

**Aims and Instruments of  
Regional Technology Policy -  
the Example of Baden-Württemberg**

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## 1. Preliminary Comment

The aims and instruments of the technology policy of Baden-Württemberg can be seen as a model of possibilities for technology-oriented regional policy. The technology policy of Baden-Württemberg can be characterised as

- strongly based on endogenous resources
- flexibly shaped in order to adapt to technological and economic change
- being strongly managed/coordinated by state authorities.

Regional industry in Baden-Württemberg is rather strong. This success can be attributed to a healthy economic structure (diversified firm sizes, sectors, good regional distribution, different technologies), forward-looking enterprises and networks between large and small enterprises that enables all firms to have access to public Research and Development (R&D) and global markets. The Baden-Württemberg "Land" government promotes industry and its technological competitiveness. The region's endogenous technological resources are particularly strong in the areas of applied research and technology transfer.

## 2. Technology Policy in Baden-Württemberg

In recent years, all the German Laender have initiated various measures for the promotion of their regional industry's innovative capability, in order to build up a qualified research infrastructure, support technology transfer and secure the financing of innovative activities. Baden-Württemberg is characterised by close, multi-level interaction between the public sector, science and industry.

### 2.1 Endogenous Resources in Research and Development of Baden-Württemberg

The spectrum of research institutions in Baden-Württemberg includes basic research (9 universities, two of them technological universities), 14 Max Planck Institutes and two national research laboratories, as well as institutions for the technological development of products and production processes, such as

- 7 contract research institutions at universities in the fields of microelectronics, information and communication, solar and hydrogen energy, production technology;
- 14 institutes of the Fraunhofer Society in the fields of information, production technology construction, sensors etc.;

- 10 industrial research associations; these are sectorally-oriented institutes (textiles, watches, clocks, fibres, leather);
- the Steinbeis Foundation for the Promotion of Industry with a technological consulting service and transfer centres in the "Fachhochschulen" (colleges for higher professional training);
- 14 incubator centres.

On the one hand there exists a specific technology offer in high-tech fields (Fraunhofer Institutes, Contract Research Institutes), on the other hand a wide basis of almost every kind of support for conventional technologies (research associations, Steinbeis-Foundation).

These institutions are distributed over the whole of Baden-Württemberg (Figure 1).

A special characteristic of Baden-Württemberg technology policy in recent years has been to reinforce the industrially-oriented infrastructure by supporting and setting up industrially-oriented contract research institutes of the Fraunhofer Society (Figure 2) and at universities (Figure 3). Their integration into the universities ensures a link-up to the results of basic research and (for instance through work on international projects) a connection to international science. The practical orientation of these institutions is ensured by the legal form of the registered association (Fraunhofer-Society) or foundations (contract research institutes).

Contract research institutes generally work with large enterprises, which is not surprising in view of the high tech fields in which they operate. The same is true of the Fraunhofer Institutes (Figure 4). In the case of industrial research associations (Figure 5) and especially the Steinbeis Foundation, it is mainly small and medium sized firms that benefit. Figure 6 demonstrates aspects of these Institutes in joint efforts to provide services for companies of different sizes (the example "Wissenschaftsstadt Ulm").

## 2.2 Technology Transfer

There is a comprehensive network of decentral innovation advisory offices at chambers of industry and commerce, trade corporations, industrial associations, at "Fachhochschulen" (where they are organised by the Steinbeis Foundation), and universities. Due to its being well known, and supplying services oriented principally towards small and medium sized firms (consulting, further training, contract development,

expertises), the Steinbeis Foundation (Figures 7-8), with more than 150 transfer centre and its technology consulting service, plays a special role within this system.

The main emphasis of the work of the technology-oriented transfer centres is not so much on research, but of the day to day entrepreneurial R&D business. It ranges from supplying specialised consulting and training, to performing individual development contracts. The Steinbeis Foundation also provides expertises for public innovation promotion and private innovation financing. It is characteristic of these centres that - apart from start-up financing - they receive no subsidies from public funds, and therefore have to pay their own way. They are extremely flexible profit centres (and are closed by the foundation if they do not earn enough money).

## **2.3 Science and Technology Promotion Programmes**

Baden-Württemberg technology policy has a long tradition and provides flexible programmes for R&D institutes and industry

- Programmes for R&D institutes to hire additional R&D personnel under the condition that future vacancies due to fluctuation may not be refilled;
- Universities can hire young professors under similar conditions. If a new professor is hired the university has to point out a professor who will retire due to fluctuation until the year 2000;
- In order to keep in touch with international development in R&D the "Land" supports international joint research projects, and funds applications for national and international R&D promotion programmes by companies and institutes in Baden-Württemberg;
- Promotions programmes for industrial innovation.

Baden-Württemberg was also very early in introducing innovation promotion programmes, for the financial support of development projects and the promotion of the use of modern technologies. These promotion programmes addressed individual enterprises, especially small and medium sized firms. Still running today is the "Programme for the use of modern technologies in manufacturing enterprises with not more than 300 employees". This promotes the adoption of products - and the introduction of processes - that are new and technologically progressive, in cases where a considerable degree of technological risk is involved and where the product/process has not yet been introduced by comparable enterprises. The support takes the form of delayed-repayment loans with subsidised low rates of interest.

