Cluster Management Excellence

Volume II: Sustainability and Effectiveness of Clusters and Networks

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An intensive debate took place on the importance of networks and clusters in increasing the innovative power of companies and research institutions. And a general consensus was found. In recent years, plenty of networks and clusters were launched through private initiatives or public financial assistance by the Federal Government and the federal states. This is due to the advantages resulting from cooperation between science and the economy. Even today, many new regional networks are being established. This has led to the emergence of a diversified network landscape in Germany. Many of the networks provide an important boost to technological developments in their respective branches. However, there is a need for the continuous existence of networks before ample benefits can be derived from network activity and before added value is generated for the players involved. This is due to the fact that success can only arise with an increasing degree of activity within the network and only after a certain stage of development. This implies that a sustainable and stable network development is a long-drawn-out process that requires constant work.

The upcoming years will focus on furthering networks and clusters. By doing so, it will enable them to participate in innovation processes effectively and on a long-term basis. There is of course no standard solution or one-size-fits-all for networks to act successfully in the long run. The individual structures and processes within the network are too heterogeneous and varied to make this possible. This also holds true for the network landscape itself. Nevertheless, there are different mechanisms and measures which enable networks to survive for a long time.

This publication answers the questions – in the form of a very illustrative and practice-oriented presentation – about the meaning of the concept of "sustainability of networks" and measures which need to be taken for networks to survive and be efficient for the players. Moreover, various networks of the Kompetenznetze Deutschland Initiative clearly show how they have managed to implement sustainable developments in different network contexts.

We hope that this publication can give suggestions to raising efficiency within networks. Additionally we hope to show how surplus value can be increased for players and how sustainability can be enhanced, in order to make even better use of the great innovation potential offered by networks.

Dr. Gerd Meier zu Köcker
Head of the Agency of the Kompetenznetze Deutschland Initiative
1 Networks and clusters: continuously successful and sustainable!

Claudia Martina Buhl

The key for the future orientation of branches and regions are technological efficiency and competitiveness in conjunction with high innovation dynamics. Growth and competitiveness can be ensured by developing innovative products and processes. The best prospects are forecast for locations in which good framework conditions exist, where a critical mass of different groups of players of an industry or innovation field have set up business and in which players cooperate closely along the value creation chain and are engaged in intensive interaction. Research results can be translated relatively quickly into marketable products, processes and services due to this close cooperation between players from science, research and the economy concentrated within a region.

Factors of success and advantages inherent in networks and clusters (Meier zu Köcker/Buhl, 2008):

- Concentration on individual specializations, i.e. the strengths of the involved players, enables every one to focus on their core competences
- Optimization of innovation cycle
- Reduction of production cycles
- Lowering development and manufacturing costs
- Improvement of the information flow
- Consolidating and improving the market position as well as developing new sales markets and winning new customers
- Broadening the range of products/production and the possibility of providing complete system solutions and processes
- Profiling the location
- Increasing of regional competitiveness

Due to the obvious advantages, networks and clusters have been established in recent years through various activities of the private sector and public funding measures on federal and regional level. This has led, one the one hand, to the emergence of networks and clusters by so-called "bottom-up" processes, i.e. industrial and research-based mergers that originate mostly from long-standing relations of cooperation in the region. On the other hand, there has been a change of paradigm in public innovation and economic assistance from the exclusive concentration on individual players to affiliated groups. In this context, the focus is increasingly put on the promotion of the region as a location of research and economic activities. Due to these diverse initiatives of the private and the public sectors, numerous networks, single network structures or even clusters1 have emerged on the basis of traditions, regional dependencies and strengths. These networks and clusters significantly shape and represent the particular scientific and economic structure.

This initiated a process for every network and cluster, the result of which can also be summed up with the following quotation:

“Coming together is a beginning. Keeping together is progress. Working together is success.”

(Henry Ford, 1863-1947, American industrialist)

Since the 1990s, there has been a wide-ranging and intensive debate on the importance and the setup of networks and clusters (following the definition of the cluster concept by Michael E. Porter) by the scientific and economic community, by political decision-makers and already operating networks. In the next few years, the focus of the debate by players on all levels (science, economy, politics, administration) will be on the further development of existing networks into independently acting and sustainably successful structures with high innovation dynamics. Just as there is no generally valid and all-embracing methodical approach to setting up new network structures, there is no exclusive, optimal method for their development into sustainable and efficient networks. In spite of the greatly varying ways of establishment, different types of structure and modes

1 Note: For the detailed description and explanation of distinguishing criteria concerning the network and cluster concept – see Buhl, Claudia Martina (2009): Erhöhung der Innovationskraft durch Kooperationen in Netzwerken und Clustern.
of operation of networks, there are various overriding criteria regarding sustainability and options for action that are generally relevant for networks. It must be the supreme aim of every individual network to build up and strengthen stable and efficient structures to continuously generate advantages for the network partners.

1.1 Aims of the publication

The Federal Republic of Germany is characterized by a diversified network and cluster landscape. This can be traced back to the fact that financial support is regarded as an effective instrument to further innovation and economic policies in the establishment of network structures. On the other hand, many companies and research institutions have become aware of the advantages existing along the value creation chain and have expanded their cooperation with networks with an office.

These different measures and initiatives have lead to the creation of numerous and highly diverse networks. In order for these networks to fulfill the advantages for their members the established structures need to be durable and efficient.

Therefore, the present publication explains the theoretical foundations of the very complex topic “Sustainable Networks”, with practical examples. Additionally, it presents networks that have implemented sustainable strategies in various contexts of their network structures, internal processes or their network activity. The focus of the presentation of sustainable network developments was on the following key issues:

- Financially independent from public funding – is that possible at all?
- Overcoming regional and thematic limits of growth – how can this be realized most effectively?
- Involving network members actively and in the long run – can that be done?
- Continuously implemented innovation processes – how can that be realized?

Steady growth over years with an extension of the range of services – how can this be done successfully?

The sustainability strategies all are pointed out or have been implemented by the most efficient networks and their offices of the Federal Republic of Germany and are thus members of the Kompetenznetze Deutschland Initiative of the Ministry of Economics and Technology. In line with the key issues above, these sustainability concepts comprise the network-specific aspects of financing, regional development, expansion of branches, involvement of members, and innovation management. In each case, the emphasis of network descriptions lies on one or two sustainability aspects. The starting situation, the nature of the problem and the strategic approach as well as the implementation of strategies are described in detail.

Due to the great variety of sustainably acting networks, the networks and clusters for this publication were chosen from the participants of the “Competence Network 2009” competition (cf. Chapter 1.2). Of all contributions, these networks and clusters2 present best-practice examples which have developed sustainable measures and strategies capable of being transferred to other networks and cluster structures and conditions.

The sustainability concepts described here intend to give suggestions on how to approach the topic as a whole or parts of it. This is meant to ensure tested and practice-oriented concepts and methods are applied to other networks and clusters, in combination with their specific features. In addition to this, it facilitates a quick development of the effects.

1.2 “Competence Network” competition

The Kompetenznetze Deutschland Initiative, which is funded by the Federal Ministry of Economics and Technology on the basis of a resolution of the German Federal Parliament, unites the most innovative and efficient national networks with a technological orientation. These competence networks are characterized by intensive action by and cooperation

2 Note: Their selection and/or sequence in the publication does not show the ranking within the competition; due to the sustainability strategies described above, the networks and clusters are rather classified thematically according to financing, regional development, branch expansion, involvement of members, and innovation management.
between innovative partners and jointly defined goals, as well as by close proximity to markets and industries, regional integration, dynamics and flexibility. All these properties make the networks and clusters participating in the initiative a core element of technological efficiency, of economic growth, and competitiveness. In a nutshell, they represent the potency of the Federal Republic of Germany in numerous technological and economic fields.

At the same time, networks and clusters develop continuously, in order to maintain their efficiency, strengthen it and adapt it to changing framework conditions and requirements. While younger networks are initially occupied with their establishment, competence networks and clusters already in place face the task of developing further sustainably in order to keep up with changing requirements. Among others the following questions arise in this context: Which other or new financing sources are available or which services can be offered to support affiliated players? Beyond that, other topics must be addressed, such as changes in existing markets, adequate (international) positioning, future technological trends or the way one’s own technological competence can successfully address new fields.

It is a special strength of networks and clusters to respond adequately to these new challenges of national and international competition. The Kompetenznetze Deutschland Initiative actively supports its pertaining networks and clusters to cope successfully with these challenges. In doing this, special emphasis is put on the possibility to identify and award prizes for outstanding concepts, instruments, methods and activities of individual networks and clusters. Therefore, the Kompetenznetze Deutschland Initiative organizes and awards the annual “Competence Network of the Year” competition, which highlights and officially appreciates the achievements of the respective networks.

Every year the competition addresses a different topic and confines itself to a retrospective view in the award ceremony. It intends to point out different concepts, possible problem solutions, best-practice examples and options to other networks and clusters for them to develop their own future-oriented activities further. This should help the initiative profit from the experience and success of individual networks and clusters and thereby evolve as a whole, according to the motto “by the networks for the networks”.

The topic of the 2009 competition was “Growth and Sustainable Network Development”, starting from the assumption that the dynamics of an efficient network or cluster should also be reflected in its growth (absolute number of members, composition according to the value chain and competitors and to the intensity of cooperation structures) and in the quality of network activity. Even if in a region all players in question are affiliated to the network (“saturation”), some measure of growth should still be recognizable as a result of new start-ups and spin-offs and/or the setting up of business by firms / institutions in the long run. In this context, it was of particular interest to see in what way technological priorities have changed or increased in scope for the networks over the years or in the face of newly arrived partners, and how new added value was created for members, thereby opening up an additional growth potential.

In this process, the question of growth and quality was closely connected with the operating capacity and (temporal) stability of the structures necessary for network activity. For many networks, a functioning office is pivotal to a centralized and coordinating development. Thus the financing of the network management / of the office is of major importance for the existence of the network. For this very reason, the focus of the competition was on ensuring, reliably and permanently, the economic basis of network management resting on various financing pillars. The decisive point here was to establish how it was possible to develop a sustainable financing concept in recent years (for publicly funded networks it was also a matter of increasing the share of their own financing). Consequently, it was not only important to list successful financing methods, but also, to achieve a learning effect, to describe the process of developing an independent financing model. Depending on the financing concept, effects result for a network that surpass the immediate effect of the conservation of the status quo. This makes it possible, for example, to reinforce the binding character of cooperation or to extend the range of activity of the office. It is thus not only important to describe direct financing, but also to derive qualitative effects for all to understand and correlate them with a reference to qualitative growth.

The 2009 winners in the category “Growth and Sustainable Network Development” were the following four networks (third place was awarded twice for equal standing):
1st Place:
Kompetenzzentrum “Oberflächentechnik Kunststoffe” Lüdenscheid (Competence Centre for Surface Technology Plastics from Lüdenscheid):
A special feature of the network is that the respective companies have been its mainstay for 20 years and that it chiefly works for medium-sized industry.

2nd Place:
Kompetenznetz “Medtech & Biotech” (Competence Network Medtech & Biotech (BioRegion STERN)) from Stuttgart:
The network has successfully managed to extend the focus of its activity from biology to medical technology.

3rd Place:
Logistik-Initiative Hamburg e.V. (Logistics Initiative of Hamburg):
As a result of rapid growth, the network has developed into the industry’s biggest on-site network in three years.

3rd Place:
Strategische Partnerschaft Sensorik e.V (Strategic Partnership for Sensor Technology), headquartered in Regensburg:
The network has been successful in basing its financing concept on several pillars supported by the private sector.

In order to award prizes to networks and clusters in each round of the competition, the most innovative and need-oriented instruments, concepts, projects, measures or methods developed, applied and successfully tested in practice by members of the Kompetenznetze Deutschland Initiative are published as well. In line with our motto “Learning from the Best Networks”, the various network-specific aspects are made available to other networks and clusters in a manual of best practices.
2 Sustainability of networks between theory and practice

Claudia Martina Buhl

From the theoretical definition of a term to the practical implementation of a comprehensive concept.

In view of the rapid development of fast-growing economies, the challenge of a development geared towards sustainability is becoming ever more pressing. Due to the great importance of economies acting sustainably, the terms “sustainability” and “sustainable development” are being used in an almost inflationary way in the current debate by economic theory as well as by innovative and economic policy. The question however is: “What does ‘sustainability’ mean in the context of economic developments”?

The concept of “sustainability” and of “sustainable development” has been greatly influenced by the World Commission on Environment and Development, which was instituted by the United Nations in 1983. The Commission, which was called upon to point out the long-term prospects of a resource-conserving development policy, in its final document “Our common future” of 1987 defined the concept of “sustainable development” in the following way:

“Making development sustainable means that the present generation satisfies its needs without endangering the sustainability of future generations to satisfy their own needs.”

According to this definition, the “sustainability” approach for the first time formulated an all-embracing strategy, which considered political and economic concepts, treated up to then separately from one another, from an integrative perspective. This implies that in the general understanding of “sustainability” as a “three-pillar model”, the three dimensions “ecological sustainability”, “economic sustainability” and “social sustainability” are of elementary importance. The three dimensions cover the following aspects in detail:

Ecological sustainability describes the aim of conserving nature and the environment for the coming generations. It relates to the general efficiency of resources and the maintenance of biodiversity, to climate protection as well as to the cultivation of cultural and landscape regions.

Economic sustainability postulates that the diverse economic activities must be geared to guaranteeing, in the long run, a sustainable base for gainful employment and wellbeing. The protection of economic resources is particularly relevant in this respect.

Social sustainability puts man in the centre of activities and makes the universal claim in the development of society that every single individual should be allowed to participate in the life of the community. This also includes a balancing of social forces with the aim of building a society that is worth living in and viable in the long term.

It is a general feature and the essence of the “three-pillar model” to combine the aims of the three dimensions Ecology, Economy and Social equally in a complex system of cause-effect interrelations. This again presupposes turning from mono-causal patterns of explanation to the conception and implementation of strategies in multi-causal relationships. Multi-complex structures, organizational processes and multidimensional interrelations are also conspicuous features of networks and clusters. In the Federal Republic of Germany, but also in many other countries in the world, many very good networks and clusters have been established in the past few years as a result of initiatives by the private sector and funding measures by the public sector of the Federal Government and the regions. In the coming years, it will be important to carry on with these networks and clusters successfully on a durable basis, so that positive effects can be achieved continuously and sustainably for the network players involved.

2.1 Sustainability of networks – a definition of the term

Economic and technological developments usually do not originate across a whole region, but they result primarily from the regional agglomeration of university and non-university research institutions, companies, subcontractors and service providers, i.e. in regions having a corresponding research potential and economic capability. In Germany there are

3 Note: The original meaning of the word is, however, rooted in the forestry concept of sustainability.
various locations and regions of origin, some of which have been associated with certain products and product groups (among other things, lock and key technology from Velbert-Heiligenhaus and knives from Solingen) for several centuries. The debate by economic scientists about the significance of these regional branch- and competence-field oriented concentrations for raising the innovative capability and competitiveness of the players involved and for the profiling of regions as industrial locations has a long-standing tradition.

One of the earliest disputes concerning this subject can even be found in “Principles of Economics” of 1890, the main work of the British economist Alfred Marshall (Kiese, 2007). At the beginning, the 20th century was marked by a trend towards the dissolution of regional economic relationships, until the specialized industrial districts of Third Italy (Kiese, 2007) gained importance in the scientific debate. In 1990, Michael E. Porter established the “cluster” concept with his work “The Competitive Advantage of Nations”, emphasizing the geographic concentrations of companies and research institutions finding themselves in mutual exchange relationships for national competitiveness. Even though the terminology differs (industrial district, industrial region, cluster), they do have common features, such as, among other things, geographic proximity, existence of a critical mass of branch-specific companies and research institutions along the value chain, intensive interactions among these players and predominant high innovation dynamics. These aspects are associated with the profiling of the respective location, increasing competitiveness, regularly occurring innovation processes, raising productivity and, based on it, safeguarding regional employment in the long term.

Given these advantages and positive effects, networks have been initiated in many regions of Germany and of the world for many years. On the one hand, networks have originated through what is called “bottom-up” processes, i.e., these are industrial or research-based associations that have mostly evolved historically as a result of long-standing relations of cooperation. On the other hand, the instrument “Financial assistance for the development of networks and clusters” has increasingly been used in public funding for about 15 years to strengthen regional competitiveness.

However, all networks, whether initiated by the private sector or financially supported by the public sector, have in common that they need to exist in the long term and develop processes of their own in order to achieve positive effects for the players involved, the network in its entirety and, as a result, for the region.

4 Note: The scientific debate from Alfred Marshall to Michael Porter will only be described here in parts and using terminology based on examples.

5 Note: In some literatures and contexts the concepts “clusters”, “networks” and “cluster initiatives” are used synonymously or they are only distinguished by minor nuances of definition. For the present publication, the following definitions are used: - “Clusters”: In accordance with the definition of this concept by Michael Porter, clusters are geographic concentrations of interlinked companies and institutions in related branches complementing one another by joint exchange relations and activities along one (several) value creation chain(s) (Porter, 1990). Well-functioning cluster structures in this context extend in a three-dimensional space. This means that they are distributed horizontally all the way to the manufacturers of complementary products and services, and vertically via the sales channels to the customers. In that regard, the geographic component is very important, i.e. the regional and/or spatial proximity of individual players to one another. Nevertheless, the concentration of the relevant players only symbolizes the existing cluster potential. Only when vicinity positively influences processes of work, exchange and communication, does the cluster potential develop into efficient cluster structures. “Networks” or likewise “Cluster Initiatives” which, on the one hand, can be initiated by the private sector, and, on the other hand, by public funding measures (in order to develop clusters systematically, too), are regionally concentrated settled cooperation associations of competent partners from science, economy and research with a common thematic focus. Networks usually embrace the different stages of the value creation chain (vertical networking) as well as different branches and disciplines (horizontal networking). Networks (cluster initiatives) are characterized by intensive, targeted interaction by the players involved. In this context, networks constitute more than a loose nexus of relations between players, because their union in a cooperation association is mostly based on historically evolved and personally motivated relations of trust and a high rate of contact between the respective players, with cooperation frequently being of a very binding character and oriented to sustainability and longer-term time horizons.

6 Note: As defined above, there are criteria distinguishing between the concepts “Clusters” (and cluster initiatives) and “Networks” (partly also cluster initiatives). The aspects and sustainability strategies described by the authors, as well as their very much practice-oriented examples of sustainable developments, are suitable for implementation both in clusters and networks (cluster initiatives, etc.). In the following, no explicit reference is therefore made to clusters and networks, but the general subject will be sustainability strategies that can be established in regional corporate research associations.
It should be noted that if network effects are to be achieved, they do not necessarily occur in the wake of network establishment. On the contrary, success needs time, and for certain network-related aspects (e.g. safeguarding of regional employment and profiling of location) it often takes years to realize the desired network goals continuously.

**Networks for sustainability versus sustainable networks**

A definition of the concept of sustainably acting networks is of key significance. Basically, a difference can be made between networks for sustainability and sustainable networks. **Sustainability networks** are mainly established with ecological aims that also comprise economic and social aspects.

**Sustainably acting networks** on the other hand are institutionalized company-research cooperations oriented to stability and long-term activity (Müller/Riedel 2006). Sustainability in this context means the continuation of organizational structures and processes over time and oriented to results guaranteeing a “win-win” situation for the players involved in the long term. These networks can have a technological focus and be associated with the service sector or with creative industries and can equally pursue ecological goals. Within these regional networks different players cooperate along the whole value chain to realize a common vision of sustainable development. The visions and goals

- encourage the integrative forces in a network by a common understanding of tasks,
- determine primary fields of activity, and
- give the network a clear-cut profile in its external communication.

Networks thus represent the organizational framework for a great number of joint activities by different players focusing on the realization of economic, ecological or social aims. The fundamental dimensions of the “three-pillar model of sustainability” – ecology, economy and social aspects – can therefore also be overriding goals of networks. Formulating a

**Chart 1: Sustainability of networks**

- **“Three-pillar model”**
  - Ecological sustainability
  - Economic sustainability
  - Social sustainability

- **Sustainable network goals**
  - Ecological sustainability
    - Enlargement of environmental portfolio
    - Environmentally friendly product design
    - Reduction of CO₂ output
    - Environmental and resource efficiency
  - Economic sustainability
    - Secured financing of future investment
    - Continuous innovating and economic growth
    - Expansion of the range of offers / products
    - Customer needs in the centre of business activity
  - Social sustainability
    - Involvement in decisions and processes
    - Development of new competences
    - Improvement of the general employment situation

Realization of sustainable aims is only possible for networks acting on a long-term basis with efficient structures and processes.

Source: Institute for Innovation and Technology, 2009
### Table 1: Sustainability aims (by way of examples) of networks

<table>
<thead>
<tr>
<th>Ecological aims</th>
<th>Economic and/or technological aims</th>
<th>Social aims</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enlargement of the environmental portfolio and environmentally friendly product design</td>
<td>Secured financing of future investment</td>
<td>Involvement of persons in decision-making and processes</td>
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<tr>
<td>Reduction of CO₂ output in the relevant processes</td>
<td>Risk and crisis management</td>
<td>Binding character of structures and processes</td>
</tr>
<tr>
<td>Environmental and resource efficiency (e.g. consumption of water, consumption of energy and emissions)</td>
<td>Continuous innovating</td>
<td>Development of new competences (economic assistance and further development)</td>
</tr>
<tr>
<td>Climate protection</td>
<td>Expansion of range of offers / products</td>
<td>Long-term commitment of personnel to work environment and region</td>
</tr>
<tr>
<td>Ecological sustainability</td>
<td>Customer needs in the centre of business activity</td>
<td>Satisfaction of personnel and adequate remuneration</td>
</tr>
<tr>
<td></td>
<td>Increase in productivity through facilitated access to production factors</td>
<td>Improvement of general employment situation</td>
</tr>
<tr>
<td></td>
<td>Commercialization through joint sales channels and lower market entry costs</td>
<td>Regional responsibility as employer</td>
</tr>
<tr>
<td></td>
<td>Development of new sales markets</td>
<td>Full use of additional competences</td>
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<tr>
<td></td>
<td>Strengthening and improvement of market position</td>
<td>Combination of specializations, i.e. of the individual strengths of the members involved</td>
</tr>
<tr>
<td></td>
<td>Strengthening of regional economic location</td>
<td>Distributive justice (win-win situation for all participants)</td>
</tr>
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<td></td>
<td>(Economic) growth for members and for network</td>
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paradigm, goals and corresponding fields of tasks is indispensable for the definition of a long-term network strategy.

In order to realize these ambitious aims as a network, effective structures need to be built, functioning processes established, and a short-term, medium-term and long-term strategy with controllable intermediate goals and a realistic time horizon need to be formulated. To implement this strategy, it is above all important for the network to ensure its continued existence. In this regard, the sustainable existence of a network, i.e. its stability and, resulting from it, its success, depends on various factors in which all network players can actively participate, but are mainly the responsibility of network management. Potent and efficient networks have the following characteristics in particular:

- Long-term and constant network development
- Continuing progress and continued growth (no stagnation) as well as openness to new developments and challenges (no isolationist tendencies)
- Timely and effective reaction to (internal and external) processes of change and changing framework conditions
- Coverage of the entire value creation chain with a high degree of mobilization and strong commitment to the network by the regional potential of players
- High degree of membership integration and participation as a basis and core element of the network, which also enables new players to become actively involved
- The existence of an integrative network strategy which, by integrating the players, can be optimized and/or adapted with an orientation to needs and solutions resulting from new developments or changed constellations (e.g. new members, thematic or regional expansion)
- Existence of efficient work, communication and cooperation structures
- Availability of a comprehensive service portfolio to support members
- Innovation processes occurring regularly with the creation of incremental and radical products and processes, and
- Balanced financing concept resting on various pillars, which enables continued network activity, guarantees future investment (among other things further network development, implementation of innovation projects, etc.), and, if necessary, allows building financial reserves and generally protecting the network from externalities.

Sustainability of networks and clusters thus relates to two different aspects. On the one hand, it is possible, within the framework of the specific strategy of the respective network, to pursue various sustainability aims in the ecological, economic and social fields based on the “three-pillar model”. On the other hand, networks are sustainable if they exist effectively in the long run, boast stable organization structures, successfully inject innovations into the economic cycle, ensure continuous growth for members, enable a profiling of the location and add to regional competitiveness.

