

# REGIONAL INDUSTRIAL POLICIES IN GERMANY

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**Abstract.** The working paper presents an overview to the system of industrial policy in Germany. Special focus is directed to the relationships between federal and regional (Länder) policies. As German industrial policy is distributed across various policy fields, objectives, strategies and instruments of the main fields – innovation, SME, and regional economic policy – are discussed against the background of recent structural challenges to the German economy. Case studies for two Länder – Northrhine-Westphalia as typical West-German old-industrial heartland and Saxony as the main industrial location in the Eastern Länder – reveal the complexity and diversity of institutional approaches and the main challenges for future regional industrial policies in Germany.

**Keywords:** cooperative federalism, SME policies, regional development instruments, public-private partnerships

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## 1. Introduction

### 1.1. *The Concept of Industrial Policy in Germany*

In contrast to other European countries, industrial policy never served as an explicit policy field in Germany. Due to the *ordo-liberal* concept of a social market economy, which had great influence on economic policy after World War II, economic structures should emerge and develop according to pressures by market and competition. Thus, the main tasks for governments to support industrial development should be restricted to antitrust policy, basic public infrastructures and civil (commercial) law without direct intervention into economic structures.

In the following we understand industrial policy as any kind of direct or indirect government intervention to influence the development and structure of manufacturing sectors. By using this definition, we identify three major fields of economic policy in Germany, which refer to different objectives of public intervention into markets, but cause influences to the manufacturing sectors as main addressees:

1. policies to cope with market failures in the context of research and development (R&D) caused by limits to privately exclusive access to scientific and business knowledge,
2. policies to overcome specific restrictions to market access and strategies for small and medium-sized economies (SME), and
3. policies to promote economic and social cohesion between the regions, institutionalised by the Joint Task "Improving regional economic structures, agricultural economy and coast protection" of the Federal State and the Länder.

Therefore, the analysis of industrial policy in Germany will follow these three main fields of governmental influence on manufacturing sectors. The institutional organisation of these policy fields is affected by the constitutional definition of Germany as a federal state. Originally, the Länder had the exclusive competence and obligation for economic policy. Only in those cases, where the equivalence of living conditions or the need for common rules is affected, rules and interventions on the federal level should be justified and necessary. With time, interpreting this constitutional rule for the division of political competencies caused different specific forms of cooperation, coordination and competition between the federal and the Länder level, which are important to understand the impact of policies on the manufacturing sectors. The following report will deal with two main features in this context:

1. the specific organisational structure of policies in those three fields mentioned above including different forms of cooperation between federal and Länder level, and

2. major strategies and instruments of those policies and their impact on industrial development.

The next section will introduce into basic empirical data on industrial development. We will take a look at the picture on the federal level as well as at regional disparities, which reached a new dimension with unification and the breakdown of the economy in Eastern Germany, and finish this section with a brief overview to basic historical developments in the policy fields described. In the second part of the report, organisational aspects of industrial policies in Germany are presented. This refers to the share of responsibilities between Federal State and Länder and basic elements of R&D, SME and regional development policies. The third section includes two case studies to get a closer look at "industrial policy in action". We analyse elements and impacts of industrial policies in two German regions, North Rhine-Westphalia as the former old-industrial heartland of West Germany, affected by intensive challenges of structural changes, and Saxony, as the most industrialised region in Eastern Germany with a long tradition of manufacturing sectors. Finally, these findings will lead to some evaluative remarks on the German case, connected to conclusions for the share of responsibilities in European industrial policies between central and regional level.

### 1.2. *Empirical overview to the relevance of industrial development for the German economy*

#### 1.2.1. Germany as a whole

During the last decade, Germany had to cope with declining dynamics of economic growth, making it to the country with lowest rates of GDP growth in the EU in 2001 (European Commission, 2001). Increasing problems of structural and long-term unemployment, lower tax revenues, financial deficits in wage-based social systems and increasing rates of insolvent firms can be observed. Behind this general picture, a look at the development of single sectors reveals an intensified structural change. Between 1991 and 2000, more than 3 million workplaces were lost in the manufacturing sectors, while more than 3.5 additional employees have been counted in the services sectors (see Chart 1, Federal Statistical Office Germany, 2002). Within the services sectors, finance and business services show the strongest growth rates in net product during the 1990s. Despite problems of separation between activities in the manufacturing and (business) services sectors, empirical data confirm that services activities within industries have grown faster in the 1990s than the traditional industrial products.

