

TECHNOLOGY CONSULTING AND TRANSFER OF TECHNOLOGY:  
PRACTICAL EXPERIENCES FROM GERMANY

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**1. Introduction**

The division of Germany after World War II had its especially negative impact on the formerly central region of Northern Hesse. The area around Kassel, traditionally oriented towards the eastern regions of Thuringia\* and Saxony, became an eastern border district of the newly established Federal Republic of Germany. In addition, it had to reorient itself along the north-south axis.

These geographical problems were further aggravated by the enormous war destructions, especially in the city of Kassel, and by the increased need for structural change (from predominant agricultural to industrial production) in the rural areas around. It was in this context that industrial policy facilitated the establishment of new enterprises or, moreover, of new branches of existing firms (with head offices located elsewhere in Germany or even in neighbouring European countries). The most prominent example for this is the branch office of Volkswagen at Baunatal (south of Kassel) with a workforce between 10 and 20 thousand persons, depending on the economic situation.

Whereas this policy of establishing new branch offices in Northern Hesse was quite successful in absorbing the rural surplus population into industrial employment, a major problem was created by the high sensitivity of those branch offices with respect to cyclical fluctuations: It came out that the management in the head offices tended to shift the burden of cyclical adaptation, especially in employment, primarily to those branch offices which were typical of Kassel and its surroundings. So, even during the time of the Wirtschaftswunder ("economic miracle") the region of

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\*For instance, up to 1945 the Thuringian district of Mühlhausen belonged to the Kassel Chamber of Commerce (see figure 1).