2.2 Factors of sustainability and fields of activity

The development of networks and clusters is a concern of many players from the economy, science and politics. However, this is a very complex task with a long-term perspective, in which success can happen at different points of time and on various levels of activity. In this respect, dominant influencing factors exist that are crucial for a successful network and cluster development. These factors (Heuser, 2007) are:

- Clear commitment, intensive integration and high participation of players as the basis of all network and cluster processes.
- Easily communicable vision for long-term growth and concrete projects for implementation as a guideline. This vision is based on fields of branches that already exist or are being established and developed further, and it defines their basic thrust. The vision must be shaped by concrete network projects that are capable of being implemented and realized in a verifiable manner.
Quantifiable objectives, a metric to assess success and measures for the control of success, which guarantees a regular measurement of the success of the development project and, if need be, makes timely adaptations possible to changed framework conditions.

Focusing on innovative branches that encourage growth and which lead to a leading market position in national and international competition, which is important for a lasting success. This process is facilitated by the explicit determination of sector-specific unique features.

High innovation dynamics, as the continuous development of networks and clusters requires products and processes that are quickly released to the market and can be fed into the economic cycle.

Self-strengthening effects (dynamic network and cluster development), because the better networked regional players are in a cluster, the more rapidly the whole cluster can develop, which again is an advantage and benefits all players involved.

Investment in lieu of exclusive subsidization, i.e. only implementing economically viable approaches and projects. All activities have to be oriented to market efficiency and profitability. Granting subsidies in the form of public funding is necessary and makes sense if new projects need to be implemented. However, it should be conceived as start-up financing and in order to close investment gaps if sufficient financing is not possible through the private sector.

Rapid success and stamina, because need-oriented network and cluster development can extend over a long period of time depending on the level of demand and the sustainability character of measures. Therefore, it is all the more important to rapidly achieve visible success that enhances the motivation of members and entails a high degree of cohesion and a strong commitment. Aside from the implementation of long-term aims, priority must be given from the start to those projects, which are capable of prompt implementation and rapid success. This then has a positive impact on a greater involvement of new players and on a lasting development.

Setting up of a network and cluster base and the establishment of stable process and organization structures, where the continued development of growth dynamics should be accompanied by a step-by-step extension to a more comprehensive regional or branch-specific context.

These influencing variables provide the basis of various sustainability factors for networks that are crucial for long-term efficient and, above all, successful network and cluster development. These sustainability factors particularly address the following network-specific aspects:

- Long-term integration of members
- Financing
- Innovation dynamics and innovation management
- Focusing and expansion of branches
- Regional development.

These interrelated five sustainability factors decisively influence prospects for development and can also delay or hinder development trends in case of negative constellations (low membership base and participation, insecure financing or low innovation dynamics).
## Table 2: Special aspects of sustainability factors for networks

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2.2.1 Long-term involvement of members

The success of many economic enterprises and research institutions is not solely based on their strengths and strategic potentials. In the face of factors such as the development of technological innovations at increasingly shorter intervals, the ever greater complexity of products, services and processes, the continuous adaptation to changed framework conditions, etc., the individual strengths and achievements of different players are frequently combined to maximize those strengths.

An important advantage inherent in networks is that companies differing in size, research and educational/training establishments as well as public institutions complement one another in their competences and resources. This requires a mobilisation of the regional potential of players by continuously enlisting new ones, identify and integrate additional competences, and that the complete integration of the value chain into network activities.

The players involved are the nucleus of any network. They contribute the required know-how and the necessary material and non-material resources to the network. Their intensive participation is intended to achieve win-win situations for all. Since much of the success and achievements in network activities are only accomplished in the course of the existence of a network, management must succeed in involving players in network processes on a long-term basis. The services and strategic aims therefore have to be geared towards the special requirements and needs of players.

The intensive integration in network processes may be ensured, for example, by involving players in working groups, which is the case for the Kunststoff-Netzwerk Franken e.V., Chapter 7), or the Logistik-Initiative Hamburg e.V., Chapter 5). Another possibility is to focus on players’ technology needs by providing technological facilities, testing techniques and laboratories, as in the case of the Kompetenzzentrum Oberflächenotechnik Kunststoffe, Chapter 3 and the Virtual Dimension Center of Fellbach w.V., Chapter 6. Moreover, it is possible to commit personnel in the long run by offering a broad portfolio of services, as for example, in KUMAS – Kompetenzzentrum Umwelt e.V., Chapter 8.

Apart from well-functioning work processes and intensive relations of cooperation, the advantage of a network or cluster involvement is seen especially in the availability of need-oriented, network-specific services. Thus, for partners, different kinds and forms of services are provided which have often been developed by the Office or by management (at times against a fee) (Buhl, 2009), and which particularly

- address issues and problems of (daily) network and cluster activity,
Sustainably acting networks and clusters

- reduce the expenditure of time and finance for individual approaches by members,
- ensure concentration on members’ specific core competences,
- enhance the efficiency of individual players and of the network/cluster as a whole.

An important aspect of services is the fact that players receive high added value and success. Without the network or cluster involvement this would only have been possible through extensive use of personnel and financial and material resources.

Need-optimized services can thus provide a chance to efficiently support both members and the network as a whole in their economic development (Buhl, 2009).

2.2.2 Financing

A secure financing base is a crucial aspect for networks and clusters. The availability of funding is influenced decisively by the capacities and resources of management and its scope of activity, but also all network processes and organizational structures. All aspects related to a network must be assessed with due regard to their financing potential. Thus, financing is one of the factors which determine the long-term existence and the efficiency of networks. It is therefore of particularly importance for networks to have a solid financing plan.

The continuous development and raising of new funds in order to have a financially balanced network budget is necessary for networks. This is true for privately financed networks (Kompetenzzentrum Oberflächentechnik Kunststoffe, Chapter 3), networks which have already converted their financial planning from public to private funding (Kunstoff-Netzwerk Franken e.V., Chapter 7; KUMAS – Kompetenzzentrum Umwelt e.V., Chapter 8), as well as networks which are still being funded and are restructuring their financing plan to include more private financing sources (Strategische Partnerschaft Sensorik e.V., Chapter 4; Logistik-Initiative Hamburg, Chapter 5).

A well-conceived financing model should be based on regularly incoming receipts, with financing sources based on variability. Potential financing pillars are for example:

- Membership fees from the players involved, which could be flexibly adjusted e.g. to the range of services or portfolio, or fixed depending on the kind and size of players
- Public financial assistance conceived as start-up funding,
- Promotion, sponsoring and donations,
- Payment for services offered by management and also usable for external players (e.g. training courses, meetings, measures of recruitment),
- Participation in receipts from patents and licences coming from network activity,
- Implementation of projects ordered by industry, and
- Public assignment-related co-financing of activities, which has a positive impact on players and the network as well as on the entire region.

A diversification of financing reduces the dependency on only one source of financing, particularly if the latter is only available for a limited period of time. Moreover, a financing plan based on various pillars enables members to engage in constant network activity, to set aside financial reserves and to make future investments if needed and it protects from externalities. In connection with this, the focus must lie on the potentials that the structures of the respective network have to offer, in order to develop financing options from it.

2.2.3 Innovation dynamics and innovation management

Companies and R&D institutions are forced to rethink traditional organizational structures due to changed market conditions in almost all branches as well as the high pressure to compete and to innovate (Fischer, 2005). What is more, the whole process of innovation is characterized by complexity in several regards. It ranges from the idea for new products, techniques and organizational solutions, to research & development and the manufacturing process and lastly the market entry and broad market penetration. In addition to the complexity of the innovation process, its character has changed in recent years as well. As a result, innovation cycles are taking place...
much more rapidly today. Innovations per se are much more comprehensive as well and frequently go beyond the boundary of one discipline or technical field - in consequence, they are often of a systemic type.

Networks and clusters are expected to generate marketable products and processes at increasingly shorter development intervals, through the help of intensive cooperation between different groups of players. This intensive cooperation along the value creation chain accelerates the transfer of knowledge, enabling companies to profit from research results and to find research institutions of capable economic partners to implement their research products.

However, in order to strengthen the innovation dynamics, a steady process is needed. This is due to the fact that such a process is not initiated automatically but emerges gradually. The continuous initiation of innovation projects for example facilitates this process, as is the case with the Kompetenzzentrum Oberflächentechnik Kunststoffe Lüdenscheid (Chapter 3). This opens up different fields of action and possibilities for support for the network and cluster management in order to support their partners. By defining the whole intra-network innovation process (e.g. Strategische Partnerschaft Sensorik e.V., Chapter 4), management can actively, effectively and durably increase the identification and acceleration of innovation topics (Kompetenznetz Medtech & Biotech, Chapter 10; Kompetenzzentrum Mechatronik BW e.V., Chapter 14). For example, this can be done by focusing on growth branches (HörTech – Kompetenzzentrum für Hörgeräte-Systemtechnik, Chapter 9) or by widening the technological focus through the systematic joining of different branches (Kompetenznetz Medtech & Biotech, Chapter 10).

The advantages inherent in cooperation with other players within the innovation process are, improved availability of specialized and otherwise inaccessible know-how, the perfectly matched combination of complementary competences, sharing of innovation risks and the improvement of the resource situation. Therefore, cooperation helps reduce the risks and (high) R&D costs that come in the wake of innovation processes, by distributing them among the players. The great chances offered by cooperations in the frame of innovation projects lie in the continued concentration of one’s own strengths (specializations) and equally in the specific form of cooperation. This means that the partners can concentrate on their core business and in the process optimize their own products and services (incremental innovations). Additionally, the project partners can participate in system solutions and in case of a successful market entry, expand their limited resources with completely new products (radical innovations) and thereby become more capable of acting as individual players.

2.2.4 Prioritization and expansion of branches

Networks do not only bundle existing branch-specific competence, however, they contribute to the development and further evolvement of existing and new branches through their intra-network and cross-network interaction, making it possible to overcome branch barriers (Kompetenznetz Medtech & Biotech, Chapter 10; BioRegion Regensburg, Chapter II; Kompetenzzentrum Mechatronik BW e.V., Chapter 14). For example, this can be done by focusing on growth branches (HörTech – Kompetenzzentrum für Hörgeräte-Systemtechnik, Chapter 9) or by widening the technological focus through the systematic joining of different branches (Kompetenznetz Medtech & Biotech, Chapter 10).

Essential preconditions for a durable marketability are flexibility and mobility of the network itself and its partners. This makes a quick and adequate response to economic, technological and other external changes possible. It also allows the development of new markets, also international ones, which make it necessary to intensify collaborative and interdisciplinary technology and product development. In the long term, economic stagnation can be a result of an exclusive concentration on core competences within the network and the implementation of partial sequences of process chains. Therefore, it is necessary to implement intra-industry followed by cross-industry networking during the network development. Alternatively, a change or complementation of the technological focus must be aimed at, because new network configurations can lead to high synergy effects.

Networks and clusters are particularly capable of moderating this future development process, i.e. of branch prioritization and expansion. This is due to the close communication and interaction which facilitate visions for the future to emerge and processes of strategy formation to commence.
2.2.5 Regional development

An increase in economic efficiency, a rise of competitiveness and the national and international profiling of locations are not temporarily limited activities (Heuser, 2008). They constitute a long-standing development project by bringing together different regional forces and initiatives. Clusters have the potential to influence a region’s competitiveness through the increase of the productivity of local involved companies and by adding to the innovativeness of a field of branches, which results from an enhanced collective capability for action (Sydow/Windeler, 2008). This can be of economic benefit to the region, e.g. through a higher added value and more jobs, etc.

Regional networks are an instrument for the targeted development of bigger clusters or complete economic regions in this process by involving players in a long-term strategy process (Hör-Tech – Kompetenzzentrum für Hörgeräte-Systemtechnik, Chapter 9; BioRegion Regensburg, Chapter 11; Dezentrale Energietechnologien e.V., Chapter 12; Forschungs- und Anwendungsverbund Verkehrssystemtechnik Berlin, Chapter 15). Apart from the presence of companies, R&D institutions and other organizations of one or several interrelated branches, an intensive constant interaction is crucial - a process that can be actively supported by network management (KUMAS – Kompetenzzentrum Umwelt e.V., Chapter 8; Kompetenznetz Medtech & Biotech, Chapter 10). Another aspect concerns the need to overcome regional frontiers, as is practiced, among other companies, by NanoBioNet e. V. (Chapter 13) through a faster and more complex regional development.

Stable relations of cooperation can be the result of already initiated network processes and may also lead to further structures and options for cooperation - for example, in the fields of personnel, management, marketing, sales, and profiling of location, which positively influence regional development. The successful realization of growth and employment effects (such as spin-offs, settlement of new companies and R&D institutions in the region, recruitment of qualified personnel) presupposes responsible action for the region by all regional players. In this context, joint dialogue and cooperation between the political, economic and scientific communities is crucial.

2.3 Strategy formation as an element of sustainable development

Networks need visions and aims, because these encourage the integrative forces by creating a common understanding of tasks, integrating the players involved in a long-term complex development process and determining the primary fields of activity. The challenge of target definition and strategy formation lies mainly in setting the course of action, which leaves enough room for further development options. At the same time, the target needs to be clearly defined in order to deduct the range of services and the relevant criteria to measure the attainment of a target. Apart from the formulation of strategic targets (e.g. enhancing innovation dynamics, improving the competitive position, jointly addressing the market, profiling of location), a joint meta-plan should define which development steps and measures need to be taken and in which time frame these need to be implemented (e.g. project outline for the innovation process, joint marketing for a higher visibility of the location). Strategic targets therefore, are confronted with the task of specifying the network vision, establishing a logical connection with operational planning, as well as with the implementation and control of measures. The important point is that the strategy targets (Posch/Perl/Strebel, 2006) must appear to every player (also in view of their long-term network involvement) as:

- comprehensible and achievable,
- not in conflict with the goals of the respective institution and
- representing a clear benefit for all partners, which is also recognized as such.

A strategy thus conceived transforms abstract goals into concrete action-oriented fields. Strategic sustainability aims are still abstract in the beginning concerning sustainably acting networks. However, only if definite measures are derived from ecological, economic and social goals, can fields of action emerge for network management and network partners. Besides the implementation of sustainability aims, measures can be integrated in the strategy process to ensure the network’s sustainable existence. For publicly financed networks this relates to the aspect of transforming the financing plan from public funding to more privately-supported financing.
pillars. Further strategic aims in the context of sustainable network existence could be measures which are formulated and adopted at an early point in time if the network meets with limits of growth or wants to extend branch priorities or widen them with greater regional coverage.

There are logical connections between the individual aims (both the sustainability aims and the long-term aims of existence). These aims may influence one another positively regarding their achievability (complementarity of aims) or negatively (competing aims). Knowledge of these connections make a common understanding of network strategy and an elaboration of an effective catalogue of measures easier. Moreover, a negative network development can be counteracted in the preparatory phase, thus avoiding stagnations or breaks in the history of the network. Nonetheless, the definition of strategic network aims and the process of deriving a network strategy with an associated catalogue of measures is not a one-time process. The aims should be scrutinized and revised regularly in order to take the changed framework conditions or new fields of activity into account.

Chart 2: Phase-specific processes of strategy formation in networks

Source: Institute for Innovation and Technology, 2009
2.4 Competences for network-specific sustainability strategies

Long-term development prospects and economic sustainability are the supreme goal for networks in their entirety as well as for individual players. Thus, networks are basically required to have a lasting beneficial effect for their partners. Advantages resulting from network activity are constant innovation products, increased competitiveness or positive growth and employment effects. In order for these positive effects to become beneficial for the network and, above all, for its members, a goal-oriented regular network development is needed to evolve well-functioning stable structures and processes. This process requires regular further work, even if a first success of the network has become visible. Once these development processes have been initiated by the network management, they need the involvement of all players. This secures that a win-win situation ensues for all and not only for the network or individual members.

Qualified network management is thus an indispensable condition for networks to fulfil their ambitious tasks at all. Consequently, it depends mostly on network managements if a network is successful in reaching its goals. Consequently, network management and network/cluster development have a recursive relationship to one another. This means that the network management affects the development of a network, while the corresponding development level of the network determines specific possibilities and limits of network management (Sydow/Zeichhardt, 2009). This also implies that the sooner and the more sustainability-oriented concepts are developed and measures installed, the faster a higher development level of the network can be reached. This again could lead to new possibilities and opportunities for the network’s further development in the years ahead.

After having been conceived and implemented, the sustainability measures can contribute to the continuity of network-specific management practices together with other instruments of network management. These management practices are also able to shape and evolve the management functions of inter-organizational networks as recurring actions. Generally, network management is classified into four key management functions (Sydow, 2006):

**Selection function** – important for the sustainability aspects recruitment of members, long-term integration of members, prioritization of branches, expansion of branches and regional development.

- Who is to be admitted to the network with their competences and stay in it?
- Who could complement the qualifications and the range of products/process chain in the continued development process?
- How can regional or branch boundaries be overcome? Which complementary competences from other branches or regions could positively affect network development?

**Allocation function** – important for the sustainability aspects financing, integration of members and innovation dynamics.

- How should tasks, capital, resources and competences be allocated in accordance with specific competences?
- How will internal innovation processes be developed? Who will assume responsibility for these processes? And who will be involved?
- What possibilities exist for the participation of members and which would be optimal for the network and for network activity?
- How sustainably based is network financing? How can financing be put on more privately financed pillars for funded networks? How can a diversification of financing sources be achieved?

**Regulation function** – crucial for the sustainability aspects member satisfaction and the resulting long-term commitment of players to the network.

- In what way and in what respect must the fulfillment of tasks be coordinated mutually?
- How can systems like information, knowledge and conflict management be adjusted in accordance with the changing framework conditions inside and outside the network?
- How can formal and informal rules and regulations as well as modes of conduct be developed and implemented within the network?
Evaluation function – generally decisive for the continuous development process of the network.

- How can activities, processes and developmental progress be investigated in a permanent process of assessment?

- How can services (cost and benefit), which are related to the network as a whole, to network relations and structures, players and products be determined in the context of a network?

- What are realistic intermediate aims (milestones) for the implementation of network aims? How can milestones be defined, realized and finally assessed? Which intermediate development aims can be derived?

These four management functions cannot be exercised separately from each other, as they are recurring functions that are interrelated and which condition one another. Again, on the basis of the analyses made within the framework of the evaluation function, it is possible to continuously perform context-related tasks in support of the selection, allocation and regulation functions. These four functions make it incumbent on network management to develop a goal- and implementation-oriented concept with transparent measures guaranteeing long-term successful network existence. This strategy plan should be already formulated in the initiation phase, involving network players (see Chapter 2.3) and adapted according to changing prerequisites (e.g. achievement of intermediate aims, new members, further scopes of activities). The integration of network players in the strategy process based on a moderated “bottom-up” process enables members to identify with network aims to a higher extent.

In order to implement these (often long-term) strategic goals, it is of importance that sustainably efficient structures and processes exist within the network. It is the function of network management to ensure that these network-specific structures and processes have the characteristics of stability and efficiency. However, it is not only important that these structures exist, but that they are indeed used regularly by members. This implies that network structures, processes and services must be conceived and implemented according to members’ needs. Management has to succeed in integrating the respective players sustainably into network activity once these services are established and offered.

Therefore, network management constantly has to ensure that members are able to focus on their core competences in their companies and research institutions. It also has to secure the participation of members in different system solutions within the network, so that the expenditure of time and cost for specific approaches is reduced and efficiency enhanced. It is thus the job of management to make sure that high added value and success are generated for players through their involvement in the network, without which their active participation would only have been possible by using a high number of personnel as well as financial or material resources. This means: The more need-optimized services are and the greater the benefits for network members, the higher their readiness to invest ideally and financially in the network. A lasting commitment of the players to the network therefore depends on their satisfaction with network constellations, management, the services offered and the achieved or recognizable added value. This can be directly controlled by network management. The intensive and long-term participation of players is a prerequisite and condition of networks.

2.5 Measurement of success and instruments of evaluation

Networks and clusters are developing continuously and are subject to a process of change. It is therefore essential for networks to analyze the evolved network-specific structures and processes that have and to evaluate them subsequently. It is equally important to reflect on the aims and network strategies defined originally. This is especially necessary in view of constantly changing economic and technological framework conditions, i.e. whether the network has to make adaptations to external developments, which in turn can influence intra-network processes. For network management, information and yardsticks of evaluation for internal control mechanisms are significant, too (Wessels/Meier zu Köcker, 2009) in order to be able to investigate and assess internally oriented network constellations and the performance of the network as a whole.

Through the use of internal and external analyses it is possible to ascertain the network’s innovative capacity and efficiency, its service as well as its product portfolio and attractiveness. This is also done in relation to competitors and thereby determines its potential
Sustainably acting networks and clusters

for success (Meier zu Köcker/Buhl, 2008). On the other hand, it is possible to classify potential new strategic fields of action or fields of action requiring intensive further development. The challenge of measuring the success of sustainably acting networks is that the aims defined, the progress made, the network constellations, structures and processes must be measurable and assessable. For this purpose, indices and systems of indices are particularly appropriate.

Indices are numbers or ratios of numbers that have direct validity for an aim. Here, the individual index can be considered separately from other indices or it can be part of an overall complex of indices. The regular comparison of the indices with network-specific actual and target values with appropriate benchmarks and representations of trends, makes it possible to record the degree of strategic aim achievement as well as the stability and efficiency of structures and processes continuously. In addition, mainly non-goal compliant trends and also future developments can be ascertained that possibly impair the achievement of goals (Posch/Perl/Strebel, 2006). This aspect is significant, especially in the context of early operational recognition, so that measures can be launched to effectively counteract negative developments as early as possible.

In contrast to indices considered separately, individual indicators and indices condition each other mathematically and logically in systems of indices and comprise all network factors relevant to sustainability as fully as possible. Network management obtains evaluations and information about the efficiency and mode of functioning of the network via separate indices as well as systems of indices. Knowledge of these different indicators relevant to the network and network development is an indispensable condition for developing network activities and processes from a solid basis.

Table 3: Indices and systems of indices

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<th>Criteria concerning indices and systems of indices (Posch/Perl/Strebel, 2006)</th>
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<td><strong>Orientation to aim:</strong></td>
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<tr>
<td>The indices must have a reference to the aims of the network and represent the degree of aim achievement.</td>
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<tr>
<td><strong>Completeness:</strong></td>
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<tr>
<td>The indices should represent all defined aims. In formulating and selecting the indices, it should be ensured that specific sectors are not under-represented or over-represented in relation to others.</td>
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<tr>
<td><strong>Balance:</strong></td>
</tr>
<tr>
<td>In formulating and selecting the indices, it should be ensured that specific sectors are not under-represented or over-represented in relation to others.</td>
</tr>
<tr>
<td><strong>Topicality:</strong></td>
</tr>
<tr>
<td>Indices should depict the current situation of the network as topically as possible and indicate looming developments as early as possible, so that control and early warning functions can be installed.</td>
</tr>
<tr>
<td><strong>Comprehensibility:</strong></td>
</tr>
<tr>
<td>The indices should be comprehensible for users as well as internal and external interest groups.</td>
</tr>
<tr>
<td><strong>Consistency:</strong></td>
</tr>
<tr>
<td>If indices are resumed in a system of indices, the latter must be designed consistently, i.e. logically and in a non-contradictory form.</td>
</tr>
</tbody>
</table>
Generally, different groups of players are interested in the results of internal and external measurements of success and thus in a neutral determination of the network’s location:

- Network management
- Strategy and steering committee of a network
- Network players involved
- Institutions spending public funds (in case of publicly funded networks)

Whilst defining network strategy and aims, it is already necessary to define the values which define the achievement of the respective sustainability aims. Additionally, if multiple individual aims are pursued on a parallel level, it becomes necessary to weigh them out mutually. In this way, priority can be given to the implementation of those activities whose contributions to the achievement of aims are the most important. The indices and systems of indices required for a measurement of success can be established within the framework of evaluations, benchmarking and analyses of member satisfaction.

