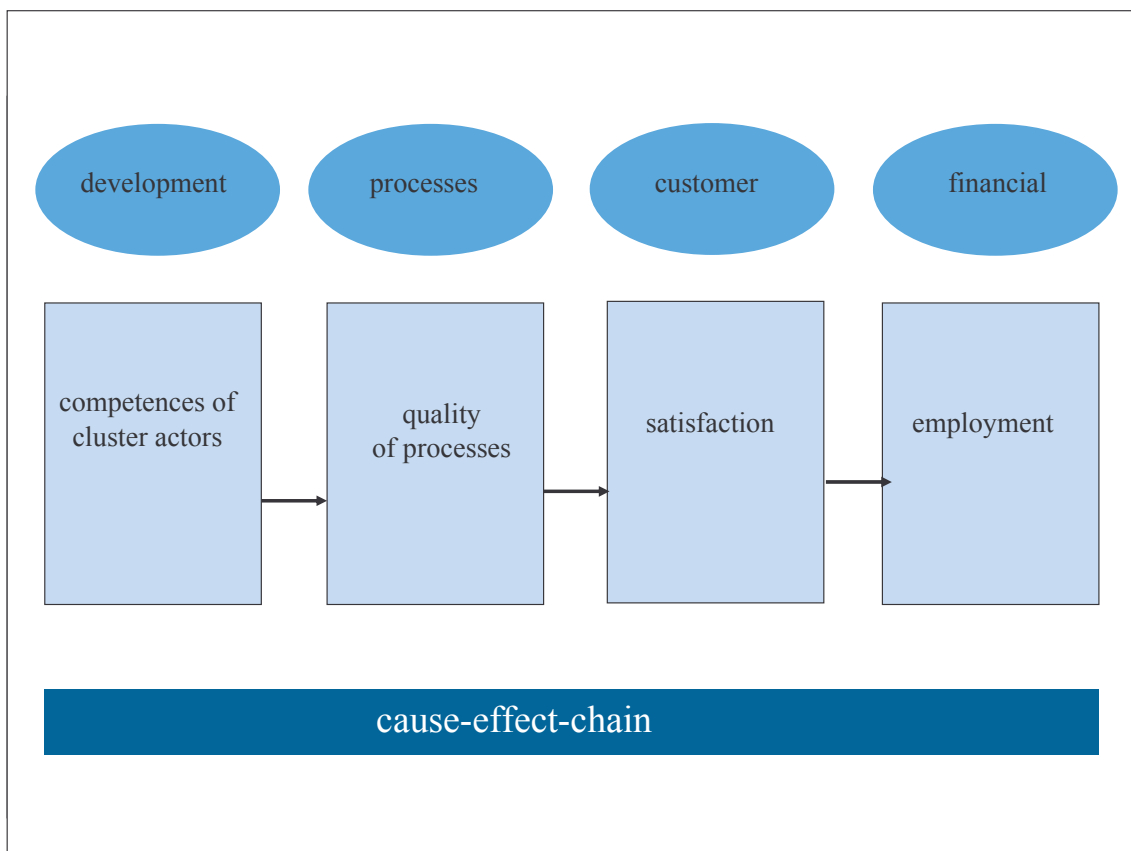
The most important strategic perspective is the financial one. The financial measured values have to fulfil a double role. On the one side they determine the financial output of a strategy and on the other side the financial measured values represent the final objective of the other scorecard perspectives. The measured values of the other perspectives have to be interconnected through the cause-effect-chain with the financial perspective.

After Kaplan and Norton the customer perspective is keyed to the customers of a company. With respect to satisfied customers objectives, measured values and strategic activities are developed.