Chart 1: Net Product Shares of Different Sectors (in %) (Federal Statistical Office Germany, 2002)

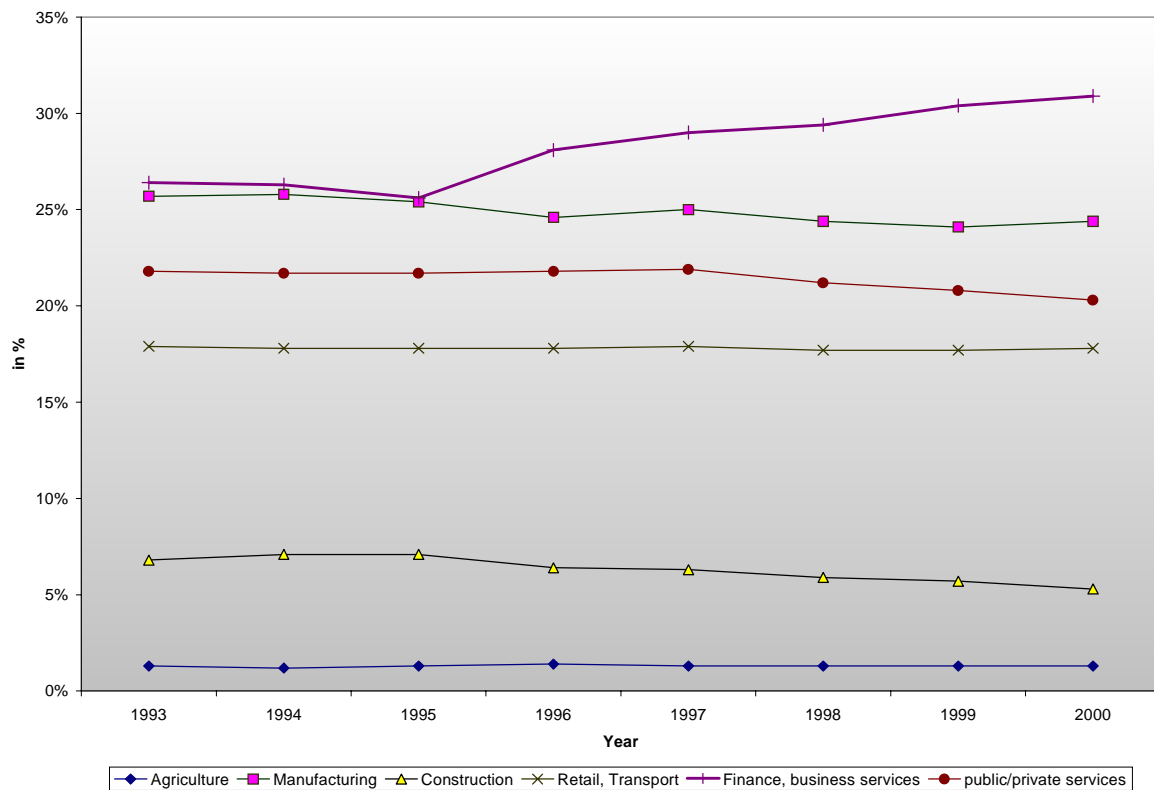
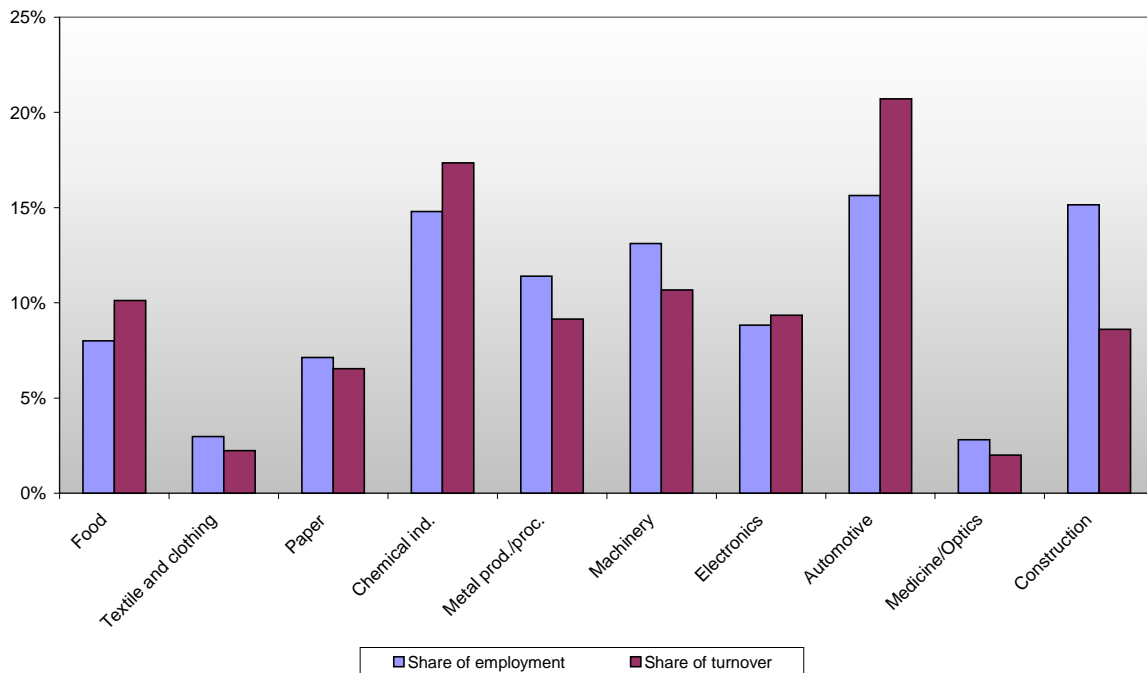