**Evaluations**

Evaluation generally denotes the description, analysis and assessment of projects, organizational units, institutions and also complex structures such as networks. Evaluations can focus both on the context (preconditions, framework conditions), the structure and the process as well as on the results achieved (innovations, products, services). Accordingly, evaluations can pursue very different aims and are conceived specifically for each case. The aims of evaluations concerning networks are identifying success, but also potentials for improvement, evaluating new methods, processes and modes of functioning or finalized projects. In this context, evaluations function as:

- Instrument for definition of aims
- Instrument for control of success

Due to the different goals and aspects to be defined, evaluations regarding networks can be implemented both “ex ante” (prior to foundation for the identification of players, goals and thematic priorities), “ex post” (for finalized projects or intermediate goals already reached), and “for process support” (evaluation of measures, optimization of processes, enhancing the efficiency of the means employed). Evaluations are especially successful if they prompt learning processes and help make network management more efficient. Network evaluation causes the players involved to re-think their own action and to become aware of factors which make their activity a success. An evaluation will mostly be successful and produce the greatest benefit for the network, if it is implemented as an integral part in its own responsibility or by an external institution during the network’s different development phases.

**Benchmarking**

In relation to networks and clusters, benchmarking is a continuous analysis comparing structures, processes, methods and products as well as services with those of other networks. Analysis is always comparative within the framework of benchmarking, and not on the basis of a universally valid and absolute evaluation scale. Benchmarking provides an orientation to the way one’s own network is positioned and acts in comparison with others. In contrast to using ranking as a means of measurement, benchmarking as a process mainly offers an opportunity to learn from better positioned networks. Benchmarking is thus a constructive, goal-oriented approach to optimizing processes, structures and constellations by means of examples of reference (Meier zu Kocker/Buhl, 2008).

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7 Note: The conception of a benchmarking approach of setting up a comprehensive data pool (various comparative portfolio scenarios are possible) was conducted in the framework of the Office work for the Kompetenznetze Deutschland Initiative by VDI/VDE Innovation und Technik GmbH.
The validity of benchmarking greatly depends on the respective reference group (the reference portfolio). Various sceneries are conceivable:

- **Intra-innovation field benchmarking**
  (comparison with networks of the same innovation field)

- **Cross-innovation field benchmarking**
  (comparison with the entire reference portfolio)

- **Benchmarking with selected networks**
  (compilation of an individual reference portfolio)

Within the framework of benchmarking, a comparison is made on the basis of concrete, previously defined indices, which can be related to existing network structures and internal network operations, services and added value as well as to the output of network activity. The results of benchmarking are proof of the efficiency and development of a network and potentials for improvement. Likewise, the results provide a good insight into the way other networks directly competing with the network concerned are structured. Through this new fields of activities and future options for action can emerge (Wessels/Meier zu Köcker, 2009).

**Analyses of member satisfaction**

The method for analyzing the satisfaction of members, offers network management an instrument to interview network members individually and anonymously, regarding their satisfaction with the services and the offers provided by the network and the added value of the process. Analyses of the satisfaction of members are usually conducted through surveys.

The results of the analyses enable network management to adjust their actions according to the interests and needs of its affiliated players. Evaluations, benchmarking and analyses of member satisfaction are sometimes connected with important implications in the interests of a reflexive network development. Therefore, these three methods of data collection are associated with diverse interests and power potentials (Sydow/Zeichhardt, 2009). It can be of advantage if measurements of success are made by external service companies committed to the postulate of neutrality. For all three methods of collection, neutrality, transparent structures and feedback processes generally serve as confidence-building measures, enhance the motivation for and the success of learning, the conception of new strategies and the implementation of recommendations for action resulting from such analyses.
### Kompetenzzentrum “Oberflächentechnik Kunststoffe” Lüdenscheid (Competence Centre for Plastics Surface Technologies of Lüdenscheid)

**Thomas Eulenstein**

**Innovations for the plastics industry: competent – rapid – practice-oriented!**

In the Kompetenzzentrum Oberflächentechnik Kunststoffe companies and research institutions from different branches work on joint research and development projects - the so-called inter-company joint projects - and organize training for their members. The pooling of the expertise along the technological value creation chain of different companies and establishments is intended to enable players to generate growth, employment and competitiveness. The Kompetenzzentrum Oberflächentechnik Kunststoffe is a network that is well functioning, steadily growing, oriented to sustainability and solely financed by industry.

The thematic priorities of the network activities are surface and decorating processes for plastic elements, the modification of tool, material and component surfaces via surface and layer technologies as well as analysis and test techniques for surfaces and plastics. The service range of all sectors comprises the protection and decoration of surfaces and the manufacture of functional surfaces.

### Kompetenzzentrum Oberflächentechnik Kunststoffe Lüdenscheid

<table>
<thead>
<tr>
<th>Innovation topic</th>
<th>New Materials and Chemistry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovation region</td>
<td>Rhine-Ruhr-Sieg</td>
</tr>
<tr>
<td>Branches</td>
<td>Plastics engineering, surface engineering, materials engineering/New Materials, tool and mould making</td>
</tr>
<tr>
<td>Date of foundation</td>
<td>1988</td>
</tr>
<tr>
<td>Number of members</td>
<td>Date of foundation: 30 (in 2009: 155)</td>
</tr>
<tr>
<td>Specific features of network</td>
<td>▶ Established in 1988 as the “extended workbench” of 30 companies</td>
</tr>
<tr>
<td></td>
<td>▶ Private services provider with an emphasis on the transfer of know-how between science and in practice</td>
</tr>
<tr>
<td></td>
<td>▶ Supports companies in selecting, developing, optimizing and implementing products, tools and operational processes in the entire field of plastics technology</td>
</tr>
<tr>
<td>Contact</td>
<td>Kompetenzzentrum für Oberflächentechnik Kunststoffe Lüdenscheid c/o Kunststoff-Institut Lüdenscheid K.I.M.W. NRW GmbH Karolinenstraße 8 58507 Lüdenscheid <a href="http://www.kunststoff-institut.de">www.kunststoff-institut.de</a></td>
</tr>
</tbody>
</table>
The Kompetenznetz Oberflächentechnik Kunststoffe is characterized by a thematic focus and a regionally concentrated, but cross-regionally operating cooperation network with potent partners. Other features are the close interaction and communication between the respective players and its operation in an innovation-friendly environment. The network covers all the steps of value creation (vertical networking, including basic and further training) and various branches and disciplines (horizontal networking).

The network is represented by the Kunststoff-Institut für die mittelständische Wirtschaft NRW GmbH (K.I.M.W.), an institute affiliated with the Technical University of South Westphalia – its focus is on increasing the quality and profitability of moulds made of thermo- and duroplastics. In 2008, more than 3.9 million Euros in sales were generated by its 44 workers.

For 2010, another two or three new employments for network activity have already been planned. Besides joint in-house projects and development projects, the firm provides a great many service offers to solve company-specific problems. Practice-oriented know-how is shared with companies in many basic and advanced training courses. The Kunststoff-Institut at Lüdenscheid combines tomorrow’s scientific know-how with today’s manufacturing.

Since 1990, the Kunststoff-Institut Lüdenscheid has been engaged in the application of surface and thin-film technologies (especially for the plastic technologies) and has been working with over 500 firms in cooperative projects in this period.

Last year alone, 238 companies participated in cooperative projects financed by the industry. Thus, almost 2,000 people from network partners were present at project meetings, enabling them to participate in developments and to engage in the active exchange of experience and advanced training. Furthermore, more than 2,000 individuals were trained during 130 seminars and four sessions.

The decorating processes for plastic materials, the modification of tool and component surfaces via surface and thin-film technologies as well as the analysis and testing of surfaces and plastics are the thematic focus of this network’s activities. In addition to a laboratory for materials testing and damage analysis, an application centre for surface technology was set up jointly with the industry, which is unique in Europe. At the centre it is possible to offer almost all important surface and decorating technologies, in conjunction with the latest industrial technologies. The institute views itself as a medium of transfer and link between academic research and the industry. Using its own developments, it has been able to implement many theoretical/scientific methods for the application at small and medium-sized enterprises and to transfer them into series production. The Kunststoff-Institut Lüdenscheid assists its clients in selecting, applying and evaluating optimal surface technologies by offering:

- Selection of surface and decorating techniques, including the introduction of new decorating technologies (prototypes, patterning, practical damage analysis)

### Diagram 1: Sales development

- **Sales in thousand Euros**
- **Years:** '89, '91, '93, '95, '97, '99, '01, '03, '05, '07

### Diagram 2: Personnel development

- **Number of workers**
- **Years:** '89, '91, '93, '95, '97, '99, '01, '03, '05, '07
Developments and optimizations of processes

Comprehensive testing techniques (colour and gloss measurement, non-contact surface roughness and topography measurement, surface energy, scratch and abrasion resistance, measurement of layer thicknesses)

Support for the preparation of tool specifications

Application-oriented selection of surface and thin-film technologies

Complete implementation of process steps: definition of pre- and post-treatments, patterning of specific processes, preliminary testing, patterning from original materials and colours, specific adjustment of degrees of gloss

Varnishing, galvanizing, IMD, water transfer and digital print, pad printing, hot embossing, laser, beaming on own equipment

Manufacturing of small series and surface finishing for RP processes

Possibilities of applications of innovative surface treatment processes are pointed out within the framework of technology transfer. The companies can check possible applications by conducting practical tests at the respective establishments. Thus, while patterning for the first time, they can employ new surface technologies without having to make major investments at that initial stage. Furthermore, it is possible to conduct practical damage analyses and thereby ensure the safety of running processes. Moreover, the institute offers development capacity and technical know-how. The following topics, with a focus on surface technology, are dealt with in the individual working groups of the network:

- Surface and decorating processes for plastic components
- Lotus Effect® with focus on injection moulding, extrusion and other process techniques
- Hybrid technology, plastic/metal compounds
- Surface and thin-film technologies for tools and components
- Inductive heating of tool surfaces

Generation of design surfaces through combined surface and thin-film technologies

Generation of close-to-nature surfaces on tools and moulds

Use of rear injection technology for foils and metals designed for surface decoration

Antibacterial surfaces

Minimization of waste during galvanization

Lubricant-free manufacture

Optical technologies

Chart 3: Analysis and measuring methods at the Plastics Institute

Extensive public relations have a special place in the Institute’s network activity. A broad-based infrastructure was built up to disseminate results and/or technologies through the support of its own technical journal, a great number of seminars and training courses, cooperation exchanges, participation in fairs, lectures at various conferences, publications and further activities.
3.1 Members of the network

Main partner is a holding of companies from different branches and market segments along the technological value creation chain with 76% of the Institut GmbH. Since it was founded in 1988, the number of affiliated firms has increased from 30 to currently 155 companies. In the last three years alone, over 70 companies have become new members of the network. The network offers its companies a number of important advantages:

- Preferential prices for cooperative projects and participation in seminars
- Free participation in the biannual events "Trends and new developments in the plastics industry" at the Institute for Plastics
- Free use of the internet database with detailed information about all affiliated firms
- Free placement of job offers on the internet (www.kunststoff-institut.de)
- Free arrangement, if requested, of a strategic alliance. The alliance aims at building up know-how, exchanging experience between cooperation partners (benchmarking), supporting development projects (quality advance planning) as well as basic and further training for the various fields of plastics technology.

The cooperation partners are entitled to use, in the technology fields described above, the technical background of the Institute vis-à-vis their business partners and customers to prove their own expertise. This results in:

- directly influencing the strategic orientation of the Institute via its members,
- a preferential treatment of affiliated companies in case of overlapping in the service sector,
- encouraging inter-company contacts and exchange of experience between members,
- a preferential selection of affiliated firms to support industry by public funds,
- the early flow of information to affiliated firms,
- cooperating with the Institute for Plastics and its partners at seminars of firms,
- recommending affiliated firms in case there are inquiries about orders,
- possibility of presenting the company in the Plastics Institute,
- carrying out information meetings and seminars.

3.2 Development and financing plan

Since its foundation in 1988, the network has relied on self-financing and sustainability. Its financing plan provides the three pillars Services, Basic and Further Training and Cooperative Projects. Last year approx. 1,900 orders were carried out with 1,100 customers in the services sector, the focus being on laboratory services. Accordingly, the aim was to make investments in equipment and put it at the disposal of a large number of companies. Furthermore, 130 seminars involving some 2,000 participants were conducted.

Another focus of activities was and is the implementation of cooperative projects between firms where development work is performed jointly with different companies. Currently, 13 projects are being run with over 200 companies involved. The corresponding numbers and diagrams show the institute’s, the holding’s and the competence network’s over-proportional growth in the past three years. In order to achieve this, a classification was developed in addition to a stringent strategic market development, a regular implementation of market analyses and large-scale recurrent corporate surveys (2,000 companies). It includes a clear limitation of risk for erroneous and faulty developments and aims at offering practice-oriented projects with specific reference to the market at competitive prices.

A major part of the annual membership fees contributed by the companies of the holding is earmarked for the preparation of inter-firm cooperative projects. The project topics are proposed and selected by the institute, followed by a discussion and evaluation on an advisory technical council instituted for that purpose and the approval of the projects by the general assembly. The nine-man advisory council that evaluates the projects represents the whole technological value creation
chain. It is made up of representatives from machine manufacturers, raw material producers, standards manufacturers, toolmakers and plastics processors from different market segments (automotive, electro, optics, etc.). Novelty, industrial interest, market opportunities and sustainability are the criteria for the selection of project topics. Following the preparatory phase, the cooperative projects are launched. Any domestic and foreign company can participate in it against payment of a contribution; firms affiliated to the holding are given a 10% rebate on the cost. Network partners and members of the holding thus do not only have a technological edge, but also the advantage of reduced cost.

3.3 Further development of the network

This year was marked by the establishment of a “Science to Business Center”, an extension to the existing application centre for surface technology and already introduced into the market. Its aim is to strengthen cooperative and application-oriented research and the corresponding technology transfer in the field of applied plastics and surface technology with a view to the sales market. Practice-oriented innovative solutions are to be developed and/or optimized with the support of the already existing know-how. The implementation of this process with the assistance of the network ensures that these developments have the highest scientific standards and that all aspects of the entire value creation chain are considered adequately.

In detail, the plan is to push ahead with developments in the four technology fields New Surfaces, New Technologies, New Materials and New Branch Networking and to combine them for interdisciplinary use in innovative products and future markets. These developments are targeted primarily at electrical engineering, medical technology, optics, aircraft and the area of regenerative energies, in addition to the automobile industry.

The field of surface technology for plastics processing, as conceived in the network, is unique. Not only in North-Rhine Westphalia, but in the whole of the Federal Republic of Germany, and even, as internet research has shown, throughout Europe. The aim and the idea to develop and to work notably in the practical interest of companies are also new to this sector. It does not only intend to point out theoretical possibilities for the application of innovative processes within the framework of technology transfer to small and medium-sized companies. It also wishes to enable them to investigate opportunities to exploit and apply new technologies by using existing establishments and without having to make major investments themselves.

3.4 New qualification measures

In order to remedy the shortage of skilled personnel, the holding founded a wholly owned subsidiary, KIMW Qualifizierungs GmbH. The non-profit purpose of the association is to promote science and research as well as education and training. This purpose is realized by encouraging the life-long learning of young people and adults and organizing in-house training and study courses in the field of plastics engineering. Acting in line with the motto “Studying has a Future – the Future is Plastics Materials”, a plastics-oriented study course was introduced again in the winter semester of 2008. In cooperation with the Technical University of South Westphalia at Iserlohn, a study course on plastics technology is newly offered in North Rhine Westphalia, unique in its form of a PPP (Public Private Partnership). The six-semester study course will be oriented mainly to plastics technology in the semesters 4, 5 and 6. In the first three semesters many basic subjects are offered. The first graduates will be available to the labour market as early as 2010. The chair of the Foundation, which has been co-financed by the network and its partners with 650,000 Euros, will be funded until 2016 and is thus oriented to sustainability as well.

All planned activities are basically oriented to sustainability and are characterized by the use of the latest technologies, thereby making an important contribution to in-house productivity and competitiveness, especially as a result of the SMEs’ technological edge. The innovative power, of SMEs in particular, is greatly enhanced through application-oriented cooperative research along the complete value creation chain. The installation of an accredited bachelor course at the Institute in cooperation with the CPSE partners in 2008, additionally ensures sustainability concerning the dissemination of results. The structure of network activity helps to achieve a horizontal and vertical networking of the value creation chains, directly enabling SMEs of different branches to exploit these developments. This adds to competitiveness and helps to safeguard and create employment.
4 Strategische Partnerschaft Sensorik e.V. (Strategic Partnership for Sensor Technology, Inc) Portfolio financing as an innovative instrument of network financing

Dr. Hubert Steigerwald

Within the framework of the Bavarian cluster drive Strategische Partnerschaft Sensorik e.V. (SPS) constitutes the network and platform for research and development in the field of sensor technology. By now, the network has 41 members and well over 150 partners from industry and science. The sensor technology network is pushing ahead corporate networking, innovation funding and competence development. It is the primary aim to increase market opportunities for Bavarian sensor technology companies that operate in the field of development, production, sales or application of sensors. In order to achieve this, SPS initiates cooperation agreements and/or cooperative projects on a regional, national and international level. In addition to this, it furthers the establishment of research capacity at Bavarian universities and encourages the exchange of experience on strategic cooperation between large-scale industry, small and medium-sized high-tech enterprises, institutes of higher learning and research establishments. Apart from organizing workshops, technical forums, conferences and publications, it is one of the chief tasks of SPS to stimulate cooperation with a view of creating added value for the players involved. In order to implement these aims, SPS offers its affiliated companies service packages tailored to their needs. These include funding programmes, development projects, partner scouting, marketing, procurement of skilled labour, and qualification. Its declared aim is to generate innovations in order to create and safeguard jobs (more information about the services offered at www.sensorik-bayern.de).

Strategische Partnerschaft Sensorik e.V.

<table>
<thead>
<tr>
<th>Innovation topic</th>
<th>Micro-Nano-Opto</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovation region</td>
<td>Southern Germany</td>
</tr>
<tr>
<td>Branches</td>
<td>Sensor technology, measuring technology</td>
</tr>
<tr>
<td>Date of foundation</td>
<td>2006</td>
</tr>
<tr>
<td>Number of members</td>
<td>Date of foundation: 20 (in 2009: 42)</td>
</tr>
</tbody>
</table>
| Specific features of network | - Network does not only offer corporate networking and innovation funding, but also assistance for the placement and the basic and further training of personnel as skilled workers  
- The focus of activity is on initiating and processing projects of cooperation/financial assistance  
- Processing of projects via service society Sensorik-Bayern GmbH |
| Contact              | Strategische Partnerschaft Sensorik e.V. Josef-Engert-Straße 9 93053 Regensburg www.sensorik-bayern.de |
In addition to large-scale enterprises of this branch (Siemens AG, Continental Automotive AG, Osram OptoSemiconductors GmbH, Infineon Technologies AG, Krones AG, EADS N.V., etc.), a broad range of innovative small and medium-sized high-tech enterprises (SMEs) are among the network's members. Particularly for these members - Gefasoft GmbH, Thyracont GmbH, Hofmann Leiterplatten, Dallmeier-Electronic GmbH & Co.KG, EMZ Hanauer GmbH & Co.KG., etc. - the sensor technology network is an important partner. The decisive added value generated for the companies results in a steadily increasing membership of SPS through their affiliation to the network. Since the strategic partnership sensoric was initiated by the Amt für Wirtschaftsförderung (Office for Economic Promotion) in Regensburg in 2003 with 14 founding members, the network has grown rapidly. In 2006, when SPS was established as an association, SPS was glad to have no less than 23 members. Currently, 41 active members are affiliated to SPS. Consequently, the target of 40 members by 2011 (as stated in the business plan) has been reached and will probably be exceeded by far.

This success was made possible by an initially local focus on the Regensburg “hot spot”. The sensor technology centre experienced and planned a regional expansion by further hotspots in Lower Bavaria (e.g. Micro-Epsilon Messtechnik GmbH & Co.KG, Elec-Con technology GmbH, Thyracont GmbH, University of Deggendorf und Landshut, University of Passau, etc.), Upper Bavaria (e.g. EADS N.V., AUGUSTA Technologie AG, Sensortech GmbH, Fraunhofer Gesellschaft IZM, Technical University of Munich, etc.), Middle Franconia (e.g. Siemens AG, HE System Electronic GmbH & Co.KG, Fraunhofer IIS, etc.), Upper Franconia (ISAT, University of Coburg, etc.) and Lower Franconia (Weber GmbH, Wika Alexander Wiegand GmbH & Co.KG, University of Aschaffenburg, etc.) after having developed and established stable and efficient local network structures in Upper Palatinate. Beyond that, SPS was largely involved in the settlement of various sensor technology companies in the Bavarian region (AUGUSTA Technologie AG, SensAction AG, BIOCAM GmbH). However, there is still considerable potential for growth for the network. The AMA Fachverband für Sensorik estimates the number of Bavarian sensor technology firms at approx. 200 companies (AMA Fachverband für Sensorik e.V., as of November 20, 2008), which guarantees a large potential for a continuous development of the network. Moreover, the great number of measures in the domains of marketing/public relations, services (technical and business-related) and skilled labour recruitment, allows SPS to regularly address potential members and familiarizes them with the network.

The established and emerging academic field of sensor technology, which is closely interlinked in the network, supports the regional sensor technology branch.

The existing competence centres in Regensburg (Kompetenzzentrum Sensorik of the university), Coburg (ISAT), Passau (ForWiss) and Landshut (university chair for sensor technology) are complemented by more centres at the universities of Regensburg and Bayreuth, the Technical University of Munich and the University of Deggendorf as well as a Fraunhofer project group in Regensburg under the programme “Bayern Fit”. The network is already operating across regional and national borders. Activities and international contacts are systematically developed through delegation trips, fairs and congresses in Russia, China, Mexico, France and Czechia. These opportunities open up additional potential for growth, which again opens up further perspectives and valuable learning processes. The design of its home page reflects its internationalization, as it provides an English and a Chinese version for international visitors (www.sensorik-bayern.de).

The enlargement of the network by new members and partners and much-frequented events – no less than 120 events with over 5,500 visitors from 2006 to 2008 – have led to a thematic extension of the network as well. The fields of environment, life sciences and biochemistry complement the original focus on automation/mechatronics and automotive. As a result of the consolidation of cooperation, a sub-network focused on life sciences has emerged with players of its own (optical technologies in the field of photodynamics). On the other hand, SPS set up a subsidiary in July 2007 with Sensorik-Bayern GmbH (SBG).
4.1 Innovative range of services around the network

SBG is a service GmbH giving assistance and offering tailor-made solutions for different problems in the area of sensor technology. Cooperation partners and customers of the network are mid-sized companies. The network supports the development of their innovative products by providing the sensor-specific know-how. Large companies are also addressed by the network. The criterion here is a flexibility to adjust the company’s strategy with personnel during cooperation to the needs of the SBG. The SBG collaborates with a great number of chairs at Bavarian establishments of higher education and numerous partner firms. This is due to the optimization of the supervision of these cooperation projects in the innovation process and the active use of SPS network contacts and of the resulting synergies. The SBG functions as a coordinating agency for cooperation projects initiated within the network and compensates various deficits of members.

Moreover, SPS achieves a significant added value for its network members through its far-reaching and continuously evolving contacts with political and institutional decision-makers in the field of financial assistance programmes.

SPS steadily enhances the quality of project applications and increase the rate of successful applications for funding by network players. It does this by utilizing its direct, personal contacts on regional, governmental and European level and its role as an interface between companies and programme directors.

The SPS and the SBG represent an “umbrella” for all relevant technical, economic and legal subjects. This umbrella covers and actively supports members and partners (mostly SMEs), similar to the structure inherent to large companies. SPS and SBG benefit from many synergies, which can also be used to be the advantage of their members and all players around the cluster. The Office is always the “pivotal point” for all ensuing coordination tasks and therefore the central and competent contact in the process.

Above all, the structural process of change in intra-network relations has a positive impact on the development of the cooperation culture in the cluster. Increasingly, SPS is becoming the first contact point for network companies when dealing with problems or when partners are being scouted. Since its foundation, the SBG especially has assumed the role of a competent, reliable project partner in the network. The somewhat restrained participation of members in SPS events at the beginning of network activities has developed into a dynamic, powerful and lively network activity by its players. This is well-illustrated by the SPS technology forums, where individual companies submit internal R&D problems for debate, which subsequently are analyzed by members and partners and then often solved jointly or via funding projects. The qualitative change in cooperation practice is equally evident in the number of the currently running thirty cooperation projects. This includes the project to set up a partly autonomous camera tracking system by means of an optical/electronic multi-sensor system for minimally invasive surgery relieving surgeons in their work.