The perspective of internal processes identifies critical processes, which have to be optimized by the cluster organization. These processes are the main processes of a cluster and therefore they contribute decisively to the objectives of the financial perspective, such as the increase of gross value added and employment. The process perspective is so occupied with the question how to organize the processes to accomplish with the requests of the customers and financiers. It is not the focus of the process perspective to control and optimize existing processes. On the contrary this perspective concentrates on identifying processes which are expected to be most successful for the realization of the cluster strategy. For the representation of the whole value added chain it is very important to integrate the innovation processes.

The perspective of improvement and development characterizes the infrastructure which is necessary to ensure improvement. The infrastructure which enables the fulfilment of the objectives of the other perspectives has to be established. This perspective has long-term effects and is so of high importance. The measured values are keyed to the competences and potentials of the cluster actors and to the application of times-technologies.

Kaplan and Norton develop a frame for the determination of the perspectives. It depends on the sort of strategy which perspectives are chosen.



**Figure 2: cause-effect-chain**

The strategy is composed of the hypothesis concerning the cause-effect-chains. The cause-effect-chain represents the relations between the objectives of the different perspectives. Generally an improvement of the perspective improvement and development will have a direct or positive influence on the objectives and measured

values of the perspective of the internal processes. The positive developments of the process perspective will produce positive effects on goals and measured values of the customer perspective which will finally improve the financial part of the strategy. In such a way various cause-effects-chains can be developed and have to be proved by the measured real effects.

### 3.2 e-clustering: vision, mission and strategy

The cluster strategy is integrated in the objectives of the regional economic policy. From the aim to maximize the welfare objectives concerning stability, growth, structure and distribution are deduced. The economic policy is always keyed to innovation, growth and employment.

To develop the model of a cluster policy a vision, a mission and a strategy are necessary. This model is the starting point for the conception of the e-clustering balanced scorecard. It is the first step in a dynamic strategic process, the scorecard process.

The cluster actors have to take part in the scorecard process, because all results, like the model, have to be accepted by the whole cluster. The vision of an e-cluster could be the following one:

In the regional e-cluster, keyed to innovation, growth and employment, the actors cooperate und compete in collaborative, with times-technologies supported and product oriented processes!

While the vision should influence the activities and decisions of the cluster actors themselves, the mission of the cluster is focussed on other clusters or customers. The cluster could determine the following mission:

Innovation through cooperation!

The cluster strategy, which means a fundamental decision for the market position, is deduced from the vision and mission. To prepare this strategic decision several methods, like market analyses, can be employed. A cost-benefit-analysis helps to evaluate the strategic approach. The result of this process could be a fundamental decision like this one:

The strength and competences of all cluster actors are leveraged and developed efficiently and effectively in the cluster processes, so that the innovation of the processes and the products will lead to a growth rate of 3 percent in the next two years!

### 3.3 The perspectives of an e-cluster

The strategic perspectives of an e-cluster support to establish a balanced system of objectives and measured values which is necessary to realize a comprehensive strategy. An e-cluster which is in an early phase of evolution should develop the following perspectives: The economic perspective, the perspective partner and cooperation, the process perspective, the perspective of improvement and development and finally the perspective policy and organization.

#### 3.3.1 The cluster perspective: economic output

The economic perspective of an e-cluster represents the final output produced by all economic cluster activities. The improvement of the economic output and therefore of the gross value-added is the decisive aim.

From this point of view a cluster should determine an expansion of the employment stock and of the capital stock as strategic goals in order to gain positive growth effects. Therewith an increase of the gross national product, an increase of employment or an increase of the investments in a regional e-cluster could be the common focus. For these objectives indicators have to specified, such as the gross national product per cluster

actor or the expenditures for investments per company of the cluster. With the balanced scorecard an instrument is available which enables the implementation of a controlling.

### 3.3.2 The cluster perspective: partner and cooperation

Modelled after the customer perspective of Kaplan and Norton, the perspective of partner and cooperation has an immense significance for the cluster strategy. The cluster actors, especially the companies, the universities, the research institutes, the public institutions, should organize themselves in network and in cooperation because they want to bundle and therefore increase their potentials and competences.