Chart 2: Structure of German Manufacturing Sector, 2000, in % (Federal Statistical Office Germany, 2002)



Within manufacturing sectors in Germany, dominant industries are still automotive, chemical and mechanical engineering industry (Chart 2). These industries have been the dominating manufacturing

sectors referring to net product, employment and export for the last decades<sup>1</sup>.

<sup>1</sup> See for a discussion of sectors where the German economy obtains a position as “lead market” Beise, 2002.

They are also the most important sectors looking at the innovative capacity of German economy, as they are the strongest contributors to R&D investments and patents (ZEW, 2003). But during the last decade, the relative position between these three industries has been changed. The automotive sector increased its share in R&D investments and exports of the German economy, while the importance of the chemical industry has been decreased. In particular, intra-industrial structural changes within chemical industry – increasing relevance of life sciences and specific chemicals, decreasing relevance of basic chemical production – caused this development. The German mechanical engineering industry is characterised by a comparatively high share of specialised SME with high global market shares in niche markets. These companies, however, increasingly have to cope with challenges by internationalisation of production structures, requests of the financial sector to adapt risk management and corporate governance structures, and globalisation of sales and procurement markets. The strong position of these sectors led to a general characterisation of German economy as dominated by medium-term technological skills with strengths in adapting piecemeal improvements into already developed production processes but limits to exploit markets for new technologies.

The observation of weaknesses of the German economy in developing and exploiting advanced and leading edge technologies at the beginning of the 1990s led to several political initiatives and programmes to improve spirit of entrepreneurship especially in technology-oriented scientific fields, enhance access of new firms to important resources (e.g. capital, skills, expertise) and support internationalisation and exploitation of advanced basic scientific research. Catch-up processes of German firms in particular in ICT and biotechnology could be observed during the 1990s, but the clash of international stock markets, limits to fast application of new technologies, and general weaknesses of the German economy stopped – or at least slowed down – this development (Czarnitzki et al., 2003). Compared to US markets, German companies in the new high-tech sectors are still restricted to niche markets and too small to develop integrated market strategies.