The members/partners involved in the project are Aktormed GmbH, Gefasoft GmbH, the Clinic of the Technical University of Munich (on the right side of the Isar), the universities of Regensburg and Deggendorf and the Regensburg St. Joseph Clinic. In this cooperation, SPS acts as a subcontractor project in the field of project management, qualification and system design authority. Another interesting cooperative project is concerned with the development of a magnetic foil sensor. It is used for the application as a locator in hydraulic and pneumatic actuators, which are increasingly used in automobile engineering and automation. Partners in the project are Micro-Epsilon Messtechnik GmbH & Co.KG, Magnetfabrik Bonn GmbH and the Technical University of Munich. SBG acts as a subcontractor for the project, as does the University of Landshut. Through these partnerships, SBG helps advance innovations and moreover ensures SPS’s own share of financing contributions.

The network also succeeds in efficiently cooperating in the area of human resource management. In order to cope with the current shortage of skilled labour prevailing in the affiliated companies, SPS has made use of the intensification of contacts with personnel departments and with institutions of higher learning and has implemented the successful instrument “Sensor technology skilled labour pool” (www.sensorik-bayern.de/sensorik-fachkraeftepool). With the assistance of the institutes of higher learning, sensor technology experts and skilled labour are actively recruited, interviewed, pre-selected in accordance with the ideas of members searching for staff and, finally, are placed. This is a
service giving the network players a clear competitive edge. In addition, the sensor technology skilled labour pool provides a balance between the flexibility of companies and the skilled worker’s wish for stability in a changing work environment. This service is also accessible to non-members, who, unlike SPS members, have to pay for that service. The sensor technology skilled labour pool is thus becoming an efficient instrument for winning new members.

4.2 Financing and professionalization

All services and activities within the network, initiated and coordinated by the SPS Office, are based on solid financing, i.e. digressive start-up financing by Bavarian cluster funding and by the contributions of the association members. Outside financing through funds from the Bavarian Economics Ministry is limited to five years. Therefore, SPS already has the vision of going a step further, concentrating on portfolio financing of the network and its Office from the beginning (see Chart 4). Several measures have been taken for a diversification and a simultaneous stabilization of financing.

The continuously rising number of members guarantees a reliable financing through the membership fees. Additionally, due to an expanding range of services provided within the network the increased added value for membership fees offers an opportunity to adjust them to the corresponding services. On the other hand, SBG as a subsidiary that fully self-finances itself makes an important contribution to the SPS’s own financing to become independent of public assistance. The individual SBG services extend from commercial consulting (coaching and elaboration of business plans, basic and further training, innovation management, application for financial assistance on a high quality level, project management, etc.) up to scientific-technical development services (feasibility studies, /patent/ research activity, physical-technical modelling and simulation, characterization of sensors, development of innovative sensor elements, measuring and testing, design of integrated circuits, etc.). The extraordinarily lively demand for such services, which is provided for network members on more favourable terms, is evident in numerous internal network orders and projects with which SBG has been entrusted and which it is carrying out systematically. The diverse available competences

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**Chart 4: Financing of sensor technology network by financial assistance to clusters, membership fees and profits from GmbH services**

- **Profits from GmbH services**
- **Membership fees**
- **Financial assistance to clusters**

Source: Strategische Partnerschaft Sensorik e.V.
and the sophisticated level of know-how are not only of great interest within the network. Companies outside the network increasingly place explicit orders with SBG. Opening the network to the national and international market is also an aspect of profitable portfolio financing, as a great potential for monetary added value creation lies here which will increase even further. The sensor technology skilled labour pool, for which non-members have to pay, is also developing into a financial pillar of SPS and additionally helps win new members.

Moreover, the foundation of SBG at the end of July 2007 implies a process of a professionalization of network activity. SPS and SBG have constantly heeded the principle of providing services in due time and with the highest quality on the basis of the agreed budget. This is in line with the network’s mentality of “Value for Money,” which shows itself within the order and service framework. Here the network’s orientation to innovation is an absolute market-economy approach. It is inclined to generate a maximum benefit for the affiliated partners in the network and serve as an attractive contact for external companies/players. SPS achieves this high degree of professionalization by employing highly qualified and motivated skilled workers and experts. In the last two years, SPS has grown not only by a managing director, but also by an assistant to the management, a director for technology and innovation management and a commercial employee. All of these new employees have an academic degree and some even a doctoral degree. Moreover, two full-time trainees assist the permanent team in the SPS office at regular intervals. The SBG records a similarly positive growth trend. In a very short period of time, a team evolved around the managing director, made up of a physicist with a doctoral degree as development director, some more physicists and engineers as project directors as well as other technical staff, graduates and work students.

On the other hand, the network achieves a benefit-generating professionalization. This is done through the concentration on developing innovations, because many innovative ideas, in SMEs particularly, are not translated into practice or do not lead to marketable products.

Obstacles to the SMEs’ innovation process are mainly the deficit in continuous R&D work and goal-oriented innovation management (IM). SBG accompanies both SMEs and large-scale enterprises on their way from a promising idea to the marketable, profit-yielding and innovative product (Chart 5). In doing so, it coordinates the activity of needed development partners, e.g. universities, institutes, firms, etc. Additionally, it ensures that requirements of product management, such as time, cost and quality, are observed. It assists network players in understandably formulating problems, starting with solid patent and market research. This process is followed by feasibility studies and a verification of the concept, which, if required, may be carried out by the competent experts of SBG themselves. With the successful completion of the feasibility study, potential funding programmes are examined and the corresponding applications are made. SPS accompanies these specific steps to success through competence development modules (e.g. training in the field of technical IM) as well as mentoring and coaching processes to implement a sustainable innovation culture in the network. This enables SMEs in particular to operate in the field of sensor technology and start developing innovations more rapidly and more effectively.

One example of the systematization of the innovation process at an SME is the cooperation project of SANtec Vertriebsgesellschaft mbH of Munich and the Russian firm SANTÉHPROM. During a business trip by a delegation from the Bavarian Economics Ministry to Moscow, the representatives of SANtec Vertriebsgesellschaft mbH and SANTÉHPROM signed a cooperation project on the development of non-contact washbasin fittings for the Russian market with the purpose of saving water and energy. Both sensor technology and network management play a key role in this innovative cooperation project.

4.3 Record of achievement and outlook

This led to the establishment of a sensor technology competence centre, which has developed successfully since then. The excellently performed network development work has also been confirmed by scientific research in this domain. In an intermediate evaluation by the Fraunhofer-Institut für System- und Innovationsforschung (ISI) in Karlsruhe, carried out on behalf of the Bavarian Economics Ministry, the sensor technology cluster was awarded first prize among 19 publicly supported Bavarian clusters, next to two other clusters. A special point was made of the excellent work performed by the sensor technology network in the fields of public relations, marketing, promotion of cooperation, cooperative projects and...
many other thematic fields. In 2007 and 2008, 104 articles about the sensor technology network were published in local, regional and national newspapers and magazines.

In addition, there is an optimistic outlook for the promising road on which the technology network has embarked. Sensor technology is regarded as a key and high technology of the future and a growth industry for the following decades with an expanding (world) market (cf. AMA2008; www.ama-sensorik.de). The sunrise branches of life sciences, automobile engineering, automation/mechatronics and environmental technology are also in the network’s focus, as defined by the Bavarian Economics Ministry. A continued increase in membership and the unique feature of a broad service range by SBG secures robustness towards changes in external or internal factors. The continuance of the available array of projects and orders as well as long-term cooperation with members and customers is ensured by a high awareness of quality and a continuous stimulation of demand by potential new customers. The growth strategies embarked upon are based on a great potential. With the help of portfolio financing, they ensure that SPS will take a successful road as a

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**Chart 5: Systematic innovation process in sensor technology network**

Source: Strategische Partnerschaft Sensorik e.V.
5 Logistik-Initiative Hamburg e.V. (Logistics Initiative of Hamburg, Inc.): biggest location network in the branch

The Logistik-Initiative Hamburg e.V., has developed into the branch’s biggest location network within a very short period of time in view of its high potential, its comprehensive service portfolio and the active involvement of its members.

Hamburg is one of Europe’s most important logistics locations as a centre of today’s international trade. It also serves as a “gateway to the world” with Europe’s second largest sea harbour - the “heart” of the logistics location. There is no other German metropolitan region with such a great range of competences and a higher regional concentration of logistics-related companies. The Authority of Economics and Labour and the economic community of Hamburg set up the Logistik-Initiative Hamburg in early 2006, in order to continue developing Hamburg’s role as the leading logistics metropolis of Northern Europe. Regionally, the Logistik-Initiative Hamburg sees itself as an initiative of the metropolitan region of Hamburg, i.e. of the Free and Hanseatic city of Hamburg and the surrounding administrative districts of the federal states of Schleswig-Holstein and Lower Saxony. This Public-Private Partnership aims at networking the economy, science and research, profiling the logistics location of Hamburg in collaboration with the initiatives for growth in the metropolitan region and transferring innovation on a broad scale with a view to strengthening companies. To achieve this aim, the Logistik-Initiative Hamburg provides a broad range of services in the domains of

**Logistik-Initiative Hamburg e. V.**

- **Innovation topic**: Transportation and Mobility
- **Innovation region**: Coast
- **Branches**: All stages of value creation and neighbouring fields of logistics industry
- **Date of foundation**: 2006
- **Number of members**: Date of foundation: 50 (October 2009: approx. 460)
- **Specific features of network**:
  - Biggest and youngest location network of the logistics-related German economy with over 450 members (companies and institutions) from logistics-related industry, commerce and services
  - A total of nine working groups on different themes, such as personnel qualification, innovation, law and risk, transport and sustainability in the field of logistics as a cross cutting theme – as one of five fields of activity.
- **Contact**: Logistik-Initiative Hamburg e. V. Habichtstraße 41 22305 Hamburg www.hamburg-logistik.net
information and public relations, service and support, working groups and events in the fields “industrial areas adapted to logistics requirements and transport infrastructure”, “manpower/qualification”, “innovation and technology” and “location profiling”.

The Logistik-Initiative Hamburg is by far the largest location network of this branch in Germany with more than 450 affiliated companies and institutions from industry, commerce and services as well as research and development and many public institutions. It is the first contact of its affiliated partners when it comes to issues concerned with the logistics-related industry, for enterprises, institutions and the public in the metropolitan region of Hamburg. The network is one of four prize-winners of the title “Competence Network 2009” competition, awarded by the Kompetenznetze Deutschland Initiative of the Federal Ministry of Economics and Technology.

Since its foundation, the Logistik-Initiative Hamburg has developed into a stable network. Within a short period of time, it has established a good reputation, and has succeeded in professionalizing its network activity further and expanding its network structures for the benefit of its network partners with the large-scale support from the economy. This regional networking of logistics players from economy, science and politics is unique in the field of logistics in Germany. Important aspects concerning the further development of the network on a sustainable basis are the active integration of members, an increase in innovation dynamics and the step-by-step conversion of financing to more privately funded sources. Additionally, the continued networking of regional players, the consolidation of network structures, the professionalization of network activity and the foundation of a service GmbH (planned for the beginning of 2010) as a wholly owned subsidiary of Logistik-Initiative Hamburg e.V. are pivotal. Private and public financing already have a more or less equal share in the total financing volume today (2009).

5.1 Active involvement of members

The members of a network are both its base and its potential. This is why the members of the Logistik-Initiative Hamburg are in the centre of activities and are meant to be actively involved. This follows the assumption that commitment within the network determines the degree of benefit and added value for those who cooperate in it. Besides the members involved in the association, there is an active exchange with other partners. These are either unable to commit themselves through a membership (e.g. institutions of higher learning, scientific networks or authorities) or do not want to be involved for a longer period or on an intensive basis. The members from the respective segments (such as e.g. logistics service providers, industry/commerce, basic and further training, suppliers/technicians/IT or infrastructure/real estate) compete horizontally in all activities of the Logistik-Initiative Hamburg. Although competition in the logistics branch takes different forms, it is extremely high in the sector of logistics service providers.

The Logistik-Initiative Hamburg is therefore confronted with the challenge to build and develop confidence and trust in the steadily growing network and to show the advantages of the network. In the nine working groups of the Initiative, theme-related projects are worked out and knowledge is exchanged with participants. In addition, a summer festival is held annually for the informal networking of members, with more than 500 persons attending every year.

5.2 Increase in innovation dynamics

One of the major priorities of the activities carried out by the Logistik-Initiative Hamburg is to promote innovations and new technologies with the aim of strengthening the location and creating new jobs. Therefore, workshops, working groups and conferences are organized regularly with the aim of enhancing knowledge in the region about branch-relevant developments and increasing the dynamics of innovation within the network.

The logistics branch has a high potential for innovation in face of globalization, new IT possibilities, Supply Chain Management and the need for new services. In view of stiff competition however, innovation activity by the logistics service providers may still be increased. In order to activate the existing potential, the Logistik-Initiative Hamburg initiates and supports innovation projects within the framework of its different fields of activity.
For this purpose, the association set up a number of working groups that take up, evaluate and develop current themes from transport and logistics branches as well as neighbouring fields and translate them into practice. The Logistik-Initiative Hamburg thus makes an important contribution to opinion-building and competence development in the respective fields. Also, pilot projects are implemented that originated from the working groups. The aim is to create synergies at the Hamburg location together with and for network members.

**Organization and added value of working groups**

The activities of the working groups of the Logistik-Initiative Hamburg are coordinated and supervised by a team leader and one or two deputies in their own responsibility and acting, above all, on an honorary basis. The first working group was established as early as mid-2006 and since then, another eight groups have been set up according to different topics. The total of nine existing working groups are concerned with the following logistics-specific aspects:

- Future logistics (technological innovations)
- Logistics expanses
- Sustainability in logistics
- Personnel and qualification
- Location profiling
- Risk + law
- Transport
- Domestic navigation
- In cooperation with the German Seeerverladerko-mitee (DSVK) in the Federation of German Industry (BDI) and its sister network Kompetenz-Zentrum Logistik Bremen: Working Group Maritime Supply Chain (optimization of sea harbour hinterland transports)

Participants are informed and encouraged to participate actively at the regular meetings of the working groups. Participants in the working groups can be members of Logistik-Initiative Hamburg e.V. and also applicants for membership in the association. The meetings are held between three and six times annually and are free of charge for the association members, according to participants’ interests. Each working group organizes forums to enable the interested public to profit from the accumulated experience and results. The half-day forums are aimed at both association members and interested guests. Experienced lecturers share the know-how generated within the working group with the participants. After the meetings, the lectures and results are made available online in form of manuals and guidelines.

This professional approach in the working groups continuously increases the added value for members. In 2008, the Logistik-Initiative Hamburg organized some 80 meetings, workshops and working groups with almost 10,000 participants, which advanced the dynamic development within the regional logistics branch.

**5.3 Conversion of network financing**

The network is partly financed through funds allocated by the Hamburg Senate for the period 2006-2011. The proportion of public funds for cluster-oriented economic policy has been reduced steadily from 2006 to 2010 and will continue to do so. Starting from 2011, financing is intended to be provided from the Hamburg budget annually. At the same time, private funds have developed considerably, such as membership fees (due to an increase in membership), donations, sponsoring, and project funds. After having been established for three years, the Logistik-Initiative achieved a 50:50 financing proportion from public and private funds in 2008.

These proportions are likely to be reached in 2009 as well. An important aim for 2010 will be another increase in private shares by increasingly launching projects in which the Initiative takes over syndication, project management and public relations. This does not only apply to private projects, but also to publicly funded projects. These represent the strengths of the initiative as a network of politics, economy as well as science and research. Moreover, events should increasingly be carried out on a cost-covering or cost-surplus basis.
5.4 Logistik-Initiative Hamburg – an outlook

Since the Logistik-Initiative Hamburg was founded in 2006, a stable network developed. Owing to a reputation acquired within a short period and due to great support by the economic community, it has embarked on a very good way towards further professionalization. In the next few years, the task will be to broaden the topics of innovation and technology even more and to intensify networking between economy and science. In order to carry on with this networking based on economy and science, a “Logistics Day of Science” is planned for the spring of 2010. The aim is to intensify contacts between companies and logistics-related chairs of the Hamburg institutes of higher education and scientific establishments. It should improve the dissemination of results in practice and, most importantly, speed up this process.

Furthermore, the degree of internationalization of the Logistik-Initiative Hamburg offers a great potential for further development, which should be tapped in cooperation with regional establishments (e.g. Hamburg Marketing GmbH, Hafen-Hamburg Marketing GmbH, HWF Hamburgische Gesellschaft für Wirtschaftsförderung mbH). The first step in this direction was taken by setting up of the working group “Location Profiling”. Together with its partners from the metropolitan region of Hamburg, the Logistik-Initiative Hamburg successfully implemented a project for international networking with logistics clusters in China in the fourth quarter of 2009. This was financially supported by the Federal Ministry of Education and Research. Good contacts exist in this domain for centuries, which should be broadened and opened to further topics.

In order to meet future requirements as well, the Logistik-Initiative Hamburg will found a service GmbH in 2010. This limited liability company is a wholly owned subsidiary of the association and is called upon to generate new projects and, additionally, to support the competences of the network through project agencies. Further future-oriented activities and measures are intended to achieve an increased professionalization of the network and of management. Additionally, they should ensure the sustainable existence of the Logistik-Initiative Hamburg for the benefit of the affiliated players.
The greater the “win-win” situation for network members, the stronger their commitment to the network.

The region of Stuttgart is the industrial core region of Baden-Württemberg and one of the economically most potent regions in Europe. In this region many leading developers, providers and users of technologies of Virtual Engineering have set up their business. It was logical to concentrate this know-how in a competence network for Virtual Engineering in order to achieve even more rapidly efficient and, above all, cost-effective solutions. This is of particular importance due to the fact that this regional concentration of players, is unique in the world.

Since its creation in 2002, the Virtual Dimension Center Fellbach w. V. (VDC) has pooled the knowledge of many players from companies and research in the field of 3D visualization and simulation technologies and technologies of Virtual Reality (VR). The VDC represents a communication platform for the exchange of knowledge and information and for inter-company cooperation projects in the form of a scientific association. The Virtual Dimension Center has succeeded in building up sustainable network and cooperation structures with the help of start-up financing provided by the town of Fellbach. By integrating and expanding these structures, the VDC has managed to convert the financing plan, step by step, from public start-up financing to more privately supported financing.
6.1 Planning and foundation stage

Many companies and research institutions working in the technological field of Virtual Engineering and the part-sector Virtual Reality have settled in the region of Fellbach (greater area of Stuttgart). These companies and research institutions wished to engage in a more intensive cooperation. At the same time, the town of Fellbach was looking for an appropriate instrument, both to keep engineering companies in this location and to support mutual technology transfer (integrated municipal economic development).

In a more or less six-month development process, a plan was worked out which, apart from the setup of a network office, envisaged the establishment of a demonstration centre where companies inform themselves and test technologies. This high investment demand required start-up financing. The town of Fellbach submitted a corresponding offer of support, as a result of which 14 companies and research institutions founded the economic association “Virtual Dimension Center w.V.” in November 2002.

In accordance with the town’s financial commitment, the chief mayor of Fellbach is chairman of the board of the association, by virtue of his office. This constellation guarantees the neutrality of the association’s business activity.

6.2 Build-up stage

In mid-2003, the Office as well as the demonstration and service centre (Demozentrum) were inaugurated and an office director was recruited. After opening, the first projects were drafted immediately, in order to establish cooperation structures between the Office and the affiliated players and/or members as well.

At the initial stage, premises, technical equipment and services in the Demo Center were rented out. The income made available through the renting out has become an important VDC financing component. In the Demo Center, there is a complete technology infrastructure, which makes it possible to present nearly all hard- and software technologies within a VR context. These technologies are offered to both association members and external players against payment. The rental income is used to re-finance the cost for the operation and maintenance of the Demo Center.

Besides the technological infrastructure, the Office also maintains a network of service providers. This enables companies to make use of both the technological infrastructure and the know-how of network partners for their projects.

The Demo Center can also be used for conferences, training courses or presentations. Meanwhile, the VDC Demo Center has become established as a congress centre. The renting service is an excellent “showcase” and a good opportunity to establish initial contact with potential customers and new partners for network members, who provide technology at the Demo Center at a low cost.

6.3 Growth stage

In the period 2004-2006, continuing the initial development stage, a great number of services and offerings were implemented and many projects carried out. VDC activities were professionalized further with regionally financed projects and cooperation in addition to the participation in fairs, the publication of a monthly newsletter, the setting up of know-how databases (competence cube, etc.) and a series of workshops. Financing based on membership fees and via EU, governmental and regional projects became more and more important during the growth stage.

The level of membership contributions is based on corporate size. These contributions by network partners help finance the basic costs of the association’s business activity. The members’ significant contribution to the financing of the network activity is expected to increase the motivation to ask for a service in return for their own financing share. The network’s basic financing is stabilised by a rising number of members.

8 Note: Virtual reality as a part-sector of virtual engineering is a new method of man-computer interaction. With the help of stereoscopic visualization, spatial input devices and power feedback, products and processes of products can be realistically simulated and experienced on the computer.
In addition to membership fees, R&D projects go a long way towards network financing both on a regional, governmental and EU level. Exclusive concentration on project funding as the sole financing source would be a problem for a network, because project funding is subject to greater fluctuations and there is usually an obligation to co-finance such projects.

Fields of activity for network management within the framework of publicly funded projects

In the case of publicly funded projects, the tasks confronting a competence network are highly diverse. The important point is that the Office presents the pertinent development programmes within the network and assesses their relevance for members. The Office also faces the task of assisting members in their application for funds, if so requested. In this case, the Office can function as an applicant itself or participate in that process as project partner with one or several members. Moreover, it acts as a contact for requests from already existing consortiums that need a special competence for a successful application. Improving the access to funded projects appears to be an important activity of network management in the case of technology networks in particular. This is due to the fact that this facilitates the chance for SMEs have to intensify work with the technology in question.

6.4 Consolidation stage

Network management and the person of managing director have a key position within a network. Experience gained in the search for personnel shows that looking for a suitable manager can be a lengthy and cost-intensive process, especially in times of above-average network and economic growth. While setting up a network, a person with good abilities and skills as a networker should be given preference, even if they only have basic technological knowledge. Once the network has been established, the technological competence of said person should increase very soon however. Since 2003, a commercial managing director has been in charge of VDC since 2003. Additionally, in 2007, a technical managing director was employed in order to support the technological competence of the office.

In the course of time membership has risen to 65 partners, due to the striking achievements of the network, participation in projects and primarily as a result of the expansion of the service portfolio. For the key players (research, science, education, software and hardware fabrication, technology users, company-related service providers, policy-makers and administrators), a high degree of coverage has been achieved with regards to the regional membership potential.

Cooperation within the network takes place on various levels, such as development cooperation, marketing cooperation, research services, or purchasers’ groups. The initiation and moderation of professional workgroups during the stage of network structures consolidation resulted in a continued professionalization of network activity. Moreover, the conduct and implementation of studies and trend analyses led to an increased scope of available know-how in the Office.

Further sources of income can be generated for the Office as soon as the network has reached a certain size. Among other things, this income stems from private projects for members and/or external players, from the revenues of self-organized events (conferences and workshops) and the successful participation in competitions as well as personnel services.

6.5 Sustainability and future viability

It is very important to develop a conclusive conceptual and financial programme in the setup and early development stage in order to ensure the network’s sustainable existence and, above all, efficiency. Therefore, a short “start-up phase” of a network and the associated financing should be avoided. An appropriate start-up financing period is one of five years, with a decrease setting in from the third year on according to the VDC Fellbach.

After passing the various stages of network development, the financing of the VDC’s network activity now rests on four permanent pillars:

- Membership fees staggered according to corporate size
- Economic development subsidies for technology transfer by the local authority
- Public project funding on a regional, governmental and EU level
- Office sales generated by the renting out of the Demo Center, consulting services, privately financed projects, receipts from organized meetings and personnel services

It is necessary to tap different financing sources at an early point of time in order to guarantee a long-term existence of a network. It is especially important to reinforce privately-based financing pillars, such as membership fees and sales from network activity, in the light of public financing modalities, such as degressivity and limitations in terms of time. Increased financing through membership fees should be achieved predominantly by a rising membership.

Sales from network activity are usually increased by expanding the network-specific service portfolio; however, the Office’s services should not compete with those of network partners. By generating sales of its own, the Office should ensure that network members are involved and a so-called “win-win” situation is produced. In the next few years the focus will be on the continuous development of the existing structures and services for members within the VDC.