Collaborative processes necessitate an optimal organization and so activities keyed to objectives. To initiate cooperation and network, it is necessary to expose not only the macroeconomic effects but also the microeconomic benefits. Dohse describes the results of an survey concerning the regional cluster BioRegio: „The most important *advantages* of the BioRegio instrument appear to be the enhancement of communication and cooperation among the regional key actors, the establishment of an innovation prone regional environment, the furthering of research cooperation within the BioRegios and the stimulation of interregional competition for technology” (Dohse 2003: 376).

Through cooperation with other clusters in the global market a regional e-cluster has the chance to develop its strength and to open up new markets. The internationalization of cluster relations results in effects on the innovation capacity and on the competitiveness.

To provide the collaborative activities of the cluster actors, the strategy has to consider objectives, measures and indicators. The objective that the cluster actors take part in collaborative processes and projects could be reached by the measure “Implementation of a cooperation, project and process management”. The number of cooperation projects, the number of cooperation partners or the number of collaborative and therefore overlapping processes, the satisfaction of the cluster actors could be the indicators to measure the success of this perspective.

### 3.3.3 The cluster perspective: processes

The internal and cluster overlapping processes which are critical for the successful market position of the cluster, have to be identified. The collaborative processes belong to the main processes of an e-cluster. The processes of innovation, of knowledge management, of learning and the public processes are chosen to illustrate the perspective processes of the cluster strategy.

The significance of the innovation and knowledge management processes are analysed by Preissl and Solimene: „In the analysis of innovation, the traditional concept of clusters as spatial agglomerations that enhance productivity and growth in a certain region has to be reconsidered taking into account the essential features of knowledge management in an information economy” (Preissl and Solimene 2003: 5).

#### *a) Processes of innovation*

The innovation process includes all activities, which cooperate logically and temporally and contribute to the commercial exploitation of a new product or to the application of a new process through the company. The starting point of an innovation process is the research and development activities, which should result in a product- or process prototype. Then activities are following to prepare the market introduction or the process implementation in the company.

The processes of innovation are the main processes of a cluster and could be accelerated by the interaction of the cluster partners, especially by the interaction between the companies and research institutes.

The objectives could be focussed on the efficiency and effectiveness of the processes of innovation: acceleration of the innovation processes, improvement of the process quality, increase of the resources for research a development, improvement of the productivity of innovation.

A process indicator could be the pass-through time of innovation projects, which means from the idea to the availability of a product- or process prototype.