#### 1.2.2. Industrial development in German Länder

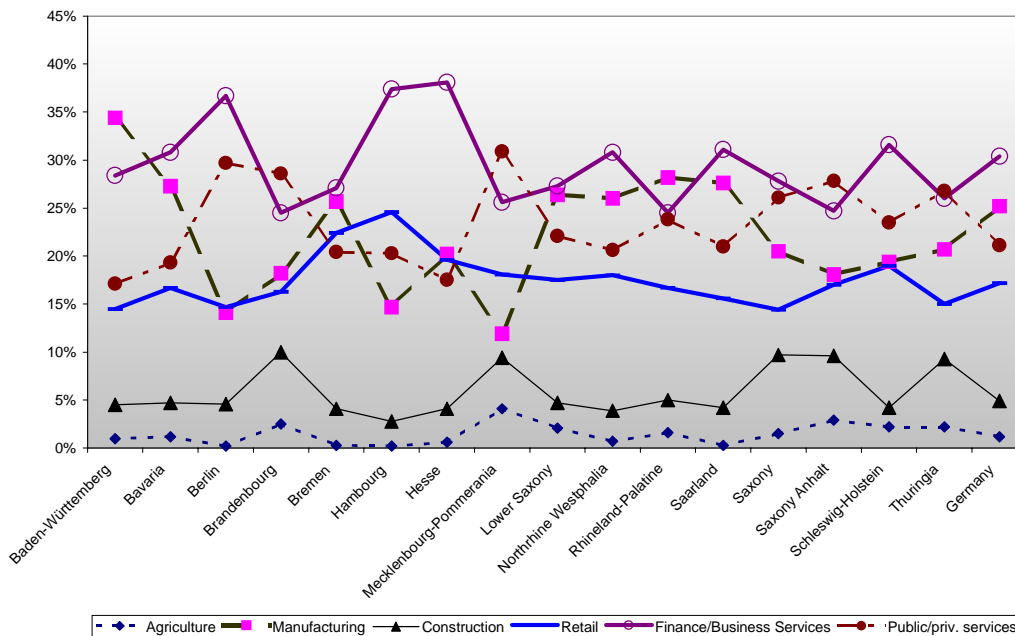
With unification, Germany was confronted with hitherto unknown economic disparities. Before 1990, Western Germany showed only weak disparities on the Länder level, mainly following a North-South division, as most of the successful companies in the (premium class) automotive sector were located in Southern Länder Baden-Württemberg and Bavaria, and many (financial) services markets were developed in agglomerations like Frankfurt and Munich. Besides this division, special regional challenges had been caused in old-industrial regions with high rates of

structural and long-term unemployment and limits to adapt skills and qualification patterns as well as infrastructures. The Ruhr area in one of our region of investigation (North Rhine-Westphalia) is the most prominent German example. Chart 3 illustrates the disparities in structure of net products between the Länder. Baden-Württemberg still has by far the strongest contribution of manufacturing sectors, with Bavaria still above the average of German Länder. Looking at the distribution of business services in space, agglomerative regions have the highest shares of net product.

With re-unification, a new East-West division emerged. The per-capita GDP of the Eastern Länder (Brandenburg, Mecklenburg-Pommern, Saxony, Saxony Anhalt, Thuringia) reached only less than 50% of the Western part, productivity was far below Western standards, and the economic organisation within largely diversified, state-owned companies with guaranteed employment caused necessities to restructure. Thus, all of Eastern Germany became Objective-1 regions within the European Union (Karl, 2000). Within the 1990s, many of the original industrial sites were closed down. In particular in those Länder with high share of industrial activity, the share of employment in manufacturing sectors decreased stronger than in the Western Länder. This process was accelerated due to negative developments in the construction sector, where bad overall economic performance and limits to investments in private housing and public infrastructure caused rapid increases of bankruptcies. Investments by industrial companies, in particular from dominating sectors in Western Germany (automotive, chemical industry, mechanical engineering), but also in the electronic industry, paved the way to new production structures and the emergence of new clusters. These internationally competitive industrial locations, however, are only local or regional exceptions, while many other regions face challenges by emigration of young and highly skilled citizens and lack of attractiveness within international competition between industrial investment locations. The contribution of industrial sectors to net product in all Eastern Länder is far below the average, with Saxony and Thuringia highest at 20% (Chart 3). Simultaneously, the relevance of public and private services for the net product is in the Eastern Länder higher, as many public schemes of employment are settled in these sectors.