Another task will to step up the international activities of the network. A focus on core branches such as automotive, machine and plant construction as well as architecture and building construction and the defined technology field, will lead to a systematic increase in membership.

Likewise, it is important for networks to continuously re-think their strategic orientation in the course of their development. Additionally, the work of the Office should be examined at regular intervals. Network growth and changing requirements of members can lead to a new orientation of activities. Development options and demands by members of the network, especially involving network partners, should be identified and optimized. This can be done with the help of different management instruments, such as the so-called “knowledge balance sheets.”

All implemented measures and future activities are aimed at a long-term integration of members into the by supporting them in their needs. Through
7. **Kunststoff-Netzwerk Franken e.V.**

(Franken Plastics Network, Inc.)

Hans Rausch

**Financial autonomy and a high degree of activity of members as pillars of sustainable network success**

**7.1 Dynamics of foundation and situation of competitors in the network**

The initiative to set up the association Kunststoff-Netzwerk Franken e.V. (KNF) was started completely by the company side. It was triggered by the project "Materials innovations by inter-company networks" which was funded by the Bavarian State Ministry of Economics, Infrastructure, Transport and Technology and implemented by the Betriebswirtschaftliches Forschungszentrum/Mittelstand (business research centre for SMEs) at the University of Bayreuth (BF/M-Bayreuth). In the context of this project, several plastics-processing firms became aware of the usefulness of dialogue and cooperation between companies for all concerned parties. These companies acted on this awareness and assumed the initiative to call the KNF into life.

The association sees itself as a technological platform of exchange for companies. Its aims are the enhancement of the competitiveness of individual companies in various fields and improvement of the plastics image with the help of a joint presentation to the public. The association increased from originally nine founding members in June 2003 to 101 companies in July 2009. Together these companies employ more than 40,000 workers and represent the entire value

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**Kunststoff-Netzwerk Franken e. V.**

<table>
<thead>
<tr>
<th><strong>Innovation topic</strong></th>
<th>New Materials and Chemistry</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Innovation region</strong></td>
<td>Southern Germany</td>
</tr>
<tr>
<td><strong>Branches</strong></td>
<td>Plastics branch and its subcontracting industries (New Materials [polymer processing oriented to the whole value creation chain])</td>
</tr>
<tr>
<td><strong>Date of foundation</strong></td>
<td>June 2003</td>
</tr>
<tr>
<td><strong>Number of members</strong></td>
<td>Date of foundation: 9 (in 2009: 101)</td>
</tr>
</tbody>
</table>
| **Specific features of network** | - Industry-driven and industry-financed (i.e. without state funds for network tasks)
- Very high active participation of affiliated companies
- Orientation to value creation chain, i.e. large common basis for members with consistent orientation to practice |
| **Contact** | Kunststoff-Netzwerk Franken e. V.
Gottlieb-Keim-Str. 60
95448 Bayreuth
www.kunststoff-netzwerk-franken.de |
creation chain of plastics processing. A distinction is made between “full members” and “supporting members” within the membership structure. Full members are plastics-processing companies and machine tool enterprises. In contrast, supporting members are technology-oriented subcontracting companies from plastics processing. This implies that companies from the areas of mechanical engineering, construction, automation, measuring and analysis and other fields are involved in network activity.

Close cooperation exists between the regions’ chambers and different research institutions, technical colleges and universities as well as other network structures and clusters. It allows the network to fulfill the industry-driven, practice-oriented interests of members which the network activity is focused on. Furthermore, it makes it possible to actively involve the relevant partners in context-related projects.

**Special features of the network**

The materials group of polymers and its processing techniques represents the basis that is common to the affiliated companies. The KNF is oriented to the value creation chain of the plastics material. Therefore, it provides players with a very broad basis of common interests and activities. This orientation to the value creation chain distinguishes the plastics network from many other network structures. The KF unites different branches that have a common interest, i.e. the material “plastics”. Unfortunately, the importance of this broad common basis is not regarded as required in setting up networks. Thus, a crucial factor of success in network activity is ignored.

**The idea of competition within the network**

The following realisation was a decisive incentive for the start of the KNF by the founding partners: namely, the existence of many pre-competitive aspects that can lead to market advantages for all participants, if they are dealt with in a cooperation or coordination. The idea of competition was no longer seen as only existing in the proximity of companies, but rather on a global scale. Companies realized that in the last analysis it was important to safeguard the German location of production, to maintain jobs and, in this context, preserve know-how. As a result of this awareness, many firms came together in the Kunststoff-Netzwerk Franken that appear to be competitors on the market.

**Chart 6: Membership development of the network from 2003 to 2009**

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of affiliated companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>June ’03</td>
<td>9</td>
</tr>
<tr>
<td>Dec ’03</td>
<td>20</td>
</tr>
<tr>
<td>Dec ’04</td>
<td>31</td>
</tr>
<tr>
<td>Dec ’05</td>
<td>38</td>
</tr>
<tr>
<td>Dec ’06</td>
<td>60</td>
</tr>
<tr>
<td>Dec ’07</td>
<td>72</td>
</tr>
<tr>
<td>Dec ’08</td>
<td>93</td>
</tr>
<tr>
<td>July ’09</td>
<td>101</td>
</tr>
</tbody>
</table>

Source: Kunststoff-Netzwerk Franken e.V.
7.2 Financing model – one pillar of network success

There was a general awareness by all founding members that this structure required a particular type of financing. Two aims were competing with one another: the achievement of financial autonomy as quickly as possible and the establishment of an own agency and the financing of a managing director. It was also clear that this financing could not be the sole responsibility of the companies involved from the beginning. The founding members therefore installed a membership fee of 1,500 Euros per year and combined this with the target of making the network financially independent of public funds as quickly as possible. This was linked to the condition to ensure that the newly admitted members should profit from network membership in the composition of affiliated members, but also that the network itself profits from their accession.

The participating companies fixed the principle of give and take at an early stage and the network was institutionalized with the appointment of a managing director. As early as October 2003, the first bigger public network meeting was held in Bayreuth. These meetings in coordination with the accompanying public relations ensured a very rapid growth of the network. As early as December 2003, the network had a record of 20 affiliated companies. Simultaneously, the Bavarian State Ministry of Economics, Transport, Infrastructure and Technology provided start-up financing over a period of two years starting in 2004 and modelled similar to the research programme “New Materials.”

The continuous growth of the network and the resultant increasing expenditure of time made a shift in the original distribution of working hours necessary and possible - from 75 % at Neue Materialien Bayreuth to 25 % at Kunststoff-Netzwerk Franken, via a proportion of 50 %-50 % up to 25 %-75 %. After two years, the KNF was able to take over 75 % of the cost for the managing director. The introduction of new industry-controlled working groups and the conception of industry-related technical events gave another impetus to growth, increased the rate of activity and enabled the KNF to occupy the position of a managing director full time (100 %) and to establish its own office. The managing director switched over to the KNF completely, which resulted in the network’s financial and organizational autonomy. The combination between public start-up financing and the employment of a managing director on a part-time basis with steadily increasing availability proved to be an ideal solution for the KNF. Today the KNF employs 2.5 persons on this basis.

The plan is to increase this rate of employment in the medium term.

Financing pillars

In the field of operational network activity, the KNF is wholly self-financed. This means that no government funds are needed for this activity. Financing is based on three pillars:

- Pillar 1: membership fees (ca. 75-80 %)
- Pillar 2: receipts from events and the provision of services (ca. 20-25 %)
- Pillar 3: receipts from funded projects (not part of operational business)

In addition to 100 % financing through events and membership fees, the network is still capable of setting aside reserves in order to react flexibly to the growth of the network. In agreement with the general assembly, the management of the network decided to build up liquidity reserves amounting to at least the volume needed for a year. This target has almost been reached. An extremely lean and efficient administrative structure only allows the claiming of funds for project activities that cannot be financed from the current budget.
The membership fees are the main source of income. Independent of company size, the membership fee is 1,500 Euros for full members, while supporting members pay between 1,500 and 3,500 Euros. This fee is graded according to the number of personnel. The unitary fee rates guarantee that none of the companies can hold a position of financial dominance. The introduction of supporting membership followed the increased inquiries by interest groups, which regarded the newly founded structure as an optimal sales platform with favourable conditions of access to potential customers. However, these groups were not able to make a contribution to network activity on their own. On the other hand, there were also inquiries from technological subcontractors who were able and wanted to make important contributions to technological exchange. It should therefore be considered carefully, who should eventually become a supporting member, as the aim is to ensure that the network and the supporting member both benefit. A supporting member has all the entitlements of a full member. However, it is not entitled to vote at the general assembly in order to prevent the transformation of the KNF into an advertising and sales platform through majority resolution.

The membership fees were established by the founding members, as they were of the opinion that each company had to contribute financially to the network cost. In addition, a financial contribution ensures that firms have a special interest in the network’s success. The contact partners endeavour to enhance the benefit for the company within the network. This is due to the fact that they have to answer to their company members concerning membership fees in talks on the annual budget plan. This increases the incentive of becoming involved in network activity and ensures a very high rate of committed players.

One of the salient features of the Kunststoff-Netzwerk is cooperation of companies in self-organized working groups. Coordination is the responsibility of an executive board, made up of affiliated members and the working group leaders (as of July 2009: twelve working group leaders), who are in charge of organizing and coordinating the contents of working groups, dates and minutes. These working groups are the focus of network activity and are coordinated by the companies themselves with regard to subject matter and organization. Professional inter-branch exchange offers all companies involved the unique chance to participate in a mutual exchange in a field neutral to competition and sales and to work jointly on solutions to cope with daily challenges. The growth of the network shows how much this advantage is appreciated. Canvassing for members through so-called “hard selling” has purposefully been abandoned. The network is growing continuously on the basis of recommendations by corporate representatives or by participation in technical meetings of the Kunststoff-Netzwerk Franken.

With the exception of the office staff, all association members work on an honorary basis. It is the agency’s task is to launch projects that cannot be financed from the normal network budget and are thus in need of public funding. In 2009, this applied to two publicly funded projects concerned with basic and further training in networks. One of the projects is funded by the Bavarian State Ministry of Economics, Transport, Infrastructure and Technology; the other one is financed by the Federal Ministry of Education and Research and by the European Social Fund of the European Union (ESF).

7.3 Networking – a closed book

On the basis of the KNF’s understanding of a network, it is not possible to establish or even operate a network of companies as an institution or a single person. It has to be accepted that networks are established and that a single person or an institution can only create framework conditions which make it easier for companies to establish a network. To corroborate this point, the following argument can be adduced: From our point of view, the network is not a construct on paper, but a living organic structure characterized by a corresponding level of activity. This level of activity must originate from the members. Single persons or institutions cannot guarantee this, because they always have to rely on cooperation of companies. For many people, this viewpoint constitutes a change of paradigm that they find hard to accept. In the KNF’s view, network organization must aim at optimizing framework conditions, facilitate a flexible reaction to the needs and interests of affiliated members and relegate one’s own interests.

At the initial stage of corporate networks, the initiator frequently makes the mistake of offering all services free of charge, especially when a sufficient volume of funds is available in the early phase of networking. Experience shows that in this process companies frequently “jump on the financial bandwagon”.
Another effect of this “consumerist” attitude is the lack of readiness to participate in network development and, in consequence, a lower level of activity of members.

The real problem of such an approach ultimately becomes evident with the question of self-financing of the network structure – this is usually when funds are depleted. At this point in time, companies often take the availability of the network’s services for granted, and their readiness to finance network activity declines drastically.

**Professionalization of network activity**

Professional network activity is characterized by an integral view of system components. This primarily includes financing, quality of cooperation, expansion, stability, growth and the factor “Social Competence of Key Players” in conjunction with mutual trust. The personal characteristics of players decide the success of network activity. It is necessary to involve persons with an integrative personality. Further characteristics of professionalization are the rapid development of a Corporate Identity (CI) of an integrated image with a high recognition value, systematic press work, lobbying of potential promoters, making of a qualified mailing list, professional organization of events and a range of events and services geared to the interests of members. Systematic environmental monitoring guarantees a network strategy oriented to the needs of companies. In this way, it is possible to collect specific information apt to define further network activity.

**Résumé**

The Kunststoff-Netzwerk Franken has shown that it is important for members to realise that the structure they wish requires a certain degree of self-initiative both with regard to the contents and finances. Working together with companies in finding a structure which satisfies and meets their interests and contents and helps achieve financial autonomy as early as possible has proved to be a success. Public start-up financing is very helpful at the beginning. However, it should be ensured that the companies are asked to contribute at the start-up financing stage, in order to involve members in the financing of network activity early on.

A high level of network activity in association with the readiness of all to sustain the network structure are the only instruments capable of guaranteeing the sustainability of start-up financing. At an early stage, all companies must evidently find themselves represented with their interests in the network. The focus on special themes should be preferred to an array of topics that is as widespread as possible. Likewise, the quick accumulation of members in order to suggest a certain size to the outside world is viewed as pointless - in view of the experience gained with the Kunststoff-Netzwerk Franken. Rather, the growth of a network in the course of time should occur automatically through the quality of network activity. To this end, the network needs persons who demonstrate the efficiency of the network to the outside world and who facilitate a “win-win” situation for all through the make up of the structure of network membership. Sustainable network activity here means linking a financial structure with a range of services precisely tailored to the needs of the target group, in this case the affiliated members.
We generate sustainability – economically for our network partners and ecologically for all of us. Economy and ecology are no contradiction, for they need each other just as the two sides of one medal!

An intact environment is the most important prerequisite for life on our planet. For all members of KUMAS, dealing with man and the environment in a responsible way is self-evident. Therefore, doing business on a sustainable basis is an important topic. We are greatly committed in the fields of Renewable Energies, Environmental Medicine, Environmental Education, Environmental Economics, Environmental Technology as well as Transport and Logistics. Our network partners contribute their share to safeguarding resources for the future generations.

8.1 KUMAS – Network features

The textile industry in Augsburg employed nearly 30,000 workers in the early 20th century at the peak of its success. However, it started to decline following World War Two. Due to this, regional players launched economic structural changes early on, bundling the existing environmental competence in the area of Augsburg and Swabia. Since 1996, these structural changes have also been supported within the framework of the high-tech drive of the Bavarian Free State. In that process, the region of Augsburg and Swabia was instructed by the Free State to develop into the Bavarian environmental competence centre. Subsequently, the Kompetenzzentrum Umwelt (KUMAS) was established with the aim of generating sustainable value creation with environmental technologies in Bavaria and creating qualified jobs. Moreover, the high degree of the available environmental competence was confirmed by a study of the Institute of Economic Research (Ifö). As a result of this Ifö study, the establishment of an association was proposed with a view of pooling all environmental activities.

KUMAS Kompetenzzentrum Umwelt e. V.

<table>
<thead>
<tr>
<th>Innovation topic</th>
<th>Energy and Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovation region</td>
<td>Southern Germany</td>
</tr>
<tr>
<td>Branches</td>
<td>Renewable Energies, environmental technology, transport and logistics</td>
</tr>
<tr>
<td>Date of foundation</td>
<td>1998</td>
</tr>
<tr>
<td>Number of members</td>
<td>at date of foundation: 8 (in 2009: 200)</td>
</tr>
<tr>
<td>Specific features of network</td>
<td>KUMAS – the Bavarian Competence Centre on the Environment is unique in its character due to the professional diversity contributed by its members from politics, administration, science, research, education and the economy.</td>
</tr>
</tbody>
</table>
| Contact                     | KUMAS – Kompetenzzentrum Umwelt e.V.  
 Am Mittleren Moos  
 86167 Augsburg  
 www.kumas.de |
Thus in the spring of 1998, under the aegis of the Chamber of Industry and Commerce, the association KUMAS – Kompetenzzentrum Umwelt Augsburg/ Schwaben e.V. was set up in cooperation with the administrative districts of Augsburg, Aichach-Friedberg and Dillingen, the Allgäu-Initiative GbR, the Chamber of Commerce for Swabia, Deutsche Bank AG and other players. Within the Bavarian environmental competence network, Kompetenzzentrum Umwelt e.V. is the key coordinating agency.

Within the network, the KUMAS members from politics, administration, science, education and the economy work on a cooperative basis. The association has set itself the aim to strengthen environmental competence in the scientific and public domain and to enhance the economic efficiency of the region. The objective is to support young environmental firms in the region, to strengthen existing companies. Additionally, the network assists companies willing to set up business, thereby improving the macroeconomic conditions. Apart from economic aspects, KUMAS focuses on maintaining and improving the regional environmental quality by actively supporting projects in the field of environmental protection and conservation.

Moreover, existing and newly founded companies are creating jobs in the domain of environmental technology. Special basic and further training courses which KUMAS offers its members generate a high potential of highly skilled young talent, professionals, and managerial staff.

The members of KUMAS themselves have a broad range of services at their disposal. It is intended to help KUMAS members to concentrate on their core competences and to obtain support by KUMAS members for activities that exceed its scope. The portfolio of services includes, among other things:

- Efficient networking of the specific ecological know-how of involved companies, universities, technical institutes of higher learning and other establishments as well as authorities and local bodies
- Incentives to develop new exportable products and services in the environmental industry
- Support for obtaining funds
- Manning national and international collective booths at environmental fairs
- Organization of joint seminars and technical congresses
- Environment-related public relations and marketing measures

In the last few years, the KUMAS network, which initially covered the region of Augsburg and Bavarian Swabia, has been able to extend its activities far beyond the region, so that further competences from the whole of Bavaria and beyond could be integrated.

8.2 Stability and continuity within the network as pillars of sustainable action

The stability and sustainability of the network is shown by its great number of focal points. Since 1998, a network emerged that has been able to sustainably improve the competitiveness of all affiliated partners. It is based on the transfer of knowledge, information, exchange of experience and cooperation. Each new partner in the network with their specific competences and experience thus adds to the efficiency within the network. In the past few years, KUMAS has been able to build sustainable structures in different segments and aspects of topics. This includes the introduction of a private financing model, the focus on a specific topic in a region and the identification of long-term development prospects.

8.2.1 Sustainability aspect “Financing”

The KUMAS Office was able to start work rapidly and to recruit more members due to the start-up financing phase with funds from the Free State of Bavaria, which lasted three years. The allocation of project funds enabled the association to expand the network and proceed to a network operation independent of public funds, i.e., financing today is based on membership fees and self-generated money. This independence enables KUMAS to take up topics raised by members very rapidly and to translate them into practice in cooperation with network partners. This procedure has proved very positive and especially sustainable for the association since KUMAS was founded. This is the only way for KUMAS and its
network to evolve further continuously, to
dynamically develop new fields of themes and
thereby maintain the association’s attractiveness
permanently.

8.2.2 Sustainability aspect
“Thematic character of
a region”

KUMAS is pursuing the aim of sustainably developing
and generating existing environmental competences in
close interaction with economy, science and education, administration and politics. The network
encourages the new development of products and
services, gives financial assistance to business start-
ups, strengthens existing companies and supports
new business settlements in Bavaria. KUMAS thereby
contributes to improving the economic potency of the
entire region.

From the very beginning, the network carried out
environment-specific measures and activities with an
impact on the outside world, linking the region with
the themes “Environment” and “Environmental
Competence”. This thematic character and the
involvement of other environmentally relevant
aspects developed gradually in dependence on the
widening of the group of players.

At the beginning of network activity, the
emphasis was initially placed on topics such as waste
and recycling. This led to the establishment of the
“Bavarian Waste and Waste Disposal Days” in Augsburg. Partners like the Bavarian Regional Bureau
on Environment, bifa Umweltinstitut GmbH and other
partners, under the direction of KUMAS, contributed
their know-how and have meanwhile made this
annual technical event a great success. Approximately
300 waste disposal experts from all over Germany
take part in this congress. Besides, the focus of KUMAS
was also on the special topics “Regenerative Energy”
and “Efficient Management of Energy”. The “eza!
energie- und umweltzentrum allgäu” in Kempten
was also founded with the help of KUMAS and KUMAS
members.

The technical congress fair RENEXPO was held
in Augsburg for the first time in 2000 with the
participation of KUMAS. In 2008, the annual technical
fair on energy was able to welcome over 300 exhibitors,
14,000 visitors and approx. 1,200 congress participants
at the Augsburg fair site.

As more members were admitted to KUMAS, the
environmental network’s know-how in the field of
water technology increased. Thus in 2005, KUMAS
started the new series of events “Bavarian Water
Days” in Augsburg. Under the overall direction of
KUMAS, the bundling of the expertise of network
partners quickly became a success (such as, e.g.,
Bavarian Regional Bureau on Environment, Grünbeck
Wasseraufbereitung GmbH, HPC Harress Pickel
Consult AG and IGS Industriepark Gersthofen Service-
gesellschaft mbH). In 2008, as many as 200 people
participated in the two-day event.

With the number of regulations in the field of
environmental law rising, it was important to
increase legal expertise simultaneously by admitting
renowned law firms to the association. This led to the
establishment of a KUMAS series of events on “current
environmental legislation”.

In the last few years, various environmentally
relevant fields of competence and/or themes have
been implemented within the network, covering:

- Environmental education
- Business start-ups
- Environmental economics
- Sustainable economic management
- Resource efficiency
- Renewable energies
- Environment: traffic and logistics
- Export of environmental technology

The establishment and further development of
environmentally relevant institutions in the region
(such as UTG-Umwelt-Technologisches Gründerzen-
trum Augsburg, bifa Umweltinstitut GmbH, the
institutes of the University of Augsburg AMU and
WZU as well of the universities of Augsburg and
Kempten), and the move of the Bavarian Regional
Bureau on Environment from Munich to Augsburg
led to a considerable improvement of framework
conditions for SMEs and for the technology transfer
between R&D institutions, administration and the
economy. Joint projects between network partners,
additionally strengthened the network and portrayed
the high environmental competence of the network and of the region – examples are the appointment of a waste advisor in Bavaria, the investigation of the innovation potential in SMEs and the acceleration of environmentally relevant approval procedures.

8.2.3 Sustainability aspect

“Environmental education”

A large and readily available range of environment-specific basic and further training courses ensures a high potential of well-educated junior staff, professionals and managers. In light of this, KUMAS has set itself the aim to promote cooperation and the exchange of information between environmental education establishments in Bavaria. Many providers of advanced training establishments for the environment have worked together successfully for many years within the network.

In the medium and long term, the various basic and further training measures in the field of environment and environmental technology are intended to meet the increasing demand for skilled labour.

8.3 Sustainable successes of the network

In the last few years, KUMAS has successfully managed to build up stable network structures, to develop and implement a sustainable, self-supporting financing plan and to link a region with a thematic focus. Most importantly, KUMAS has succeeded in generating advantages for the players involved in a great variety of sectors of network activity.

Over a period of ten years, more than 40 prizes were awarded by the programme “KUMAS Lead Project”, for especially innovative and environmentally relevant projects. Under the motto “Innovation needs motivation and assistance”, KUMAS annually awards the distinction “Official lead project of the competence centre on environment”. Lead projects of the competence centre are techniques, products, services, schemes, developments, or research results that are particularly suited to demonstrate environmental competence “made in Bavaria.” KUMAS supports the development and implementation of innovative projects by awarding prizes for lead projects and ensures the scientific and technical environmental know-how of the region.

The range of services has been broadened by the continuous expansion of the KUMAS with its 200 partners and approx. 50,000 co-workers. Additionally, it has encouraged important investments in scientific institutions as well as educational and economic establishments. As a result, the macroeconomic conditions for the environmentally relevant economic enterprises in the region have improved. Over the ten-year period, the Environmental Firm Information System (Umfis) of the Chamber of Industry and Commerce of Swabia increased from approx. 300 to almost 600 companies in 2008. In this context, KUMAS assists environmental companies in setting up business and systematically supports young business starters and entrepreneurs. As the demand for technology and services is greatly increasing on an international scale, KUMAS is paving the way to global markets especially for small and medium-sized enterprises. The aim is to open up new global markets for all members through collective stands at international fairs held abroad, the exchange of experience within the working group “KUMAS-Arbeitsgruppe International” and by advising companies on the setting up of international consortiums of firms.

Since the network was founded, a Bavarian competence centre on environment, with an appeal for the entire Bavarian region, was established in order to develop and expand key technologies for the 21st century.
HörTech – Kompetenzzentrum für Hörgeräte-Systemtechnik (HörTech Competence Centre for Hearing Aid System Technology): Ensuring sustainability through high diversification

Hearing loss is a widespread phenomenon; some 15 million people in the Federal Republic of Germany have a hearing impairment that needs to be treated. This impairment is correlated with age. As much as 37% of the 50-59 age group and 54% of people over 70 have hearing problems. However, only approx. 20% of those affected have hearing aids, the reason is that the acceptance of hearing aids and their rate of success are still very low despite the severe consequences this impairment has for communication.