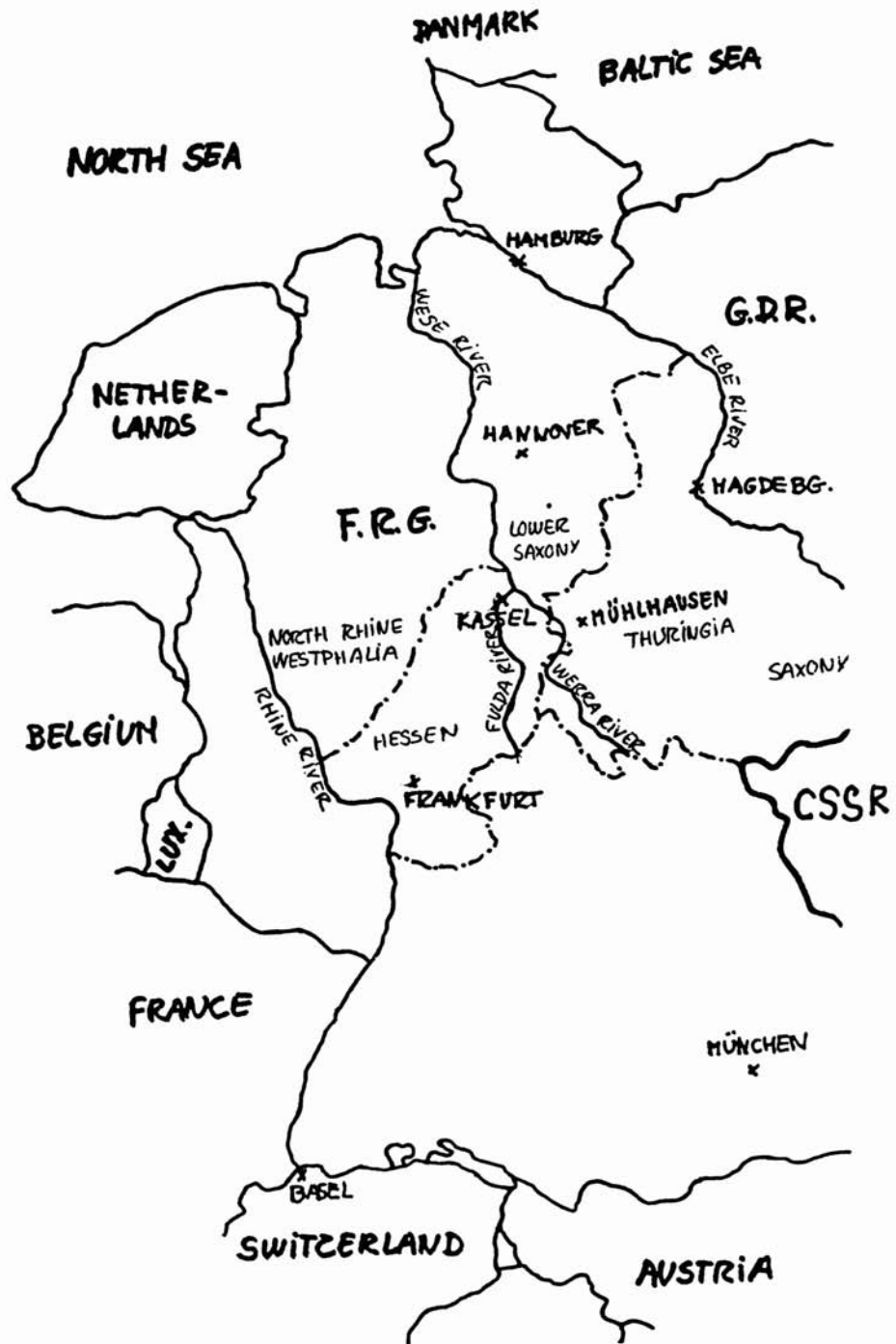


Fig.1: Geographical location of Kassel and Hessen

Northern Hesse experienced some structural disadvantage compared with the flowering economic regions of the Federal Republic in the west, the north and the south. It came as no big surprise that these disadvantages became more weighty by the middle of the the sixties <sup>when</sup> /the German "economic miracle" came to an end and problems of a nation-wide unemployment started to emerge. The already existing problems were further aggravated by a migration of the more mobile and normally more qualified part of the workforce, by a "brain drain" of academicians, engineers and technicians, and the inability of many of the predominantly small-sized firms to keep up with their competitors from outside. Moreover, very often they did not dispose of the financial and personnel resources to use superior new technologies. With the explicit aim of struggling against those negative trends, the University of Kassel was founded in 1971 and was assigned the primary task of establishing close links to the region and its practical problems.

## **2. The office for technology and innovational consulting at the University of Kassel**

Considering the needs and expectations directed at the new University of Kassel, it was a very consequent step to establish a special office for technology and innovational consulting at the University of Kassel. This took place as early as 1981, at a time when only two other German universities (Berlin and Bochum) had established similar departments. At this stage, the development of organized transfers from universities to business and administration was at the very beginning. The office of technology and innovational consulting (Technologie und Innovationsberatung, TIB) is organized as a central service function of the university and is part of the university president's central administration. The office of technology and innovational consulting was staffed by the university with a position of the leader of the office and one secretary. During the following years, there has been a big expansion of the office's staff, due to the successful acquisition of projects. The primary task consists in making

accessible the know-how of the technical and natural science as well as economic and social science departments of the university to firms and other interested institutions (such as associations, municipalities, etc.) In order to do so, the office has to create and to apply the appropriate forms of cooperation between the university and these institutions.

The main targets of this cooperation are as follows:

- solution of specific problems from the university practice
- implementation of basic university research to new products and processes
- initiating of additional research and development, also in cooperation with outside firms and institutions.

Viewed from the side of potential users, the technology and innovational consulting facilitates the goal-oriented access to the different sections of the university. Especially for small and medium-sized enterprises with no prior knowledge of the university's functions and divisions, this advice is an essential help. Therefore, making contacts and fostering projects in cooperation with small and medium-sized enterprises of the North Hessian region is a particular challenge.

### **3. Services and procedures**

The services of the technology and innovational consulting comprise the following areas:

- Use of the scientists' stock of knowledge for applied research, for development, for analyses, studies and expert judgements. The departments and institutes of the university which offer specific services are summarized in a special "list of services" (Leistungskatalog). This list provides detailed information on each department and institute concerning the main focus of their research and the resources in terms of personnel and equipment.

- Creation of new firms

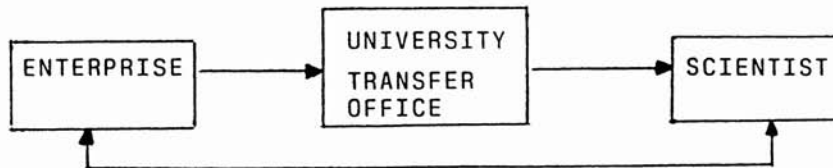
Very often, individuals considering the establishment of new small firms are interested in and in need of specific support by the university. This support reaches from laboratory work, from joint research and development and the use of specific scientific equipment up to business management studies concerning questions of organization or entrepreneurial concepts. Advice for creating new firms given by the office of technology and innovational consulting is without charge for the user.

- Personnel transfer

If an enterprise is in need of specific qualifications not available among its own personnel in order to carry out certain projects, the office of technology and innovational consulting supports the search for qualified people via the informational resources of the relevant departments of the university.

Considering the methodology and procedure of transfer offices, such as the office of technology and innovational consulting, two basic models can be distinguished, the "agent model" and the "project management model". The agent model, which is also labeled as "broker model" or as "naive transfer model", operates similar to brokers in the following sense: Questions and demands from the practice (from firms and other institutions) which are directed to the transfer office are forwarded to an appropriate scientist willing to cooperate. The regulations for the concrete cooperation between the scientist and the interested practitioner are left to these both partners. The following figure 2 illustrates the schematic functioning of a transfer demand along the agent model.