This process of restructuring, however, has been described as a “normalisation” and adaptation of the Eastern Länder to the economic structure of the rest of Germany (Berthold, Drews, 2001). By increasing investments in R&D, building up new industrial clusters with a large share of SME and a strong orientation to advanced industrial expertise and export, in particular Saxony seemed to be on the way to a smaller but internationally competitive manufacturing sector. In 2002, the export rate of the

Chart 3: Net Product Share of Sectors - Regional and Federal Level in 2000  
(Federal Statistical Office Germany, 2002)



economy in the Eastern German Länder was 22%, twice as high as in 1996, but still only half as high as in Western Länder like Lower Saxony and Bavaria (Chart 4).

In the beginning of the 1990s, growth rates in the Eastern Länder were higher than in the Western Länder. Redistributions by social security systems, transfers by federal government and public investments in infrastructure promoted this early

boom. After 1996 growth in the Eastern Länder decreased and was in the following years below the Western level. Unemployment rates rose during the 1990s and still exceed those in the Western Länder by far (Chart 5).

In 2000, per capita GDP of the economically strongest Eastern Land, Saxony, was still below 73% of the per capita GDP in the economically weakest Western Land, Rhineland-Palatine (Chart 6 and 7).

Chart 4: Export Rates and Investment Rates in German Länder in 2002 (BMWA, 2003)

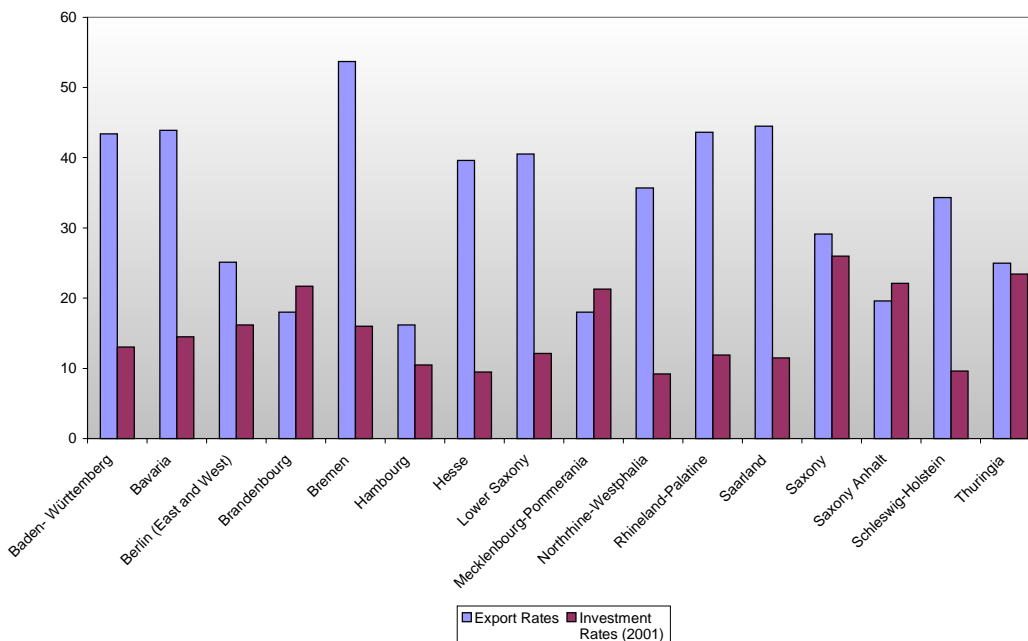


Chart 5: Unemployment Rates in German Länder, in % (German Employment Agency, 2003)