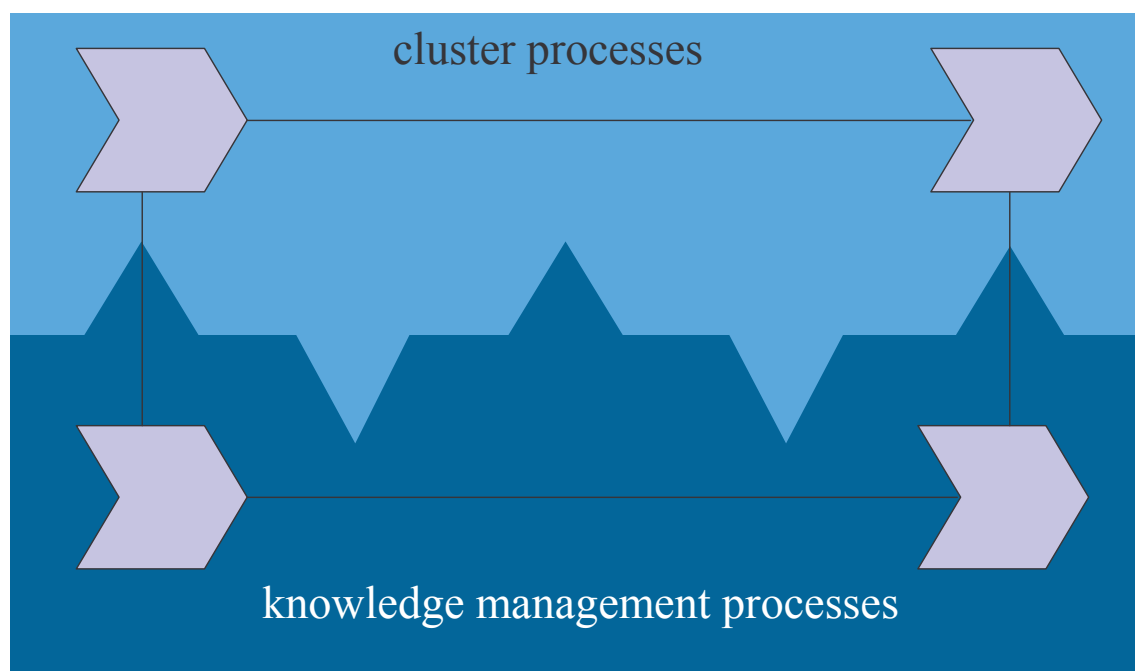


The indicators which are orientated to the input of innovation could be the expenditures for research and development. The innovation productivity could be measured by the number of patents.

*b) Processes of knowledge management*

Knowledge management, being a comprehensive approach, accepts implicit and explicit knowledge as a strategic and value creating resource and is keyed to the optimization of the interconnection of knowledge management processes with the business resources.

A process oriented knowledge management enables the cluster processes, such as the innovation processes, to be accelerated and improved. A decrease of the process costs and increase of the process quality are the consequences.



**Figure 3: Process oriented knowledge management in an e-cluster**

Knowledge management has the aim to use knowledge in such a way, that the objectives of the cluster could be reached optimally. A process oriented knowledge management concerns because of the cross-function all parts of the cluster. To make the knowledge just in time in the processes of the company or in the collaborative processes of the cluster available needs an interlocking between the business processes and the

knowledge management processes. Positive effects on the quantity and quality of the output and therefore of the value-added of the cluster are the consequence.

The main processes of knowledge management are the knowledge identification, the knowledge acquisition, the knowledge development, the knowledge distribution, the knowledge utilisation and the knowledge storage (Probst et al.1999: 53-56).

The process knowledge identification comprises the analysis and the description of the existing knowledge basis of a cluster. The aim of this process is to receive and improve transparency regarding the existing and available data, the information and competences of the cluster.

The process knowledge acquisition has the task to identify sources of knowledge lying outside the cluster. Through the integration of experts or through the cooperation with other clusters the cluster has the opportunity, to use knowledge potentials which are not available within the cluster.

The process knowledge development is a very important one because this process is keyed to develop new competences, new products, better ideas and innovative products. The process of knowledge management development is directly linked with the innovation processes of a cluster.

The process knowledge distribution supports the distribution of the knowledge in a cluster and increases so the just in time availability of this important resource.

The process knowledge utilisation ensures that the existing knowledge is used effectively in the cluster processes.

The function of the process knowledge storage is to avoid that knowledge gets lost to the cluster. The focus of this process is to save and to update the existing and available knowledge basis in the cluster processes.

The objectives of the knowledge management processes are especially the process acceleration, the improvement of process quality and the decrease of the costs of information, decision and transaction.

The measured values could concern the quantity and quality of the knowledge basis of a cluster, the pass-through-times of projects and processes, the level of costs of information and transaction or the cooperation with the universities and research institutes.

### *c) Processes of learning*

To improve the innovation capacity and therefore the competitiveness of a cluster, it is necessary that the cluster understands itself as a learning organization. It appears in outlines that the knowledge management processes and the learning processes will converge more and more which will lead to an optimized interconnection between the processes of learning and the knowledge management processes in a learning cluster organization. While the objective of the knowledge management is to structure, to save and to distribute information and knowledge, the processes of learning have the aim to support the internal qualification in the complex and distributed structures of a cluster. The integration of knowledge management and learning management is the condition for the individual and flexible use of learning contents on the one side and for the possibility on the other side, to connect the teaching and learning contents with an effective skill management. „Life long learning“, „training on the job“, „organizational learning“ and „training on demand“ are the future scenario to organize collaborative processes of knowledge management and learning in a cluster.