**Aim of the network:**

“..., because we want to make the vision of ‘hearing for all’ a reality” (Prof. Dr. Dr. Birger Kollmeier).

The purpose of the network is to encourage science and research and to generate new methods and findings. In addition, the establishment and the operation of the Kompetenzzentrum für Hörgeräte-Systemtechnik were meant to support this. The centre of expertise wants to offer companies, involved in the process of research and development, the opportunity to come together on a pre-competitive level. The goal is to allow them to work on projects orientated towards the development of hearing aid system technologies as well as associated projects. Such companies are cooperating companies and institutions from the private sector as well as universities and research institutes involved in the process of research and development. From the start, the aim was to represent

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**HörTech – Kompetenzzentrum für Hörgeräte-Systemtechnik**

<table>
<thead>
<tr>
<th>Innovation topic</th>
<th>Health and Medical Science</th>
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<tr>
<td>Innovation region</td>
<td>Coast</td>
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<tr>
<td>Branches</td>
<td>Medical technology, hearing aid technologies, audio-technology, language communication, digital signal processing techniques</td>
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<tr>
<td>Date of foundation</td>
<td>2001</td>
</tr>
<tr>
<td>Number of members</td>
<td>at date of foundation: 12 cooperation partners (in 2009: approx. 65 cooperation partners in the network)</td>
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<tr>
<td>Specific features of network</td>
<td>Unparalleled concentration of research institutions and companies in the field of hearing rehabilitation, language communication and audio-technology</td>
</tr>
<tr>
<td>Contact</td>
<td>HörtTech gGmbH</td>
</tr>
<tr>
<td></td>
<td>c/o Haus des Hörens</td>
</tr>
<tr>
<td></td>
<td>Marie-Curie-Straße 2</td>
</tr>
<tr>
<td></td>
<td>26129 Oldenburg</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.hoertech.de">www.hoertech.de</a></td>
</tr>
</tbody>
</table>

9 Note: Cf. www.forumguteshoeren.de/Ohren/Zahlen-und-Fakten.html
Sustainably acting networks and clusters

as much of the entire value creation chain as possible and to make full use of the relevant regional players’ potential. Within the framework of these projects, the institutions are guaranteed the necessary confidentiality which enables a committed collaboration and a contribution of expertise and know-how of their own. In addition to this, HörTech gGmbH develops and markets products on the basis and results of projects or other research activities.

The Kompetenzzentrum für Hörgeräte-Systemtechnik is actively engaged in the “Auditory Valley”, which originated in the greater area of Oldenburg and Hannover. The Auditory Valley operates across a variety of branches and unites the world leaders in the field of hearing aids, cochlea implants, measuring instruments and audio system technology manufacturers as well as many renowned research establishments. As an example, 100 % of cochlea implant manufacturers and 92 % of hearing aid manufacturers operating in the world market are involved in projects within this cluster. In this constellation, the Auditory Valley is unique in the world.

Chart 7: Cooperation partners of the Kompetenzzentrum HörTech

Source: Kompetenzzentrum HörTech
Ensuring sustainability through a high degree of diversification

Since April 2002, HörTech gGmbH has managed the entire business of the competence centre, coordinated its activities and developed the idea of “HörTech” further. The University of Oldenburg and the Hearing Centre of Oldenburg are partners of the gGmbH with 51% and 49% respectively. The financing of the Kompetenzzentrum HörTech is based on five pillars:

- Financing by the hearing aids industry (implementation of industrial projects)
- Financing by regional, governmental and EU funds (R&D project funding)
- Revenues from associations (Office activity)
- Revenues from licence sales (product development and sales)
- Revenues from services (e.g. participants’ fees)

Chart 8: HörTech within the Auditory Valley cluster
Financing by hearing aids industry

The market of manufacturers of hearing aids has very manageable proportions, with six companies covering 92% of the world market. In 2003, HörTech invited manufacturers of hearing aids of the three big companies to participate in the First Hearing Aid Developers’ Forum in Oldenburg. A constructive atmosphere developed quickly although the manufacturers were initially sceptical of meeting with their competitors. It became evident in the topical workshops organized by HörTech that there are issues within the branch that have their focus in basic research. Therefore the capacities of individual manufacturers are insufficient to solve them on their own initiative. Nevertheless, it was necessary to bring about a rapid solution in order to considerably improve quality standards. The first thematic workshop led to regular so-called CTO conferences. During these meetings the heads of the development departments of the six major manufacturers meet under the coordinating direction of HörTech. They defined topics which they regarded as necessary to approach and solve on a pre-competitive basis. The industry which profits from this solution is responsible for the financing.

Financing from regional, governmental and EU funds

The Kompetenzzentrum HörTech is involved in various projects financed with regional, governmental and EU funds. These projects are carried out in close cooperation with a great number of institutions, ranging from basic research to testing and application.

Revenues from associations (Office activity)

HörTech gGmbH maintains the Agency of the German Society for Audiology. Within the framework of this activity, HörTech administers and organizes annual meetings.

Moreover, HörTech operates the Agency of the German Medical Technology Alliance (GMTA), an
association of the centres of expertise in medical technology that originated from the competition by the Federal Ministry of Education and Research.

**Revenues from licence sales**

By selling licences in various contexts, the Kompetenzzentrum HörTech is engaged in technology transfer. For example, the audiology methods developed by the Medical Physics Department of the University of Oldenburg (such as the Göttingen Sentence Test, the Oldenburg Sentence test and the Categorial Loudness Scaling) were made available to the market. In order to do so, a “manual CD version” of the Oldenburg sentence test was developed and sold by HörTech gGmbH. In 2004, a certification of HörTech gGmbH as a manufacturer of medical products was conducted in order to achieve a greater propagation of test methods and to replace the much-criticized old methods. The certification as a manufacturer of medical products was the first necessary step to the large-scale launch of the Oldenburg Measurement Applications onto the market.

**Revenues from services**

In the field of audiology, the demand for qualified measures of advanced training has increased largely in recent years. The Medical Chamber, the Federal Guild of Hearing Aid Audiologists as well as the German Society of Audiology make the participation in certified further training measures obligatory. It is one of HörTech gGmbH’s major ambitions to present the collected know-how of the competence centre to the outside. This is done through the help of a training programme, which appeals to the branch. In September 2009, the ninth training programme was established. Participants have to pay for further training events offered within the framework of the programme. The special emphasis of the programme is on interdisciplinary networking between medical and technical contents. The target group ranges from hearing aid audiologists, audiometric and audiology assistants to physicians with different specializations.

It has always been the Kompetenzzentrum HörTech’s major concern to develop new fields of activity, in addition to the projects funded by the Federal Ministry of Education and Research in the first five years. The ultimate objective is to expand the service portfolio step by step, involve affiliated players in the own activities on a long-term basis and, above all, broaden the financing basis. This all happens in order to protect it from externalities and changing framework conditions. Given its non-profit character, all revenues from the above-mentioned financing pillars are directly or indirectly re-invested for the benefit of hearing research in projects or activities of HörTech. This ensures that successful work can be carried out continuously to enable the vision “Hearing for All”.
Medical technology is an established branch of industry which looks back on a long tradition. In 2007, sales totalled 17.300 million Euros, with 1,100 million Euros coming from export. In contrast, biotechnology is still a young industry. Close to 50% of biotechnology companies have been set up since 2000. The Kompetenznetzwerk “Medtech & Biotech” aims to intensify cooperation between the two technologies in order to encourage innovations and to consolidate their position as key technologies. Cooperation between these highly innovative, but very different branches is a door opener to new convergence technologies.

**Kompetenznetz „Medtech & Biotech“**

- **Innovation topic**: Biotechnology as well as Health and Medical Science
- **Innovation region**: South West Germany (Stuttgart, Tübingen, Reutlingen, Esslingen and Neckar-Alb)
- **Branches**: Regenerative medicine, medical technology, biosensor technology, molecular diagnostics
- **Date of foundation**: 2003
- **Number of members**: 2003: approx. 70 (in 2009: approx. 160)
- **Specific features of network**:
  - Winner of the competition “Health Regions of the Future” of the Federal Ministry of Education and Research
  - Extraordinarily high number of medical technology companies in the BioRegion
  - Close cooperation with other competence networks such as the Competence Centre for Minimally Invasive Medicine + Technology of Tübingen – Tuttlingen MITT e.V. and Baden-Württemberg Connected
- **Contact**:
  - Kompetenznetz „Medtech & Biotech“
  - c/o BioRegio STERN Management GmbH
  - Friedrichstraße 10
  - 70174 Stuttgart
  - www.bioregio-stern.de
10.1 Foundation of the network

The foundation of the Kompetenznetzwerk “Medtech & Biotech” can be traced back to the BioProfile Competition, organized by the Federal Ministry of Education and Research in 2001. Two years later, in 2003, the BioRegioN STERN was admitted to the Kompetenznetze Deutschland Initiative as a member, with its original topic and the associated name “Kompetenznetz BioProfile Regenerationsbiologie”.

On the basis of the competences bundled at universities and colleges, research establishments and economic enterprises, the cities and regions of Stuttgart, Tübingen, Esslingen, Reutlingen and Neckar-Alb made regenerative biology their main topic. The players of this STERN region summed up their profile in a plan and won the BioProfile competition. This brought funds of a total of 20.5 million Euros to the region in the following five years. The primary goals of the competence network “Bio-Profile Regenerationstechnologien” were the development and the public communication of the market’s growth potentials for biological and medical regeneration technologies - from the research all the way to the commercial exploitation. In order to better support network dynamics and assist developments in the BioRegion, the name of the competence network was changed in 2009. Since October 2009, the competence network has been operating under the name “Medtech & Biotech”.

The STERN Management GmbH functions as the central contact and coordinating agency for biotechnology in the BioRegion and as the agency of the Kompetenznetzwerk “Medtech & Biotech”.

10.2 Network structure and membership development

The biotechnology companies and research institutions located in the BioRegion are affiliated with this network. When the competence network “Bio-Profile Regenerationsbiologie” was founded, there were less than 60 biotechnology companies in the region. In the following six years, the number of biotech firms increased to more than 90 companies (cf. Chart 10).

Three universities in the region, five institutes of higher education with focus on Life Sciences and renowned research institutes (such as the Fraunhofer IGB, the Max Planck institutes or the Scientific and Medical Institute NMI at the University of Tübingen) strengthen the competence network with their excellent scientific expertise.

The project “Discovering synergies: Medtech & Biotech” was launched in 2005 with the aim of bringing medical technology companies closer to biotechnology and lead to a considerable increase in membership. In the BioRegion STERN, 120 medical technology companies set up business, 65 of which actively cooperate with the competence network today.

10.3 Aims and sustainability

The main tasks of the competence network “Regenerationsbiologie” has been the development of the potential for the future growth of the “Regenerative medicine and biology” market and simultaneously the creation of ideal framework conditions for biotechnology companies and research institutions. Apart from development measures which contributed 20.5 million Euros worth of funds into the region in the period 2002-2007, the newly established structure and service range of the competence network have also enabled regeneration biology to establish itself in the region with an outstanding profile.

The achieved success is evident in the founding of the Centre for Regeneration Biology and Regenerative Medicine (ZRM) in Tübingen, an establishment of the University Clinic and of the Medical Faculty attached to the Eberhard-Karls-Universität. The Centre sees itself as a hub of activities in the field of regeneration biology and regenerative medicine.

Above all, the international congress for regeneration biology BioSTAR, held in Stuttgart every two years, has successfully established itself. In 2008 the congress was attended by over 300 visitors from 20 countries. For the third time, it offered a unique platform for the interdisciplinary exchange of experience for regenerative biology and medicine.

The new project “Regenerative Medicine in the region of Neckar-Alb”, REGiNA, is the logical continuation of the programme “BioProfile Regeneration Biology” and the resultant scheme “Discovering Synergies: Medtech & Biotech”. With this project, the bioregion is one of the two winners in
Chart 10: Members of the competence network
the “Health Regions of the Future” competition, organized by the Federal Ministry of Education and Research. Interdisciplinary cooperation, as provided by REGiNA, is intended to accelerate the introduction of highly innovative methods of treatment and to establish them as standards in the treatment of patients.

A high degree of interdisciplinary cooperation, in addition to future-oriented focusing, is needed in order to ensure and strengthen network dynamics sustainably. Therefore, BioRegio STERN Management GmbH in 2005 launched the project “Discovering Synergies: Medtech & Biotech” under the motto “Thinking Economic Progress”. Cooperation between regenerative medicine and medical technology has an enormous potential for new approaches and innovative concepts. Cases in point are, for example, the development of devices and instruments with a biocompatible and/or organic coating or of biomaterials serving as wound cover and as vascular grafts.

10.4 Discovering common interests and improving the practice of cooperation

The BioRegion STERN is ideally suited for cooperation between biotechnology and medical technology with its extraordinarily high number of medical technology firms in and around the BioRegion.

The primary goal of the twin kick-off meetings in the autumn of 2005 was discovering synergies between the two highly innovative branches. The first meeting “Discovering Synergies: Medtech meets Biotech” was held at Hechingen, where many medical technology companies are located. At the meeting, the biotechnology branch presented itself to medical engineers. At the second meeting “Discovering Synergies: Biotech meets Medtech”, held in Tübingen, where many biotechnology companies are located, the subject was reversed, with lecturers from the field of medical technology. Both meetings were a great success, with more than 50 participants at each meeting. In order to elaborate on the treated topics, BioRegio STERN Management GmbH, together with Capgemini, subsequently conducted a survey among 1,400 companies in the German-speaking region to elucidate the cooperation status and willingness of the two branches. The results of this survey in 2006 led to workshop topics for the nation-wide meeting “Discovering Synergies: Medtech & Biotech”. Over 100 participants followed BioRegio STERN Management GmbH invitation to seek common potentials of the two branches in workshops and during a closing panel discussion later on. On that occasion, the results of the survey were presented for the first time and later published by BioRegio STERN Management GmbH. The evaluation showed that representatives of both companies were expected an increase in cooperation between the two branches as opposed to the competitive situation in the years ahead. Surprisingly, the medical technology companies were more interested in cooperation than biotechnology companies. Within the framework of round table talks, BioRegio STERN Management GmbH until today has encouraged the initiation of cooperation with the project Medtech & Biotech.

There is an important difference in their degree of maturity between the two industries. Medical technology, dominated by the engineering sciences, is a long-established industry conscious of tradition, while biotechnology, dominated by the natural sciences, has an unconventional corporate culture. The results of the survey show that the partners involved deliberately created a joint cooperation and communication culture. The measures described above served to lower communication barriers and to initiate cooperations between medical technology and biotechnology companies.

The project “Discovering Synergies: Medtech & Biotech” resulted in close cooperation with the Competence Centre “Minimally invasive medicine and technology of Tübingen-Tuttlingen” (MITT e.V.). The latter is also a member of the Kompetenznetze Deutschland Initiative, in which MITT e.V. encourages the transfer of knowledge between science, trade and industry.

At the same time, the contact with Medical Valley Hechlingen was intensified. Medical Valley Hechlingen is a high-tech location where innovative medical technology companies have joined in a local network.

“We had an intra-firm innovation meeting at the initiative of the BioRegio STERN, during which this was the subject of debate, one day after the symposium on cooperation between medical technology and biotechnology. We will increasingly be confronted with these topics and probably soon be taking up a project that combines the two sectors”, said Christian O. Erbe, managing director in the fifth generation of ERBE Elektromedizin GmbH, commenting on
common ground with the biotechnology branch. Successful cooperation such as, the one between the medical technology company Aesculap AG and the biotechnology company TETEC AG or between the working group “Tissue Engineering” of the Anatomical Institute of the University of Tübingen and Translumina GmbH prove that the pursuit of the project “Discovering synergies: Medtech & Biotech”, is the right path for the region.

In February 2009, the competence network BioProfile Regenerationsbiologie was awarded second prize in the “Competence Network 2009” competition. The prize was awarded due to the successful shift in the network’s activity focus from biology to medical technology. The award was a confirmation of the success of previous activities as well as a mandate for future ones for the competence network. Therefore, the competence network adopted and has been operating under the new name “Kompetenznetz Medtech & Biotech” since October 2009.

Interdisciplinary cooperation with medical technology has expanded the BioRegio STERN Management GmbH beyond the region’s geographical borders within the framework of the partnering activities of the Kompetenznetze Deutschland Initiative. Under the name of “EuroPro+MeD” (for European Prosthesis + Medical Devices), “BioRegio STERN” and “Pole Technologique de Haute-Champagne (PTHC)”, France, as well as “medical cluster”, Switzerland have founded a strategic partnership in order to jointly advance cooperation across borders between their respective companies and research institutions in the domain of medical technology.
11 BioRegion Regensburg: sustainable growth through interdisciplinary networking in the region

In 2009, The BioPark Regensburg celebrated its 10th anniversary. During that period, 254 million Euros was invested in the development of Life Sciences, of which 102 million Euros alone was allocated in the form of venture capital. The Return on Investment is excellent, because since 1999 no less than 33 firms have been assisted in their founding effort and the number of personnel in the region has increased more than six-fold, reaching 2,600. The BioRegio Regensburg is thus Bavaria’s second biggest biotech cluster after Munich.

Located in the university grounds, the BioPark Regensburg is the seat of successful firms such as Antisense Pharma GmbH (new cancer therapy) Geneart AG (DNA engineering and processing) or AMGEN Research GmbH, a research centre of the largest US biotech company. Currently, 22 tenants with 500 workers are located in the BioPark on 12,000 square metres. With the current third building stage, another 6,000 square metres of office and laboratory space will become available from 2011 on.

BioRegio Regensburg

<table>
<thead>
<tr>
<th>Innovation topic</th>
<th>Biotechnology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovation region</td>
<td>Southern Germany</td>
</tr>
<tr>
<td>Branches</td>
<td>Life Sciences (analytics, sensor technology, diagnostics, biotechnology, pharmaceutics), medical technology, Renewable Energy (bio-gas, bio-diesel), cross-section technologies (paper, textile, glass, mechanical engineering)</td>
</tr>
<tr>
<td>Date of foundation</td>
<td>1998</td>
</tr>
<tr>
<td>Number of members</td>
<td>at date of foundation: 11 (in 2009: 49)</td>
</tr>
<tr>
<td>Specific features of network</td>
<td>Second biggest biotechnology region in Bavaria with 40 companies and over 2,600 personnel in the core sector</td>
</tr>
<tr>
<td></td>
<td>Interdisciplinary linkage as a result of the foundation of a cross-technology network with application-oriented branches located in Eastern Bavaria (paper, textile, glass industries as well as mechanical engineering and sensor technology)</td>
</tr>
<tr>
<td></td>
<td>Cross-country linkage as a result of partnering with Linz (A), Clermont Ferrand (F), Belo Horizonte (Brazil) and Qingdao (China)</td>
</tr>
<tr>
<td>Contact</td>
<td>BioRegio Regensburg c/o BioPark Regensburg GmbH Josef-Engert-Straße 9 93053 Regensburg <a href="http://www.bioregio-regensburg.de">www.bioregio-regensburg.de</a></td>
</tr>
</tbody>
</table>
BioPark Regensburg GmbH is also the administrative centre of the biotechnology cluster of BioRegio Regensburg in Eastern Bavaria. The region is a strategically favourable location at the northernmost point of the Danube in the three-country triangle with Austria and Czechia and is regarded as the enlarged European Union’s gateway to Eastern Europe. At the present moment, 40 firms in the field of Life Sciences with over 2,600 personnel operate in the BioRegio Regensburg. Additionally, nine firms from interdisciplinary branches (paper, textile, glass, mechanical engineering) are involved in the cluster.

**Sustainable growth through interdisciplinary networking with the “Interdisziplinaritäts-Agentur BIOTECH”**

Interdisciplinary application denotes the linkage of technologies from originally different branches of industry, which represents a significant innovation leap forward. The Interdisziplinaritäts-Agentur BIOTECH (IA-BIOTECH) is a cross-technology network helping biotechnology companies, academic working groups and companies of other established branches to engage in cooperations in order to advance the development of innovative products and of new business fields. Biotechnology as a cross-section technology can be applied in many fields of other branches or linked with other technologies. The aim is to bring together, on an increasing scale and goal-oriented, companies and research institutions from different branches in Eastern Bavaria in order to fully exhaust their innovation potential and to strengthen the region sustainably.

Moreover, the goal-oriented interlinking of different branches also allows creating new, modern jobs. Instead of only viewing the biotechnology cluster and the existing economic branches of the region separately from each other, a concept has been developed with the challenge to establish suitable interdisciplinary cooperation in practical activity, i.e. to interlink clusters successfully.

**Registering the regional, interdisciplinary potential**

In a first step, those branches were identified which are especially suited for linkage with biotechnology. This includes, in the region of Eastern Bavaria, the automobile, chemical, electrical, glass, ceramics, plastics, medical technology, machine construction, optical and photonics as well as textile and environmental industries.

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**Chart 12: Result from the analysis “Interdisciplinary application fields“**

<table>
<thead>
<tr>
<th>Assessment of the potential</th>
<th>Branch</th>
<th>Possible inter-disciplinary field</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glass industry</td>
<td>Bio-functional surfaces</td>
<td>• Lab-on-a-chip technology</td>
</tr>
<tr>
<td></td>
<td>Development of biochips</td>
<td>• Miniaturization of plant systems</td>
</tr>
<tr>
<td></td>
<td>Anti-microbial, anti-inflammatory, bioactive glass</td>
<td>• Biosensor technology • • Economical recovery of valuable materials</td>
</tr>
<tr>
<td>Material technology</td>
<td>Protective coating of textiles</td>
<td>• Aseptic surface coating • • Intelligent control linking sensor technology and medical physiology</td>
</tr>
<tr>
<td>Microelectronics</td>
<td>Tissue engineering</td>
<td>• Telemedicine (telemonitoring, telesurgery, etc.)</td>
</tr>
<tr>
<td>Telecommunication</td>
<td>Use of natural fibres in compound materials</td>
<td>• Miniaturization of plant</td>
</tr>
<tr>
<td>Mechanical engineering</td>
<td></td>
<td>• Economical recovery of valuable materials</td>
</tr>
<tr>
<td>Automobile and vehicle construction</td>
<td></td>
<td>• • Intelligent control linking sensor technology and medical physiology</td>
</tr>
</tbody>
</table>

**Biotechnology/Life Sciences**

Source: Biopark Regensburg GmbH
In a second step, 50 interviews were conducted with institutions and companies from both the Life Sciences and other branches on the basis of a location analysis by a renowned consulting firm. This was done in order to identify suitable interdisciplinary topics and to enquire about their readiness to cooperate. This was followed by several all-day working group meetings focusing on such central topics as, e.g., “Biofunctional Surfaces” and “Molecular Diagnostics / Biochip Technologies”. Innovative product and application ideas were jointly developed and concrete cooperations were initiated at the meetings.

The interviews and workshops led to the initiation of a total of 28 potential cooperations. This enabled the companies involved to continue these cooperations on their own, which ended the meeting on a positive note.

**Establishment of the agency IA-BIOTECH**

BioPark Regensburg GmbH has decided to continue encouraging their creative innovation potential. Through this, it hopes to integrate the companies operating on an interdisciplinary basis into the network. The concept of interdisciplinary initiation of cooperation was adopted by the IA-BIOTECH. Therefore, the agency has organized further interdisciplinary workshops since then and functions as a permanent contact.

**The IA BIOTECH pursues the following activities:**

- Maintaining the regional database (competence database)
- Regularly conducting focus interviews
- Conducting theme-related interdisciplinary workshops
- Alternative events, such as bilateral partnering and “Innovation Day”
- Sustaining already initiated cooperation
- Coordination with technology transfer agencies of universities in Regensburg

One of the main tasks however is to identify and address new themes that reflect players’ needs. Topics that have already been dealt with are elaborated further by involving new players (cross-regionally as well). In addition, new topics are identified and treated that reflect the technological diversity of the regions of Regensburg and Eastern Bavaria.

The economic assistance given to cooperation so far thus strengthens the regional economy and creates new jobs. This is why “IA-BIOTECH services, as an economic development agency, are free of charge in the initial phase. In consequence, the BioRegio Regensburg profits sustainably by creating a cross-technology network, widening its regional scope and increasing its membership. Until mid-2009, nine regional companies have been integrated into the network additionally through the activities of the IA-BIOTECH.