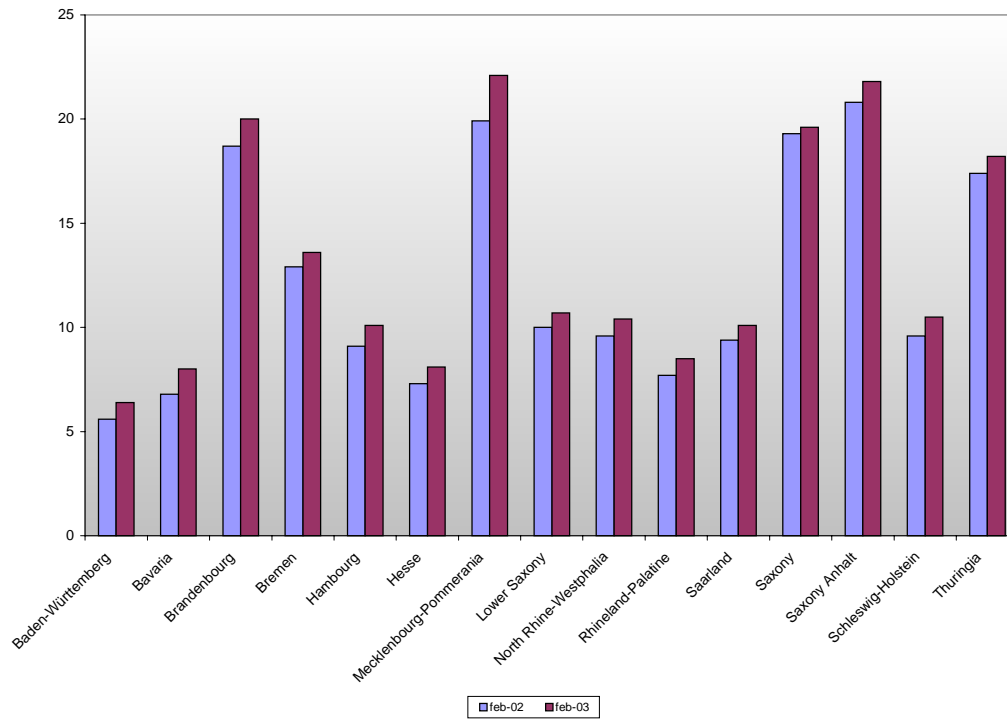


Chart 6: GDP per capita in German Länder 2000, in thousand DM (Federal Statistical Office Germany, 2002)