Figure 2: The agent model

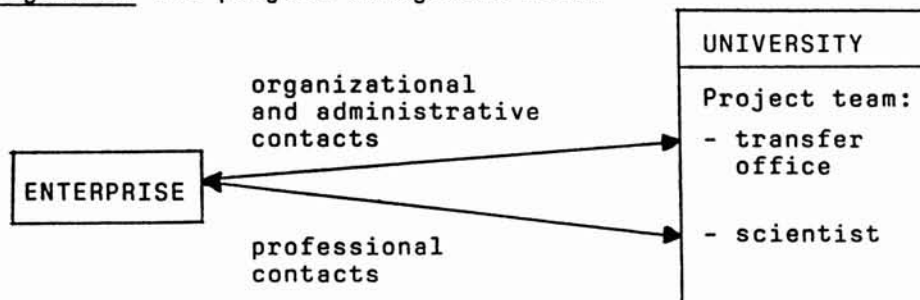


An essential disadvantage of this procedure is, among others, that

- the transfer offices does not receive a regular feed-back concerning the success or failure of the demand and
- that no marketing or management functions for both the project and its later results are taken by the transfer office.

In contrast to the agent model, organized university transfer along the "project management model" is done in cooperation with the transfer office. The office helps to make clear the different initial positions, in cooperation with the partners it works out agreements (e.g., with respect to questions of licences, costs, time schedules), and in addition to that it functions as a middle-man for problems which might arise during the cooperation. This methodology and procedure can be described by the following schematic figure 3:

Figure 3: The project management model



This procedure is increasingly used, and it has the advantage for the scientist involved that he can focus himself on his professional research and development. The necessary administrative work is taken over by the office of technology transfer.

#### 4. A selection of projects carried out so far

Up to now, the office of technology and innovational consulting has carried out about 500 projects, two-thirds of them in co-

operation with enterprises from the region of Northern Hesse. Two-thirds of the enterprises involved had less than 100 employees. The projects correspond to a sales volume of about 5 million DM.

Besides these general tasks described above where the technology and innovational consulting serves primarily as an "accompanying middle-man" between demanders and suppliers of technology and knowledge, several other projects are carried out directly by the office of technology and innovational consulting. The most important ones are:

- Regionalization of technology and innovational consulting in Northern Hesse

The aim of this regionalized consulting in Northern Hesse is in giving advice especially to small and medium-sized enterprises on problems of technology or business management which are related to the development of new products and the implementation of new technologies and in giving them access to the research potential of the university. The partners of this cooperation in regionalized technology and innovational consulting are the districts and their savings banks of Hersfeld-Rotenburg, Kassel, Schwalm-Eder, Waldeck-Frankenberg, and Werra-Meissner.

- Training for employees of transfer offices

The office of technology and innovational consulting has received the order from the Federal Ministry for Education and Science to develop specific training courses for employees in transfer offices, to offer and to carry them out all over the Federal Republic. The essential aims of this training program are as follows:

- to harmonize the service supply of all German universities with respect to size and content
- to create a uniform level of quality for the employees of transfer offices
- to foster the exchange of experience between all parties involved in the transfer process within the whole Federal Republic.



- R&D informational service

This project of the technology and innovational consulting office aims at establishing a data-bank which informs about the research and development potential available at German universities. This project is carried out jointly with the universities of Frankfurt and Marburg and the colleges of Darmstadt and Frankfurt. It is supported by both the State Ministry of Science and Technique and the State Ministry of Science and Art in Hesse.

- Information and communication technologies

Supported by the IBM company and on behalf of the Federal Ministry of Education and Science, the office of technology and innovational consulting analyzes, based on present experience, how and in which way the transfer process can be supported by new information and communication technologies. This project is carried out in cooperation with universities of Dortmund, Kaiserslautern and Oldenburg and it constitutes a joint effort of different Federal States in Germany.

- Creation of new technology oriented firms

The office of technology and innovational consulting has received an order from the Hessian State Ministry of Economy and Technique to support the creation of new technology-oriented firms both in the stage of planning and conception and in the stage of practical implementation. In addition to that there is series of regular seminars and exchanges of experience in the frame of this project which aims at a qualification of individuals during the process of the creation of new firms.

## 5. Concluding remarks

As the descriptions given above should have made clear, the office of technology and innovational consulting normally does not give direct expert advice and knowledge to partners from business and administration. Its main services can be described as providing "meta-knowledge", i.e. initiating and fostering the transfer of

technology between the relevant university sections and the partners from business and administration. It facilitates these contacts and the transfer by providing its experience from earlier transfer processes and by supplying a juridical and organizational frame to those transfer processes. Although the economic and academic situation is quite different in Germany and Portugal, we think that a lot can be learned from the operation of the office of technology and innovational consulting at the University of Kassel which attempts to contribute its part to improve the economic and social position of its structurally disadvantaged region: The major task of such a transfer office will not be to provide its own knowledge concerning the concrete business and administrative activities nor to provide major personnel and financial resources; instead it supplies its experience and knowledge concerning the organizational and juridical framework where the concrete cooperation between the relevant sections of the university and the interested partners in business and administration can take place. In this way, by providing this kind of "meta-knowledge" (i.e., the information about the persons and institutions within the university who do really know) the transfer office benefits both partners from inside and outside the university. We are convinced that similar patterns of cooperation between academic, business, and administrative institutions, especially at the regional level, can be used in the further development of the Portuguese economy in order to keep up, at least in the long run, with its other European partners.

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