### 3. Cooperation between the Public Sector, Science and Industry

In Baden-Württemberg there is a State Commissioner for Technology Transfer of the Land government, directly answerable to the Minister President of Baden-Württemberg, whose special charge it is to ensure that the technology policy of the Land is continually adapted to meet current needs. The Commissioner has the following specific tasks:

- to make available necessary information for the development and continuation of new technologies;
- to promote cooperation between research and industry;
- to support enterprises in development activities over a defined period (development management);
- to co-ordinate all innovation R&D services in Baden-Württemberg;
- to participate in international technology contacts;
- to participate in the conception and realisation of programmes introduced by the Land of Baden-Württemberg for the promotion of research and development in industry and science.

**"Land"-Expert groups of R&D:** In Baden-Württemberg the Land government tries to concentrate resources. Over the past few years Baden-Württemberg has embarked on a number of activities in this field. In 1988, a report was submitted entitled "Focal points of future technology development". This report was produced by a working group drawn from industry and science; it itemises focal points in different fields of technology, describing trends for the next five to eight years, and examines existing and desirable structures in research and industry.

In December 1992 the Land government introduced the Programme "Baden-Württemberg as a location for industry", which included various measures in fields such as microsystems technology, life sciences, and production sciences. At the beginning of the 1990s followed the study of the Baden-Württemberg Commission for the Future, Industry 2000 ("Zukunftskommission Wirtschaft 2000").

Since April 1994, on the recommendation of the Commission for the Future, a permanent Innovation Committee (the "Innovationsbeirat") has been in existence. This committee provides active support for the Land government, and is directly under the Minister President. The "Innovationsbeirat" has the following tasks:

- organising the monitoring of the technological and economic development lines which are of particular importance for the economic structure of Baden-Württemberg;
- preparing proposals for the strategic orientation of research, technology and economic policy, and for the future development of public S&T promotion policy;
- presenting recommendations for the improvement of innovation-relevant frame conditions, and methods for more rapid exploitation of research results, products and processes;
- indicating the need for coordination in research, technology and economic policy;
- elaborating proposals for specifically-aimed public relations, in particular for improvement of the innovation climate.

#### 4. Continuous Development and Adaption of Technology Policy in Baden-Württemberg

**Aims:** All measures for the promotion of technology are continually being adapted to the growing demand from industry. Thus, research establishments in Baden-Württemberg have the task of going beyond the present *status quo* and acquiring new know-how. This process is supported by the expansion of existing research institutions and by continual modernisation and re-structuring.

Baden-Württemberg's technology policy attempts to achieve a synergetic focusing of the Land's resources by financial support (expansion of application-oriented research, intensification of technology transfer), by active organisational structuring measures (appointment of a State Commissioner for Technology Transfer) and by taking on the role of moderator in the dialogue between science and industry (technology commissions). At the same time, appropriate forms of organisation in the research infrastructure (in particular in contract research), as well as the spectrum of tasks of the Land government commissioner, are also intended to ensure a global orientation in Baden-Württemberg's support of innovation.

The technology policy of Baden-Württemberg demonstrates that not only by means of financial R&D support but by a large variety of activities it is able to mobilise synergetic effects of regional R&D and industry in almost all fields of technology and on different levels of technology. The Land of Baden-Württemberg thinks there is a strong government obligation for public measures to intensify the generation of innovations in a joint effort by science, industry and the state.

## Literature

- Arbeitskreis Baden-Württembergischer Technologiezentren (Ed.): Technologiezentren in Baden-Württemberg. 1993.
- Bundesministerium für Forschung und Technologie: Bundesbericht Forschung 1993. Bonn 1993.
- Derner, N.; Heinze, C.-D.; Klaus, F.; Melezinek, A. (Eds.): Technik und Daseinsgestaltung, Alsbach 1989.
- Hucke, Jochen; Wollmann Hellmut (Eds.): Dezentrale Technologiepolitik? Technikförderung durch Bundesländer und Kommunen. Basel, Boston, Berlin 1989.
- Landtag von Baden-Württemberg (Ed.): Wirtschaftsnahe Forschung in Baden-Württemberg - Antwort der Landesregierung auf die Große Anfrage der Fraktion der SPD, Drucksache 11/2449 of 3. September 1993. Stuttgart 1993.
- Liebig, V.: Das Projekt "Wissenschaftsstadt Ulm", Technologietransfer als Herausforderung.
- Walter, Günter H. : Technologiepolitik im regionalen, nationalen und europäischen Kontext. MOEL-Arbeitspapier Nr.15. Karlsruhe 1994 (ISI).
- Wirtschaftsministerium Baden-Württemberg (Ed.): Wirtschaftsnahe Forschungseinrichtungen in Baden Württemberg - Leitfaden durch außeruniversitäre Forschungseinrichtungen und -institute mit ihren Angeboten für die Wirtschaft Baden-Württembergs. Stuttgart n.d.



## Science and Technology Transfer in Baden-Württemberg

- Contract research institutes
- Institutes for joint industrial research
- ▢ Institutes and laboratories of the Fraunhofer-Gesellschaft
- ▣ National science laboratories
- Technological consulting service by Steinbeis Foundation / Fachhochschulen
- ▣ Transfer centres of the Steinbeis Foundation
- ▣ Universities
- Incubator centres