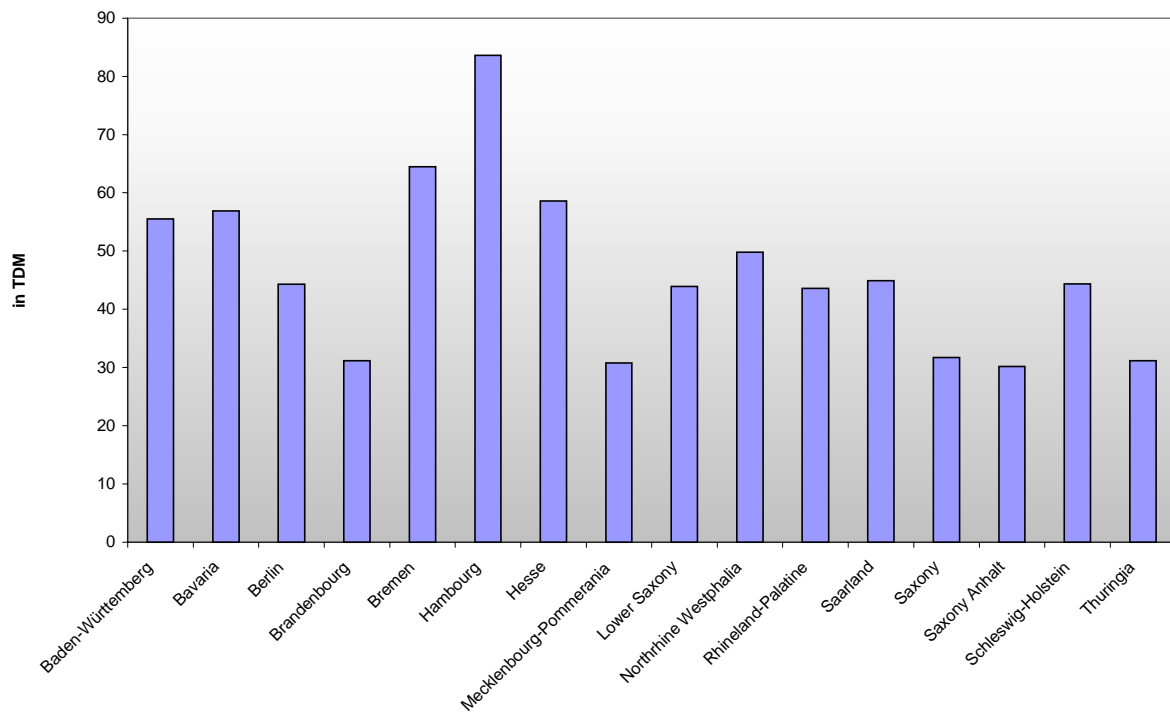
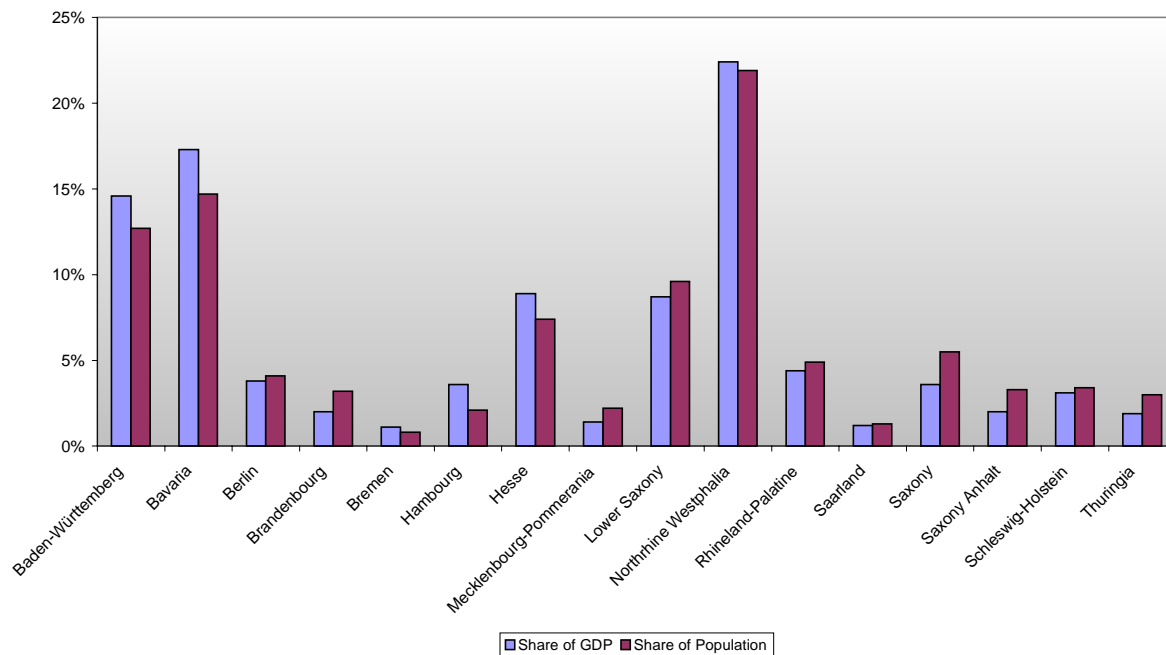




Chart 7: Share of GDP and Population on the Länder level, in %, in 2000  
(Federal Statistical Office Germany, 2002)



Summing up, German economy is still affected by consequences of unification. East-West disparities are still the dominant pattern of regional economic differences. But behind these general threats to the objective of equivalent living conditions in space, four regionally specific challenges can be observed:

- economic restructuring in old-industrial regions with obsolete location factors and difficulties to adapt,
- economic restructuring and development in former industrial heartlands of Eastern Germany with backlogs in commercial R&D and infrastructures,
- economic restructuring in rural areas, where former location advantages of lower wage costs have been eliminated by internationalisation, and
- economic restructuring in successful southern industrial regions to obtain excellence in international competition.

The case studies will especially deal with the first two challenges. Before taking a look at German industrial policies in more detail, some historical lines are presented to highlight path dependencies in content and structure of these policies.