These enterprises have been placed on the network’s internet page at www.bioregio-regensburg.de, classifying them into Biotech, Life Sciences, and interdisciplinary companies.

**Future prospects of IA BIOTECH**

BioPark Regensburg GmbH has broadened its range of services around the topic “interdisciplinary applications” for the development of biotechnology in particular and of cross-section technologies in general. By setting up the above cross-technology network in Eastern Bavaria and establishing the agency IA BIOTECH. The management unit of the network has thus reached a high level of development compared to other BioRegions in Germany. In spite of this success, there is still work to be done to professionalize the network.

Intensive cooperation with other networks, such as Strategische Partnerschaft Sensorik e.V., the Initiative Medical Photodynamics, the IT network Telemedicine and the Mechatronics network Cham increases the network’s thematic diversity further and adds to innovation dynamics. Overcoming boundaries through the cooperation with other clusters is another strategy for the sustainable increase of the competence and thematic diversity within the network. The Danubian cities of Regensburg, Straubing, Deggendorf, Passau and the Austrian city of Linz have been organized in the EU association “Donauhanse” since 2004. It provides the basis for the intensification of cooperation between the networks BioRegio Regensburg and the Health Cluster GC in Linz, Clusterland Oberösterreich GmbH. The companies of the respective networks are
classified according to key areas of activity and competence and potential partners and projects are analyzed with the help of the network agency within the framework of this cooperation.

A close cooperation also exists within the framework of the initiative “Allianz Bayern Innovativ” with the Bavarian clusters Medical Technology (Forum MedTech Pharma e.V., Nuremberg) and Biotechnology (Bio M Development GmbH, Munich). On that basis, the interdisciplinary concept shall extend its scope to the whole Federal State of Bavaria.

In future however, the services of the IA BIOTECH will no longer be offered free of charge. Costs will have to be carried by participants, making a financial contribution of their own to the workshops and partnering events. In this way, the financing plan of BioPark Regensburg GmbH can be enlarged to include another financing source. It will also be possible to professionalize the network on a broader scale, increase its quality and, above all, provide services on a sustainable basis. This will particularly benefit the network players involved.
Complementary development of the regional technology network into a cluster

The region of Northern Hesse with the independent municipality of Kassel and the four administrative districts of Kassel, Hersfeld-Rotenburg, Schwalm-Eder, Waldeck-Frankenberg and Werra-Meißner look back on a strong tradition as a location of industry and trade. In the last 25 years, ample know-how in the thematic field of “decentralized energy technology and energy efficiency” has been developed and implemented. Many economic entities, the University of Kassel and associated research institutions are dealing with decentralized energy facilities and their integration into existing systems of supply. This ranges from environmentally compatible construction, the rational use of energy to climate-efficient modes of production.

In 2003, the bundling of competencies in Northern Hesse within the framework of the aforementioned innovation theme led to the foundation of the competence network Dezentrale Energietechnologien e.V. (deENet). The network is unique in Germany and represents the whole value creation chain, based on a concentration of research and development, planning and design, production and operation up to basic and further training. Since its initial setup stage in the period 2004-2006, deENet has been the first contact for research, the economy and politics in Northern Hesse concerning “Renewable Energy and Energy Efficiency”.

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**Kompetenznetzwerk Dezentrale Energietechnologien e. V.**

<table>
<thead>
<tr>
<th>Innovation topic</th>
<th>Energy and Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovation region</td>
<td>Middle Germany</td>
</tr>
<tr>
<td>Branches</td>
<td>Wind energy, hydropower, solar energy, bioenergy, geothermal energy, energy-efficient building and energy-efficient processes</td>
</tr>
<tr>
<td>Date of foundation</td>
<td>2003</td>
</tr>
<tr>
<td>Number of members</td>
<td>at date of foundation: 31 (in 2009: 110)</td>
</tr>
<tr>
<td>Specific features of network</td>
<td>Consistent further development of a regional network into a cluster</td>
</tr>
<tr>
<td></td>
<td>Broad know-how in the thematic field “Decentralized energy technology and energy efficiency”</td>
</tr>
<tr>
<td>Contact</td>
<td>Kompetenznetzwerk Dezentrale Energietechnologien e. V. Ständeplatz 15 34117 Kassel  <a href="http://www.deenet.org">www.deenet.org</a></td>
</tr>
</tbody>
</table>
As a corporate and research network, deENet aims to develop integrated system solutions in energy supply. This development is characterized by increasingly decentralized consumer-oriented structures using renewable energies on a large scale and by demands (also made on consumers) to improve efficiency considerably. The key areas of activity of deENet are:

- Decentralized supply technologies
- Energy-optimized planning and construction
- Energy-efficient industrial processes
- Sustainable supply schemes

The know-how of network partners and the cooperation structures that have developed enable integrated supply solutions which extend to single buildings and settlements, but also cover entire regions.

The structural networking and goal-oriented encouragement of cooperation within the network are intended to develop new products and services, to sustainably improve the regional economic power and to create safe workplaces.

**Development of the model region**

"Decentralized Energy and Energy Efficiency" through goal-oriented cluster build-up

In cooperation with all important cluster players in Northern Hesse, a study named "Nordhessen 2020: Dezentrale Energie und Arbeit" was conducted in 2007. The outcome of the scientific investigation was that at least 20,000 new jobs could be created by 2020 in the sector of decentralized energy technologies and energy efficiency. Moreover, decentralized energy technology and energy efficiency in Northern Hesse could become important economic factors in the long term and thus have a great economic impact similar to the one by the automobile industry today.

"Together we are forming Northern Hesse into a model region." (deENet e.V.)

In realizing these goals, the branch can develop into the economic and social locomotive for the region. However, this requires a number of concrete strategically coordinated measures. These measures will have to be taken in the following areas:

- developing technological leadership for solar-electric and solar-thermal components and systems,
- developing industrial production in the domain of decentralized energy and efficient technologies,
- developing research and education as well as strengthening and bundling research infrastructure,
- strengthening regional value creation through increased application of renewable energy technology in the region,
- developing decentralized energy supply structures for power, heat and transport,
- developing basic and further training capacity.

These future tasks need to be solved successively. The involvement of the economic, scientific and political community and of other important players is intended to implement these measures as projects through a “concerted effort” in the respective region. This requires a professional cluster management that takes the proposed measures and makes them part of a strategic action scheme. At the same time, the existing cooperation structures will be developed further within the network deENet. The office of the association deENet will focus intensively on stepping up the built-up of the regional cluster “Renewable Energies and Energy Efficiency” through strategically oriented cluster management.

To this end, deENet has concluded a cooperation agreement with the Regional Management of Northern Hesse as the central institution for the economic development of the region. By taking this step, the region emphasizes the high importance attached to this economic branch. On the road to profiling Northern Hesse as a model region, a process of coordination by cluster management was initiated. This ensures the continuity and sustainable development of the cluster build-up.
Within the deENet Office, the association provides a cluster manager and additional skilled personnel as well as the corresponding infrastructure. Cluster activities are financed by the Hesse Ministry of Economics, Traffic and Regional Development. The regional bodies as well as the economy and trade are involved directly in this process. Cluster management creates the preconditions for the players’ networking and for the initiation of regional cooperation projects with the following work packages:

- Encouraging cluster dialogue and initiating cooperation
- Developing and implementing regional lead projects
- Intensifying research and development
- Speeding up information and knowledge transfer
- Setting up a project management system
- Expanding cluster information services
- Individual counselling of cluster players
- Internationalization

For the profiling of the network and/or cluster regarding their contents, a great deal of projects have been initiated and supervised by the agency as the responsible part. On the federal level, it has been possible to win several application-oriented research projects. These were carried out in partnership with research institutions from the network and producing enterprises from the region. One of the lead projects of the network is the study “100 % EE-Regionen (Renewable Energy Regions) in Deutschland”, funded by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety. In this context deENet works out development scenarios for the whole of Germany in order to ensure the region’s full supply from renewable energies and advises municipal players and other networks. At the same time, the findings of the study help to develop its own cluster in Northern Hesse into a “100 % EE-Region”.

In order to carry out publicly funded research and development projects, the association deENet founded deENet GmbH in June 2007 as sole partner. Its non-profit purpose promotes application-oriented research and development with a view of making greater use of decentralized energy technologies. This enables it to function as client vis-à-vis municipalities, state and federal ministries as well as companies without directly competing with the services offered.
by individual affiliated players (such as energy consultants, engineering bureaus, institutes). For the partners of the network, the network services will, however, open up additional markets. In addition, new products/services will be jointly generated.

With the measures already implemented and being planned, deENet is on positive path towards forming the cluster and placing its structure on a sustainable basis. At the same time, the model region of Northern Hesse serves as an important instrument to strengthen the national and international market position of deENet members and maintain its market leadership. With this strategy deENet will do justice to its character as a regionally acting cluster with international appeal.
13 NanoBioNet e.V.: Rooted regionally, crossing boundaries and acting globally

Christoph Schreyer

In order to accelerate interaction between research, economy, politics and society, the non-profit association NanoBioNet was founded in 2002 as a typical bottom-up structure. The original core of the network was some 40 research institutes and companies from Saarland and Palatinate. In 2006, NanoBioNet e.V. additionally assumed the functions of the competence centre cc-NanoBioTech, Kaiserslautern.

Today, NanoBioNet has approx. 100 members, representing an efficient network of institutes of higher education, research institutes, clinics and companies operating in the fields of development, production, economy and technology transfer.

Its members come from different branches, with a focus on pharmaceutical biotechnology, chemical nanotechnology or nano-biotechnology. Their common interest is research and development as well as the practical application of nano- and biotechnology to create marketable products and new jobs - with the help of an ethically justifiable technology.

The association shapes the network and actively develops it across state boundaries. New products, processes and services stand for cutting-edge research, innovation and growth of the region.

NanoBioNet e. V.

<table>
<thead>
<tr>
<th>Innovation topic</th>
<th>Micro-Nano-Opto</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovation region</td>
<td>South West Germany</td>
</tr>
<tr>
<td>Branches</td>
<td>All technical branches associated with nano- and biotechnology</td>
</tr>
<tr>
<td>Date of foundation</td>
<td>2002</td>
</tr>
<tr>
<td>Concept of “sustainability”</td>
<td>The developed activities are to be continued on a self-sustaining basis, also after the expiry of the period of funding</td>
</tr>
<tr>
<td></td>
<td>Research and production of the members in the network has to be sustainable, e.g. in relation to the environment and to ethics</td>
</tr>
</tbody>
</table>
| Contact | NanoBioNet e. V.  
Science Park 1  
66123 Saarbrücken  
www.nanobionet.de |

The association endeavours to

- position the region, nationally and internationally, as a competitive location in the nano- and biotechnology sector,
- bundle nano- and biotechnological know-how with a view of creating qualified jobs,
- support research and development,
- encourage basic and advanced training in the domain of nano- and biotechnology,
- inform about opportunities and potentials for application of nano- and biotechnology, and to
- provide information about risks associated with these technological and ethical issues.

NanoBioNet is engaged in various projects along the entire value creation chain, starting with research and development all the way to the finished product. Besides, topics such as “life-long learning” or “public relations” are in the focus of its activities.
Regionally, but not provincially

The VDI Technologiezentrum GmbH (VDI-TZ) identified approximately 45 German nano networks. After the merger of cc-NanoBioTech Kaiserslautern with NanoBioNet, only one of these can be found in the South West – namely cc-NanoChem.

The membership of NanoBioNet has risen steadily since the network was founded. Since 2007, this trend has slowed, the reason being that network growth has “natural” limitations. The degree of saturation is very high; more than 90 % of the nanotechnology companies located in the region are already affiliated with NanoBioNet. The regional quantitative growth potential is thus almost exhausted and the primary aim of establishing a successful network has been achieved.

How will this development continue? If its function as the representative of the interests of a branch is to be fulfilled in future, growth must extend beyond the region’s boundaries – quantitatively and qualitatively – in application of the formula: the grander, the more attractive.
From these facts NanoBioNet draws the following conclusions:

- NanoBioNet will tap new resources of growth. From 2009, an increased effort will be made to address nano- and biotechnology companies in Rhineland-Palatinate and beyond the boundaries of the region in order to win them for the network.

- NanoBioNet will be presented as a cross-regional network and provided with an improved range of services.

- The merger planned for 2010 with the sister organization cc-NanoChem will be an important impetus to growth, targeting an absolute number of members (approx. 120). As a first step, cooperation will be intensified – meetings, fairs, conferences will be planned and organized together (e.g. NanoMed 2009, SIZE MATTERS 2009, Ethical Challenges of Nanotechnology), and online and print media will be published together. The future network will be sustainably stronger than two competing networks.

Securing financing – emancipation from public authorities!

As has been described above, NanoBioNet was first founded as a “bottom-up structure”, which is still its dominant feature regarding character and intra-network cooperation. However, if only the financing is considered, a striking change can be observed. While network activity was initially based on the members’ commitment, the association today can be described as an “endogenous top-down network”. It holds true that its financing is based on several pillars, but for the most part it is secured through projects with public authorities.

In the coming four years the network rests on a solid financing base with the initiation of the project “Nano+Bio – Saar 2012” by the Saarland Ministry of Economics and Science. The network primarily pursues location marketing as a service provider for the regional government, in the manner described above. But meanwhile NanoBioNet has succeeded in developing further sources of refinancing, which allow engaging in network activity beyond the year 2012. Therefore, NanoBioNet has begun with the set-up of a commercial service portfolio.

Chart 16: Development of NanoBioNet e.V. membership

![Chart showing the development of NanoBioNet e.V. membership from 2002 to 2008.](image)
Commercial services include:

- Advanced training programme;

  The region is playing an important role in non-university nanotechnological advanced training. On its web page, VDI e.V. names eight NanoBioNet members from only 21 non-university advanced training institutions throughout Germany. NanoBioNet successfully cooperates with many regional providers and now offers a broad range of further training measures. It is important for it to maintain this lead and expand its base intensively through new measures: NanoBioNet offers advanced training modules of its own in the field of nano- and biotechnology.

- PR services;

  Many companies, especially smaller ones affiliated to the network, are unable to perform professional PR work of their own. The agency offers a PR package as a service. In this way, companies can make use of the office’s infrastructure at a low cost – press distribution lists, dissemination of information, provision of press info, establishment of editorial contacts.

- Distribution of teaching material for schools and universities;

  The “NanoSchoolBox” is an experimental box helping pupils and students to experience and understand the application potentials and scientific foundations of nanotechnology. The NanoSchoolBox is currently being used on a broad scale at Saarland’s grammar schools. There are many orders from all over the world for the box. As the accompanying material – brochures, CD ROM, safety data sheets, etc. – is available in several languages, the box can be marketed internationally.

  The service portfolio with a commercial background will be expanded continuously in the years ahead.

Professionalization of network activity

The members of NanoBioNet rightly expect a high degree of professionalism in network activity, due to the fact that their membership fees do pay a part of the projects issued by NanoBioNet. Various services and activities of the association directly bring added value for network members:

- Participation at reduced cost in further training measures, conferences and fairs

- Financial assistance for feasibility studies

- Support in the search for project and business partners

- Assistance for the submission of applications (“bureaucratic jungle compass”)

- Marketing support (joint presence at fairs, catalogues, etc.)

- Build-up of a competence database to simplify research for business contacts

- Assistance in tapping financing sources (research funds, venture capital)

- Use of free information media – newsletters online and in print

  The points outlined above factually reduce the expenditure of time and/or cost considerably for the members of the network.

Sustainability, stability and growth

Apart from being a stable and, in the long run, dependable financing base, sustainability has indeed an additional significance: a higher number of members should not only be understood as an end in itself. Network membership also has the character of a self-obligation. For this reason, NanoBioNet has worked out a code of conduct in which members with their signature commit themselves to sustainable, i.e. ecologically and ethically responsible action, in nanoscience and technology.

NanoBioNet will advance on the road embarked upon of winning new members and developing refinancing potentials. The network wants to become known by 2012 as the most important German competence network for nano- and biotechnology. Its aim is to win leading representatives from all over Germany as new members and to have a strong lobby that allows transforming NanoBioNet into a nationwide association structure.
In addition to strengthening the network on national level, NanoBioNet would like to increasingly operate on a European scale. It will therefore strive for networking with major European institutions or bodies (e.g. European technology platforms, internationally operating associations or networks).

**Improvement of cooperation practice**

Due to the network’s dynamic growth, there are also companies in the association of NanoBioNet which, given their business idea or their array of products, appear as competitors on the market. Nevertheless, these members are making use of the possibilities of the network and its services by jointly exhibiting their products at fairs at home and abroad, by initiating joint development projects, by elaborating joint feasibility studies or establishing a joint marketing platform (“empower Nano”). In this manner, the network establishes the frame for creating a propitious climate for innovation. This improved cooperation – between competitors as well – is made possible with the portfolio of services offered or moderated by the office.

**The network as a turntable**

Founded in 2002 as a regional cluster for nanobio-technology, the network has changed its character over the years. NanoBioNet has become a network for all those interested in developing nano- and biotechnology – also across regional boundaries. In this connection, the association office plays a special part in the organization of network activity. It functions as a “turntable” or go-between and information portal at the interface between politics, science, economy and the public.
Volker Schiek

The Kompetenznetzwerk Mechatronik e.V. (KMBW) is an industry-driven cooperation association of currently 89 companies. As the key topic of the network, the cross-section technology mechatronics unites all technical branch-specific and thematic fields on an interdisciplinary basis and provides many ambitious – but also interesting – tasks for implementation in the prevailing difficult economic situation. As business location, Germany faces several profound changes caused by the present economic crisis, the climate change and changes in the population’s age structure. Many companies use the competence network to develop new business fields and markets in this crisis. The generation of renewable energy and their efficient use are identified by many companies as a future market with a large sales potential which Germany can dominate globally. The construction of wind power plants or solar and photovoltaics plants is increasingly becoming profitable regarding the gas and mineral oil prices, and many big companies operating successfully in other markets are interested in these new markets. The automobile market also faces far-reaching changes. In the long run electric drive will replace combustion engines in vehicles and cause completely new vehicle developments. This will entail changes for the big automobile manufacturers, but also the systems suppliers or smaller subcontractors will have to cope with changed framework conditions. Even the classical mechanical engineering will have to change and advance topics like transformation capability and energy efficiency. Electric vehicles do not need pistons, cylinder heads, fuel tanks or exhaust systems. They need safe and efficient electronic systems, robust electronic drive and brake units as well as reliable and efficient energy storage systems. The subject of energy storage is of preeminent importance for both the energy and the automotive sector. Topics like range and comfort, air conditioning and heating have not been satisfactorily settled for future electric vehicles. For producers of regenerative energy, the temporary storage of energy is very important for periods with no production. A direct link between energy production and energy

Kompetenznetzwerk Mechatronik BW e. V. (KMBW)

<table>
<thead>
<tr>
<th>Innovation topic</th>
<th>Mechatronics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovation region</td>
<td>Baden-Württemberg</td>
</tr>
<tr>
<td>Branches</td>
<td>All technical branches</td>
</tr>
<tr>
<td>Date of foundation</td>
<td>2001</td>
</tr>
<tr>
<td>Number of members</td>
<td>at date of foundation: 28 (in 2009: 89)</td>
</tr>
<tr>
<td>Specific features of network</td>
<td>Politically and economically independent</td>
</tr>
<tr>
<td></td>
<td>Industry-driven</td>
</tr>
<tr>
<td></td>
<td>Provable successes in implementation of innovations</td>
</tr>
</tbody>
</table>

Contact
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www.mechatronik-ev.de
consumption needs to be avoided. However, this will also change the infrastructure for energy supply. Without combustion engines, petrol stations with fossil fuel will no longer be needed; instead, charging stations or stations for battery change will alter townscapes.

This is a real opportunity for innovative small and medium-sized companies to position and establish themselves with radical innovations on the newly evolving markets and to secure market shares for themselves. Radical innovations primarily originate at the interfaces between branch and innovation fields. Mechatronics thus provides an ideal environment to engage in interdisciplinary, constructive and sustainable network activity. The KMBW is now in a position to provide expertise for the solution of any problem. All relevant partners and competences are swiftly and promptly accessible. The number and the scope of the network activities demonstrate the low number of topical boundaries. The KMBW operates predominantly in Baden-Württemberg, but is also actively cooperating with other networks on national and European level.

14.1 History of the network

The foundation of the Kompetenznetzwerk Mechatronik e.V. was triggered by the withdrawal of a part of the textile industry from the Göppingen district to Eastern Europe and Asia. At the initiative of the Göppingen administration and with the participation of the Stuttgart Chamber of Industry and Commerce, of the district chamber of Göppingen, and of the local university’s Mechatronics Faculty, representatives of the industry began to search for solutions and alternatives to the loss of further branches. In January 2001, the Kompetenznetzwerk Mechatronik Göppingen e.V. (former name of the network) was founded with 28 members in this precarious economic situation as a proactive initiative. The KMBW can thus be called a bottom-up approach. Start-up financing by the town of Göppingen made the establishment of an office possible. By winning the “Cluster Competition of the Stuttgart Region”, the network was able to obtain additional sources of financing from Wirtschaftsförderung Region Stuttgart GmbH about 9 months after its foundation. This made it possible to establish a professional office with a full-time managing director. The financing plan – which enabled the network to sustain itself after a period of three years – was established in the early phase. Until 2004, membership increased to approx. 50 firms, thus reaching the critical mass for survival. However, further growth was considerably impaired by limited personnel and financial resources, because maintenance and acquisition costs were too high. Therefore a second person was recruited to support the managing director at the end of 2004. Efforts were made to win third-party funds in order to close the ensuing financing gap. At first this happened on a regional level in the Stuttgart district, where public funds addressed different topics by organizing competitions. Jointly with Wirtschaftsförderung Stuttgart GmbH (WRS), various topics were taken up and combined into eligible projects for funding. For example, there was an analysis of regional basic and professional training opportunities for mechatronics and a comparison with those in the rest of Germany. The analysis proved the region to rank among the top of all German regions, but at the same time there were obvious gaps in the provision of basic and further training opportunities. Industry-related basic and professional training opportunities were created with the “Mechatronics Systems Engineer” (IHK) and the MechatronikPlus study course. These began as pilot projects and are now reference models and are being applied in the whole of Germany. Later on, the KMBW also became actively involved in various research projects on governmental and EU level, for example in two INTERREG III projects. Another example is the “Aquimo” project, which is currently in its final phase in the sector “Research for Tomorrow’s Production”, category “Reliable Mechatronics Systems” of the Federal Ministry of Education and Research. Based on these research results and the income from these projects it was possible to obtain new funds needed to finance the office and running costs. At the same time, the office had appropriate topics enabling it to get in touch with representatives from industry and institutes of higher learning. Within the framework of these network talks, a potential membership was put to debate. These achievements have made it possible to continue increasing the network’s membership on a stable basis until now. These positive network experiences in the last analysis provided the basis for the new cluster approach. In 2008 a third assistant was employed and the limit of 80 affiliated companies was surpassed at the same time. In order to extend the market place for members once again, it was decided at the 2007 general assembly to change the name to Kompetenznetzwerk Mechatronik BW e.V. and deploy the network nationwide.
The membership structure became more and more homogeneous over the years and today includes both big companies operating on the world market and SMEs as well as business starters. These companies bring entrepreneurship, market access and know-how as well as expertise of their own to the network. Other important pillars of the network are universities, institutes of higher learning and research establishments, which mainly contribute new research findings and methods. Dominant branches for the KMBW are manufacturing technology, mechanical engineering, machine tool building and plant construction, automobile construction and medical technology. Among the most important topics currently treated are qualification, standardization, smart products, intelligent and transformable production, cluster formation, e-mobility, simulation and industrial design, energy technology and Renewable Energy as well as development methods and tools. In all of these sectors the network can look back at provable successes.

14.2 Cluster approach of the network

The KMBW has developed a cross-branch cluster approach to meet the demands of its affiliated companies in a better way. The cluster activities and initiatives help establish interdisciplinary teams on special thematic fields, which jointly initiate novel ideas and innovative products. In this context, it is not always easy to precisely define the role of the KMBW. This mostly depends on how well the players involved know and understand one another. In this regard, the cross-section technology functions as a catalyst helping to network, interlink and position existing and new branches of industry in Germany for the future. This strategy is aimed at creating innovations with which the world markets can be developed and pushed ahead from Germany as a base. As a result of increasingly new macro-economic conditions, new systems of incentives and global competition, industry, science and politics are generating the energy needed to drive the mechatronics innovation engine. By developing competitive products, innovative processes and new services from the fields “Research and Development”, “Basic and Further Training”, and through direct “intra-firm engineering services”, the KMBW can give an impetus to the technological branches in Germany and thereby encourage global markets indirectly through its players. The following graph illustrates the principle of action of mechatronics on the different stakeholders in the innovation process.