### *d) Processes of government*

The public sector is partner and actor in a cluster organization. The companies have to comply with a lot of requirements of the public sector especially concerning taxation and statistics which produce common processes. Furthermore, the public sector is a very important supplier of information and knowledge for the companies so that the public sector takes directly part in the decision processes of the company. In addition, the public sector orders services of the companies and subsidizes the private sector so that

additional processes between the public and private sector, like procurement and funding activities, are produced.

There exist a lot of processes of information, communication and of transaction between the public and private sector. The processes of information include a broadcast of information without bound by law. The processes of communication are generally without or to a restricted extent bound by law. The processes of transaction represent an integrated and collaborative realization of government processes which are highly bound by law.

The objective is to identify the critical government processes which have an important influence on the competitiveness of the cluster. To produce positive competitive factors it is necessary to integrate these government processes into the cluster processes.

From the perspective of a cluster critical government processes could be funding processes, processes of information and communication and cluster specific processes such as hortatory proceedings which could be for the competitiveness of a telecommunication cluster decisive.

The implementation of process management in the public sector and the reduction of the compliance costs of the private sector belong to the most important issues to optimize the government processes. Indicators should refer to the degree of process implementation in the public sector and therefore to the process quality and process costs.

#### 3.3.4 The cluster perspective: improvement and development

The focus of the cluster perspective improvement and development are activities and measured values which represent on the one hand the improvement and development of the competences of the cluster actors and on the other hand the optimal application of times-technologies in the cluster processes. This strategic perspective is orientated to the growth of the cluster because the human capital and the times-technologies are important motors for innovation.

The competences of the cluster actors are to be enforced to reach positive effects on the process and product qualities of a cluster. The development und improvement of the human capital of a cluster is the key task for the cluster management. Especially with the implementation of the knowledge management and learning processes just as the cooperation and network this strategic objective will be taken into account. In addition to this continuation training and qualification in accordance with the skill requirements of the cluster have to be supplied.

Indicators could be the number and quality of the supply of training, the number of participants of the courses or the number of students at the universities. To evaluate the realization of the cluster strategy the quality of the skill profile of the cluster could help.

The effective and efficient support of the cluster processes with innovative times-technologies will result in product and process innovation and finally in the development of an e-cluster. The times-infrastructure of an e-cluster consists of broadband, security, platforms and broadband-applications. The objectives of an e-cluster are the improvement, the standardization and the integration of the times-infrastructure of a regional e-cluster.

The main processes of the cluster are collaborative processes so that the support of them by times-technologies will generate a benefit for the cluster actors and for the cluster as the whole.

a. e-innovation management

In the innovation processes of a cluster companies, research institutes, universities and the government takes part. Distributed and complex process and project structures necessitate a times-supported process and project management. A central information and communication platform, such as a process oriented cluster portal, fulfils these requirements. The utilisation of web-based groupware- and community-applications for example contribute to the acceleration of the innovation processes and reduces so the pass-through-times of collaborative projects.

b. e-knowledge management and e-learning

The knowledge management needs a support with times technologies not only because of the interlocking of the knowledge management processes and the business processes but also because of the convergence of the knowledge management processes and learning processes.

With e-knowledge- and e-learning-applications the processes and contents of knowledge management and learning are digitized so as to the cluster actors could use them on demand at any time and from anywhere.

The following scenario describes the benefit of a times-supported knowledge management (eknows): An employee of a middle-sized company is in a working process. The employee has the job to develop an e-marketing-strategy. He has to interrupt his working process because he wishes to develop the strategy on the basis of actual research and practical results and methods, which he does not know. Out of his working process he connects himself with eknows and step by step help is offered to him. He asks online in eknows his question concerning his problem. In a first step eknows offers the employee a definition which is eventually already the answer he is looking for. If he is not satisfied with this definition he can order a further explanation or examples for his problem. If his question is still not answered the employee has the possibility to send his question to an expert of the virtual expert organization of the cluster who is then responsible to find an answer for the problem of the employee. The expert develops new knowledge for eknows and sends the answer to the employee. The employee is satisfied and so able to continue his working process. The new knowledge is stored in eknows and therefore available for all users. If in another company the same question arises, the answer is given through eknows without engaging an expert. In a further step it should be possible for the employee to start an e-learning-application.

c. e-government

The digitalization of the processes of government is a competitive factor for the cluster. In the public sector e-government-strategies are realized with the objective to organize the public services as processes and to support them with times-technologies.

With the e-government-strategy DeutschlandOnline cooperative strategies for the implementation of public online-services in Germany exist. These strategies are not always in accordance with the requirements of the regional e-clusters. The integration of a regional e-government-strategy with the regional e-clustering-strategy is a competitive factor for the development of clusters.

As in the example of a telecommunication cluster illustrated the digitalization of hortatory proceedings could be of high priority whereas e-procurement which is part of the DeutschlandOnline-strategy is not a priority public process for a telecommunication cluster.

The cluster specific government processes have to be identified, integrated in a regional e-government-strategy and therefore supported with times-technologies. So it is possible to integrate e-business- and e-government-applications in a regional e-cluster.

### 3.3.5 The cluster perspective: organization and policy

The perspective organization and policy is concerned with the objectives and activities of the cluster management and the cluster policy. Especially in the early phase of the development of a cluster it is important to integrate the perspective organization and policy in the balanced scorecard.

To fulfil the objectives and activities of the other perspectives of the e-clustering balanced scorecard a cluster management with the following tasks is to be implemented: strategic and operative cluster management, process management, times-management, skill management, cooperation- and partner management, event management, information and communication management and finally knowledge management.

The most important objective from the view of the perspective organization is to establish an effective cluster management. The cluster management should concentrate in the early phase of the cluster development especially on the following activities: the strategic process, like the scorecard process, the establishment of an organizational unit,

like a cluster agency organized as a public-private-partnership, the financing, the establishment of the technical infrastructure, the implementation of the process management, the acquisition of cluster actors and members, the creation of a cluster profile through marketing and public relations and the networking.

The measured values could be the number of cluster members, the participants of events, the number of cooperation projects and the number of users of the technical infrastructure.

The perspective cluster policy is necessary because the realization of the cluster strategy and therefore of e-clustering and of the cluster management require political activities and decisions. Dohse explains the requirements concerning a regional cluster policy: „A core element of region oriented technology policy is the stimulation of regional high tech clustering. A necessary – although not sufficient –condition for the success of such a policy would be that the regional clustering of innovative activities does indeed yield substantial positive externalities” (Dohse 2003: 384).

The objectives of cluster policy are especially keyed to the development and the supply of cluster specific funding programmes which contribute to the realization of the cluster strategy. The focus of the regional funding programmes is to subsidize the cluster agency, the technical and process infrastructure, organizational and cooperative projects in order to support networking, competence centres, projects of research and development, projects of qualification and e-government- and e-business-projects.

### 3.4 Cause-effect-chain

The development of a cause-effect-chain is necessary because the assumptions concerning the perspectives overlapping effects have to be described and with the controlling to be evaluated.

The point in question is whether the assumptions about the effects are valid. How cooperation is influenced by the funding activities of the public sector? Is the influence of the cooperation within the cluster on the innovation processes of a cluster significant?