Chart 17: Principle of action of mechatronics

However, this potential can only be tapped and utilized by an organically grown and trustful cooperation. In this process, sustainability and stability are the bases of network activities. Cluster success should be exploited immediately in order to encourage new developments. As an industry-financed network, the KMBW now rests on a solid financial base and has not needed any more start-up financing since 2004. The network’s history shows that a long-term and organically oriented growth strategy leads to lasting and sustainable success. Since its foundation, the KMBW has reached a higher degree of maturity every year; new members were won and competences and efficiency were continuously enhanced. The development presented below also shows that the KMBW wants to grow with its tasks. Instead of passively reacting to activities of other players, the office is going to function actively as an initiator, moderator, coach and practice-oriented theme driver in order to have economic success, to act on topics with a promising future and to encourage inter-firm innovations.
14.3 Further development of the network

Like any other company, a network needs to change constantly and to develop further. As regards the KMBW, the next necessary step will be to make the growth phase profitable so as to benefit directly from cluster activities. The network has to professionalize its operation further and rely even more on the success of implementation. The KMBW office as a professionally operating management agency initiates, moderates and coaches the goal-oriented interaction between network partners by conducting and directing a theme-specific dialogue. If required, the network management looks for more suitable partners to close existing gaps in know-how. In this entire process, the network initially operates without prior payment in order to rapidly and convincingly demonstrate potentials and success in project work. Once an idea has been transformed into a successful product on the market, the network requires payment for the cluster service in the form of licence fees or sharing in its expenditure.

The whole process may look like this: As a result of many talks and on the basis of current developments, interesting and promising topics are identified. Those are discussed by means of moderated dialogues, investigating their feasibility potential. During that phase, it is the main task of the network management to identify potential stakeholders who have a strong interest in pursuing a certain idea. The topics thus identified are subsequently focused, specified, and implemented with these stakeholders through workshops and round tables. Network management then faces further tasks apart from identifying new project partners. Dialogue between the stakeholders has to be moderated and pursued intensively. Also crucial for success is the presentation of win-win situations, because it enables individual players to continue their work on the topic and makes them feel involved in the whole process. A project financing plan and a roadmap will have to be developed in that phase, too. To this end, financiers and investors and potential research programmes need to be identified. This will gradually lead to obligations for companies (obligation to report and communicate) and for the network (secrecy and support). The network should subsequently be refunded to carry out a successful network activity, e.g. in the form of commissions or licence fees. By that, the companies incur no risk at all, they cannot but succeed and make the network a part of the success achieved. This service can be demanded by any company, even if it is not a member. It must be said, however, that members are treated preferentially in the search for appropriate partners. Other external companies can only be considered when affiliated companies have no interest in their own participation. The success of this implementation-driven approach essentially depends on the moderation and professionalism of cluster management.

With the new orientation based on an innovative business model, Kompetenznetzwerk Mechatronik BW e.V. will be able to tap further funds apart from fulfilling its original task of setting up networks. Its previously only source of income "membership fee" would be complemented by commissions and licence fees as a new source. This achievement-oriented business model is intended to ensure a sustainable basic financing. The KMBW urgently needs this form of financing to generate durable and sustainable growth and find competent solutions. Furthermore, the KMBW could improve its profile as a promoter of innovations, industrial cooperations and innovation partnerships and continue developing this idea for other clusters. It can be said that this approach encourages and furthers the network idea as well as science and technology transfer already today. The success generated from cluster work is able to create trust and benefit, enhance its image, add to the visibility and appeal of cluster competence. Beyond that the network is a competent contact for all kinds of mechatronic tasks.

Based on interdisciplinary system integration, inter-firm and cross-branch methodological competence as well as orientation to globally relevant future themes, the cross-section technology mechatronics must combine regional competences in Germany to give it a competitive edge on a global scale. The success of this aim primarily depends on the financing and business model and particularly on the professionalism and efficiency of cluster players. The KMBW will evolve strategically in the direction of "profitable growth". Whether this aim can be finally reached will depend on the partners involved and on the practicality of the new methodological approach.
Transport and mobility – always in motion for the German capital region

One out of six workplaces in the manufacturing industry in the region of Berlin-Brandenburg belongs to the cluster Transport and Mobility – with a tendency to rise. This development is driven by innovations that allow using available resources more and more efficiently and increasing networking between the different modes of transport. The Forschungs- und Anwendungsverbund Berlin Verkehrssystemtechnik Berlin (TSB-FAV) – the transport initiative of the TSB Technology Foundation of the Berlin Group – has become committed to this sector as a competence field manager for more than ten years.

Based on its independence from individual interests, TSB-FAV as service provider of the federal state of Berlin and in collaboration with ZAB (ZukunftsAgentur Brandenburg GmbH) brings together entrepreneurs and researchers. It gives assistance for project development on regional, national and European level, helps to obtain start-up financing and also takes over project management in selected cases. TSB-FAV sees itself as a neutral link to identify and make usable common ground between players with different perspectives, and supports the involvement of regional companies and scientific institutions in international development partnerships.

Current analyses see the competence field of transport system technology as well positioned in the Berlin-Brandenburg location, with a high economic potential for the region. A characteristic feature of transport system technology in Berlin is the mix of all technological segments and fields, a broad research environment and close interlinking with users and operators. Great potentials lie in the application and
Sustainably acting networks and clusters

utilization of multidisciplinary networking of science and economy in order to secure mobility economically and ecologically. During the previous two years, some 2,500 new jobs have been created in over 400 manufacturing firms and research institutions of transport system technology. At present, there exist approx. 51,800 workplaces in the cluster Transport and Mobility.

In addition to manufacturing companies, the cluster Transport and Mobility includes the big transport service providers of – PNV (public local transport) with some 48,000 workplaces and the sector Haulage and Freight Logistics with 56,000 employees. This branch is now employing approx. 150,000 personnel in the capital region. There has been a rise in the number of workplaces by about 9 % since 2003.

**Concentration and pooling of regional forces**

TSB-FAV is focused on the following fields of activity:

- Traffic telematics
- Logistics
- Rail transport technology
- Aerospace
- Road transport / Automotive

These fields of activity are subject to regular examination in the light of conditions prevailing in transport, transport science and transport economy. The identified regional scopes of activity are characterized by the fact that they cover the whole value creation chain from research via development, production, and application to worldwide marketing. With that the region is able to master complex systems in transport system technology.

TSB-FAV functions as a coordinator of the cross-state future field of transport system technology within the framework of the joint innovation strategy of the federal states of Berlin and Brandenburg. In close coordination with ZAB, the cross-state networks are being further extended and lead projects developed that affect the interests of the whole region.

Currently there are ten networks with some 500 members active in the region, composed of approx. 350 companies and scientific institutions. This represents a major part of the regional potential in the network.

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**Table 4: Workplaces in Berlin-Brandenburg by fields of activity**

<table>
<thead>
<tr>
<th>Field of activity</th>
<th>Employees in companies</th>
<th>Employees in scientific institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rail transport technology</td>
<td>18,700</td>
<td>500</td>
</tr>
<tr>
<td>Road transport / automotive</td>
<td>19,000</td>
<td>600</td>
</tr>
<tr>
<td>Traffic telematics</td>
<td>3,130</td>
<td>190</td>
</tr>
<tr>
<td>Logistics</td>
<td>5,060</td>
<td>300</td>
</tr>
<tr>
<td>Aerospace</td>
<td>4,000</td>
<td>200</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>49,890</strong></td>
<td><strong>1,790</strong></td>
</tr>
</tbody>
</table>

Networks in the cluster “FAV” – how different networks operate within the cluster

Aerospace initiative BerlinBrandenburg
In 2006 the network RiBB – Raumfahrtinitiative BerlinBrandenburg was founded.

The German capital region is one of the technology leaders for small satellites weighing 1-100 kg in the whole world. Since 1991, 8 satellites have been launched into space. In addition, firms and research institutions of Berlin and Brandenburg participate in major international missions with key systems. Since the turn of the millennium, small satellites have increasingly conquered new fields of use through their progressive miniaturization and are one of the booming branches of the German aeronautics industry with an annual growth of 25%.

The small satellite industry in the capital region is characterized by the existence of many innovative SMEs. In contrast to other aeronautics locations in Germany, no big system integrator like EADS-Astrium has settled in the region. The RiBB network was set up to concentrate regional SMEs and in this way create a critical mass under its roof to carry out small satellite missions as turnkey projects. TSB-FAV exercises the function of innovation manager within the network. It is in charge of internal communication and for external presentation. Its position allows a view of coordinated technology roadmaps and gives an impetus to developments and projects. The aims and tasks of the RiBB network include:

- Establishment of a regional innovation network
- Interregional networking with efficient partners
- Increase of the value creation and industrial competence of SMEs in the sector of aeronautics technology
- Development of system and sub-system expertise from the respective lower levels of the value creation chain
- Implementation of technological excellence with innovative research projects
- Use regional competences from adjacent key areas (e.g. optical technology, robotics, information technology)

Internet: www.fav.de

Chart 18: Increase in number of workplaces

EURNEX e.V.

EURNEX e.V. (EURNEX) is a spin-off from the EU project EURNEX, coordinated by TSB-FAV. It was set up in October 2007.

This European research network figures among the few "Networks of Excellence" of the 6th Framework Programme that have consistently embarked upon the road of sustainability. Almost 50 universities and research institutions from all over Europe, leaders in the field of railway research, are organized in EURNEX. EURNEX pursues the following aims and tasks:

- Integration of fragmented railway research
- Intensification of research through "strengthening of strengths"
- Contribution by railway research to a sustainable European transport policy
- Improvement of competitiveness and economic stability of the rail sector by creating a customer-oriented and sustainable network
- Provision of integrated know-how for railway operators and subcontracting industry
- Creation of an interoperable and harmonized European railway system

This integrated and multidisciplinary research cooperation is a quantum leap not only from the point of view of research customers, but also for the great majority of scientists who are thereby inspired beyond the boundaries of their respective disciplines. With the help of the trio of industry, operators and science, the rail research network of excellence EURNEX has by now been established in Europe as a constant magnitude in the representation of science. In the perception of its partners, EURNEX now unites the best European railway researchers. This network of excellence was managed by TSB-FAV. Today it supports its spin-off EURNEX in the development of EU projects.

Internet: www.eurnex.eu

Innovation management and project coordination as a service of support for regional companies and scientific institutions

Supporting technology transfer by using R&D projects is elementary for the development of the competence field. Thus the prerequisites for transforming scientific findings into economically usable products and services are being created. This also and particularly applies to transport system technology, where it is important to link recognized regional scientific capabilities in a sustainable way with the corporate landscape. The basis to do this is – apart from the aforementioned participation of players in functioning networks – the resultant extension of the system’s capability through cooperative projects of scientific institutions and companies along the entire value creation chain on regional, national and EU level.

Current regional lead projects are occupied with specific aspects of logistics and technological assistance for the development of the new airport BBI. Moreover, the participation of scientific institutions and companies in EU projects ensures integration in the latest technological developments. To make this possible, TSB-FAV is engaged in different functions in a number of EU projects. In order to make better use of the potential of transboundary cooperation, a great many minor companies are particularly in need of support. In the direct field of operation of TSB-FAV, project funds amounting to approx. 255 million Euros have been obtained in the last eight years. The region’s project partners, from science and industry, account for almost half of those funds. From a strategic perspective and in view of their involvement in major cooperative projects, small and medium-sized enterprises find project cooperation with new partners and contacts on a decision-making level more important than assistance from funds of the German government and the EU. Berlin-Brandenburg is meanwhile with a number of important R&D cooperative projects well positioned on regional, national and European level, with the large participation of players from the Berlin-Brandenburg region.
### Aims and motives for science and economy to participate in international projects

- Projects increase their knowledge regarding the international state of the art in the field of technology, research as well as technological trends and future markets in key topics:
  - Self-assessment of one’s own market position
  - Elaboration of key competences
  - Participation in international standardization committees

- **Strengthening of regional scientific and economic competences:**
  - Through definition of innovation topics and generation of know-how in the region
  - In the competition for the best brains
  - Through input of funds into the region

- International projects constitute an important sales channel and an access to foreign customers:
  - Direct and personal access to key players in R&D and purchasing (trust)
  - R&D involvement of partners later results in advantages with regard to services offered

- Project funding acts as start-up financing for one’s own innovative products

- Enhancement of one’s own value creation by creating system capabilities with one’s own core competences and complementing international partners

In order to advance the internationalization of the region through development partnerships, TSB-FAV is pursuing a strategy for European cooperative projects with different effects, actions and goals. One of the short-term actions is the “pre-screening” of project proposals with Commission representatives in Brussels with the aim to get their feedback on the project ideas and thereby increase funding chances.

Workshops with medium-term effect are conducted with regional networks. In that process, project ideas are generated and clearly defined, both analogous to and across fields of activity, regional consortiums are being established and search is conducted for international partners. The workshops serve to provide information about specific calls for applications and the respective fields of activity. The aim of the thematic workshops on the EU research programme is to integrate the region of Berlin Brandenburg into it. In order to reach this aim, promising project applications for the framework research programme are needed with the leadership and/or the large participation of the region, the use of informal networks to involve project partners on EU level and to integrate strategic aims with a view to facilitating later applications and improving opportunities under the 7th framework research programme and subsequent framework research programmes.
The development of innovative products and processes and their rapid national and international commercial launch are the key factors for economic growth and the sustainability of industries. In this process, Germany as a business location must focus on industries in which it can tap its existing innovation potential as efficiently as possible, so that it can generate cutting-edge innovations in ever-shorter product cycles. Innovative products and processes can be generated especially quickly in regional technology networks, in which the actors cooperate with each other along the whole value added chain and share their knowledge intensively. Thus, many networks have been established by private initiative and public financial support measures in Germany over the last few years, which have advanced successfully ever since.

Under its Kompetenznetze Deutschland Initiative, the Federal Ministry of Economics and Technology assembles the most innovative and high-performance technology-oriented networks. These networks are characterised by the intensive activities and cooperation between the parties involved and by their jointly defined aims. Furthermore, they excel as far as their proximity to industries and markets, their regional foundations, their drive and their flexibility are concerned. All these qualities turn the networks of the Initiative into a core element of performance and competitiveness. In addition, the networks represent Germany’s concentrated strength in numerous fields of technology and the economy.

Almost 100 networks from nine innovation sectors and eight innovation regions are currently operating under the Kompetenznetze Deutschland Initiative, covering all essential sectors of high technology. The number of networks varies slightly over time, because new technology networks are admitted while some networks merge as a consequence of their common themes or leave the initiative if they cease to meet the quality requirements.

For the Initiative, the following eight innovation regions have been defined:

- Coast,
- Northern German Lowlands
- Rhine-Ruhr-Sieg,
- Rhine-Main-Neckar,
- Berlin-Brandenburg,
- Middle Germany,
- South West Germany, and
- Southern Germany.

The division of the Federal Republic of Germany is not based on its administrative classification into federal states, but is clearly oriented to regions spanning administrative districts and federal states, which have various economic and geographical features in common, particularly with a typical focus in their economic structure that has developed over decades.

**Aims of the Initiative**

The aims of the Kompetenznetze Deutschland Initiative have greatly changed since their implementation in 1999 and have undergone a marked transformation in the last few years in terms of surplus values for its members. Initially the Initiative was conceived as a web-based presentation and information platform on the most efficient German networks. Since its new alignment at the beginning of 2007 its focus has been on offering specific, need-oriented services to the affiliated networks and network managements in particular, enabling them to meet their members’ requirements even more effectively. In this process, network managements are in the centre of attention because their efficiency is crucial for the overall success of the network. Only if network management is able to support members in a goal- and need-oriented way, can network players benefit from the network and the strategic network goals achieved.

As a result of the claim of the Kompetenznetze Deutschland Initiative to represent, on the one hand, the German innovation location nationally and internationally and, on the other hand, to support the competence networks involved in their developments and activities, there are two key complexes of tasks with different goals.

For the purpose of external representation, the Initiative concentrates the information about Germany’s most effective competence networks, areas of innovation and innovative regions and...
presents them effectively to the public.

Internally, the Initiative supports participating networks in their further development and transformation processes, assists them with horizontal networking within the same and between different areas of innovation, gives them access to innovative information and communication infrastructures, and provides them with an opportunity of reaching their target audiences through other platforms such as fairs, events and publications as well. It also organises internal workshops to promote the mutual exchange of experience among members as well as some open to all interested parties regardless of affiliation with the Initiative.

These inwardly- and outwardly-directed goals of the Kompetenznetze Deutschland Initiative are reflected in the diverse offers made by the Initiative to its internal and external target groups, the most important representatives of which are:

- national innovation networks,
- investors and business founders in search of business locations,
- decision-makers from industry, politics and administration,
- similar international cluster and network organizations,
- present and future scientists,
- the media and the interested public.

The added values of membership

Being made up of the best-performing and most cost-effective technology networks, the Kompetenznetze Deutschland Initiative is the “club of the best innovation networks” in Germany. For this reason, one of the most important added values for members is the “Kompetenznetze Deutschland” seal of quality, a registered trademark the members receive upon admission. Membership in Kompetenznetze Deutschland is a distinction which symbolises recognition of member networks’ performance by the Federal Ministry of Economics and Technology.

Other advantages for the participating networks are:

- membership as a seal of quality confirming the network’s high level of performance and organisation, certified by a scientific advisory council,
- permission to use the registered trademark “Kompetenznetze Deutschland”,
- greater visibility for decision-makers in business, politics and administration as a result of national and international presentation,
- intra-Initiative networking with the best national networks,
- support for networks in their strategic development, transformation, internationalization efforts and initiation of cooperation,
- support for network management through an ample service portfolio and individual services,
- benchmarking and thereby comparison with the best networks.

Process of admission

As the membership in the Initiative represents a seal of quality, admission as a member must depend on certain clearly defined requirements in order to preserve the high standards of the Initiative. An independent scientific advisory council, in close cooperation with the Federal Ministry of Economics and Technology, decides on admission provided these requirements are met. The Federal Ministry of Economics and Technology invites renowned representatives from science and economy to join this council, which not only decides about the admission of new networks, but is also involved in setting the strategic focus of the Initiative.

Interested networks that meet the definition of technology networks may apply for admission. The admission is preceded by an intensive process of evaluation.
**Quality criteria**

The following core criteria are crucial for the admission of new networks to the Initiative:

- Emergence and development of the network (sustainable existence of the network, activities of predecessors)
- Thematic and/or technological focus of the network (unique features)
- Organization of the network (high degree of organization with intensive participation of members)
- Responsibilities and activities of the network (generation of added value for members through activities in specific areas of responsibility)
- Membership structure (at least 15 members representing the various levels of the value creation chain with a 50 % minimum ratio of companies)
- Internationalization (strategy for internationalization or the intention of expanding activities to a transnational level)

**Agency of the Initiative**

Since 1st May 2007, Berlin-based VDI/VDE Innovation + Technik GmbH has been in charge of the agency’s management on behalf of the Federal Ministry of Economics and Technology. The agency consists of a four-man core team and an enlarged team of experts. The latter especially contributes special branch know-how in accordance with the fields of innovation as well as competences in the sector of public relations and web page. The range of responsibilities of the agency embraces three key fields of activity: services for members of the Initiative, securing the quality of membership as well as strategic aspects of network and cluster policies.

The Agency develops and implements various demand oriented services for the members of the Initiative. It does this in close cooperation with the members in order to ensure that precisely fitting new services are implemented and the existing portfolio of services is refined continuously.

The continuous safeguarding of the quality and representativeness of the members of the Initiative is an essential responsibility of the Agency in order to realise the Initiative’s aspiration to excellence. On the one hand, this involves all processes required of new applications for admission up to and including the presentation of the applications to the scientific advisory council of the Initiative. On the other hand, it includes the critical examination of current members. If the quality standards are no longer met by a network, it receives active support in recovering the level of quality expected by the Initiative. Should the network be unable to recover from this critical phase in spite of this joint effort, its membership in the Initiative will finally be revoked.

The Agency is concerned with basic problems of innovation and cluster policy and strategically develops the topic “Networks and Clusters” in close cooperation with the Federal Ministry of Economics and Technology. The basic aim of the Agency is to help represent Germany as a centre of innovation on a national and international level and to support its participating networks in all of their endeavours and their further development.

For this purpose, both externally oriented and internally oriented measures which are closely interlinked are conceived and implemented. In order to strengthen its external impact, the agency pools information about the most efficient networks in Germany, about fields of topics as well as innovative regions and assumes responsibility for representing them to the public. The agency makes use of different communication media as well as fairs and meetings. In addition, the staff of the office are also responsible for international networking activities, e.g. by initiating cooperation with foreign networks.

Within the Initiative, the agency assists the competence networks in the process of development and transformation as well as in horizontal networking both within the same and between different thematic fields. At the same time, it provides access to innovative information and communication infrastructures, thus enabling networks to address regional target groups. Moreover, the agency organizes seminars for the exchange of information between members. Some workshops also address all interested network players and those in charge of economic developments as well as representatives of cluster policy.
In the last few years, the agency has developed the following need-oriented portfolio of services for the affiliated networks:

1. **Support of the activities and further development of the member networks**
   - Benchmarking (interviews and comparative analysis with the best networks / elaboration of an extensive benchmarking report)
   - Analyses of member satisfaction (On behalf of a network, the Agency interviews its members in order to ascertain the degree of their satisfaction with network activities and to identify additional or new fields of activity for network management.)
   - The Agency conducts “Training” workshops for the network offices on current network- or management related topics (topics already covered: “Education and professional training in networks”, “Financing networks”, “Public relations for networks”, “Making a network international”, “Networks and sustainability”).
   - The work-group concept (The Agency has established and is coordinating three work-groups on the topics of “Financing”, “Management of innovations” and “Excellence in cluster management”. The members of the Initiative specify the precise contents and aims in a joint process of deliberation with the Agency. The work-groups receive resources of their own to carry out their activities.)
   - Initiation of exchanges and cooperations with other national and international networks and cluster initiatives (pre-arranged meeting service at meetings and fairs)
   - Support for internationalization efforts (organization of networking visits / joint booths at fairs at home and abroad / development of internationalization strategies / provision of information about internationalization instruments)

2. **Consultancy for interested networks**
   - First contact and network visit
   - Assistance in the admission process

3. **Public relations for the Initiative as a whole**
   - Operation of the website www.kompetenznetze.de for the target group-oriented presentation of relevant content for and about the member networks. Information for and about the networks can be accessed and placed here by the networks themselves. Includes an online newsletter.
   - Publication of the Annual Report, issued biennially
   - Compilation and publication of short studies about topics relevant to networks

4. **Organization of the “Competence Network of the Year” competition**

5. **Internationalization**
   - Identification of appropriate foreign networks and their suitability for transnational cooperation
   - Initiation and moderation of bilateral network cooperations
   - Studies and international cluster mapping
   - Participation in cluster projects of the 7th Framework Programme and transfer of know-how from these projects in the interests of members
   - Elaboration of harmonized evaluation procedures and quality indicators of clusters and networks

6. **Initiation of cluster policy processes**
   - Communication with cluster policy representatives on regional, national and European level
   - Shaping of cluster policy discourses in a national and international context
Studies and discussion papers about topics relevant to clusters

Consultancy for providers of funding concerning cluster-specific funding measures

7. Individual services

In close cooperation with the member networks, the Agency develops demand-oriented services for individual networks and topics and implements them together with the networks (an “Optical Technologies Cluster Atlas”, for example).

Individual coaching for networks that have, for example, discovered shortcomings through benchmarking, or for networks looking for a new perspective. The portfolio of services is continually being expanded to meet the demands made by new responsibilities and other developments specific to individual networks or clusters.

The portfolio of services is continually being complemented on the basis of needs and in dependence on new key areas of activities or network- and cluster-specific developments.

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Chart 19: Regional distribution of the networks of the Kompetenznetze Deutschland Initiative (locations of network offices)

Source: Agency of the Kompetenznetze Deutschland Initiative (as of December 2010)
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