And finally, which effects on the gross value-added and the employment are to be expected? The Cause-effect-chains of the balanced scorecard are all based on assumptions concerning the dependencies of objectives and measured values. A controlling and therefore if necessary an adaptation of the balanced scorecard is necessary if the assumptions cannot be proved by evidence. To produce reliable assertions with the instrument of the cause-effect-chain, the application of statistical methods is required.

#### 4 Case Study: e-clustering strategy Schleswig-Holstein

In the State of Schleswig-Holstein the strategy of economic policy is based on the cluster concept. The State of Schleswig-Holstein realizes a cluster policy which is keyed to innovation, growth and employment. The future clusters are life sciences, tourism, maritime industries, information and communication industries and finally food and fodder production and trade.

The cluster information and communication technology is the focus of the cluster policy because of the double function as a cross-section cluster and an application-cluster.

The economy of Schleswig-Holstein consists of small and middle-sized companies. Networking and cooperation are regarded as the key factor for the acceleration of the innovation processes. This is the reason why the policy has the objective to enable the small and middle-sized companies to take part in the collaborative processes and projects, either they are regional or global.

Networking and cooperation requires more and more the support of times-technologies otherwise the business and government networking in a rural area like Schleswig-Holstein will suffer efficiency losses.

Internet-technologies, like infrastructure, applications, platforms, broadband, enable the business processes between companies, research institutes and government to be networked. E-business and e-government will cause a fundamental structural change of the private and public sector. Owing to this development, there is a new demand for

economic policy and technology policy. With the strategy of e-clustering this demand is taken into account in Schleswig-Holstein. The partners in an e-cluster are networked by standardised processes, which are supported by online-applications. An e-cluster needs a central infrastructure and services. E-knowledge management, e-learning, and e-government are the main processes and services of an e-cluster to accelerate the innovation processes.

The Funding activities focus on innovative e-clustering-projects in the State of Schleswig-Holstein: They should on the one hand increase the demand for broadband infrastructure and services and therewith for the regional development of times (telecommunication, information technology, multimedia, entertainment, security) and on the other hand support networking and e-business in the local cluster and with global clusters.

## 5 Conclusions

With the application of the balanced scorecard a strategic frame for a regional cluster is developed. A comprehensive and balanced cluster strategy is required to expand the potentials of a regional development and competitiveness in the global market. The process orientation and the application of times-technologies are the key factors for the development of a cluster and therewith for the realization of the innovation and growth objectives of a cluster.

To optimize the strategic scorecard process in a cluster a participation of all actors is necessary. Especially the determination of the vision, mission and strategy requires a process of participation. From the cluster strategy individual strategies and balanced scorecards of the companies, the universities, the research institutes and of the public sector can be deduced. The strategic network of all actors will improve the competitiveness of the cluster decisively.

## References

- Dohse D (2003) Taking Regions Seriously: Recent Innovations in German Technology Policy. In: Bröcker J, Dohse D, Soltwedel R (eds) Innovation Clusters and Interregional Competition: 372-394
- Kaplan RS, Norton DP (1997), Balanced Scorecard: Strategien erfolgreich umsetzen. Aus dem Amerikanischen von Peter Horvath et. al., Schäffer-Poeschel, Stuttgart
- Porter M. (1990) The Competitive Advantage of Nations. The Macmillan Press LTD, London und Basingstoke, 1990
- Porter M (1998) Clusters and new Economics Competition. Harvard Business Review 6: 77-90
- Preissl B, Solimene L (2003) The Dynamics of Clusters and Innovation, Beyond Systems and Networks. Physica-Verlag, Heidelberg
- Probst G, Raub S, Ronhardt K (1999) Wissen managen: wie Unternehmen ihre wertvollste Ressource optimal nutzen. 3. Auflage, Gabler, Wiesbaden

## List of Figures

Figure 1: times-technologies as cross-section-technologies.....	4
Figure 2: cause-effect-chain.....	12
Figure 3: Process oriented knowledge management in an e-cluster.....	17