### 1.3. Historical development of German industrial policy

After World War II, the most urgent tasks of economic policy referred to the availability of energy, food and basic materials for the population (Kokalj, 1994; Peters, 1977). Besides this provision with general infrastructure, private markets should be the major process of coordination with public authorities

as guardians to secure openness of markets and protection against dominating big companies. Economic policy to enhance conditions for entrepreneurship and to eliminate location disadvantages should be carried out by Länder governments. With these general constitutional and political guidelines, specific patterns of German industrial sectors emerge (Owen-Smith, 1994; Soskice; Hall, 2001, Katzenstein, 1987):

- the comparatively high share of specialised industrial SME,
- the spatial diversification of industrial activities,<sup>2</sup>
- the close connection between financial and industrial sectors,
- the concentration of corporate R&D to specific applied research,
- the comparatively low share of private equity, and
- the high level of qualification with dual system of vocational training.

Additionally to this market-economy approach of industrial policy, specific support was given to the development of large-scale technologies, e.g. nuclear energy, aerospace and aircraft, and to SME to overcome difficulties of access to financial capital, e.g. by funds of the European Recovery Programme. Occasional observations of weaknesses in the industrial development caused further corrections to this policy.

<sup>2</sup> Exceptions mainly refer to heavy industries like coal and steel mining with their specific dependence on location factors. See for a closer look at spatial patterns of industrial employment, Bade; Niebuhr, 1999.

*First*, increasing regional disparities in economic performance as well as in capabilities to attract industrial investments, led to request for more interregional compensation and federal support. First sectoral crisis with increasing unemployment in old-industrial regions intensified this demand. In 1969, the constitution was changed to implement a Joint Task of Federal State and Länder to improve regional development, agro-economic structures and coastal protection (GRW). This system of interregional redistribution was later integrated into the system of European Funds for Regional Development and – after 1990 – extended to cope with the specific regional challenges of unification.

*Secondly*, weaknesses of German companies in the development and exploitation of advanced technologies led to first programmes of technology policy on the Länder level in the early 1970s, accompanied by federal initiatives to increase application and economic relevance of advanced public basic research. Activities within these programmes have also been integrated into research framework programmes on the European level, where similar objectives have been followed (Starbatty; Vetterlein, 1994; Grande, 1996).

*Finally*, insights in the specific weaknesses of SME to be involved in commercial R&D projects and the relevance of absorptive capacity in SME to exploit new scientific knowledge caused a reorientation of governmental programmes on the federal and the Länder level. Intermediaries like technology transfer-centres, incubators or network moderators are especially supported (Benzler; Wink, 2000). Funding criteria do not solely refer to excellence of innovative ideas or exploitation of new markets, but also to emergence of clusters and networks and the integration into regional development. Industrial and professional organisations and public-private cooperation play an important part within the policies to support SME.

With these three processes, changes in the organisational structure of responsibilities between federal and Länder level can be observed:

- increasing centralisation within regional economic development policies due to the need to formal coordination between federal state and Länder (and EU Commission),
- increasing competition between innovation policies on the local and Länder level with only formal coordination within joint commissions, and
- parallel structures of SME support on the federal and Länder level.

Processes and content of these policies will be described in more detail within the following section. The analysis will always follow the same structure. First, a brief overview to the rationale and organisation of the policy field will be given.

Secondly, main instruments and financial inflows will be presented. Finally, some information on evaluative experiences will be introduced featuring institutional structures – in particular coordination between federal and Länder level –, incentive compatibility and observable impact on industrial development.

## 2. Institutional organisation of German industrial policy

### 2.1. SME Policies

Since post-war period, SME have always been a specific target group for economic policies.<sup>3</sup> These activities were not concentrated on specific sectors and therefore no explicit industrial policy. Due to the important function of specialised manufacturing SME for regional economic development, however, industrial structures have been affected by these policies. There is no single programme especially dedicated to SME policies but a wide range of different approaches within different policy fields attempting to strengthen SME.<sup>4</sup> Instruments cover exemptions from regulation as well as direct or indirect financial support.<sup>5</sup> Federal and Länder governments have their own instruments and organisations to support SME. There is no overall division of responsibilities. On the federal level, we will have a closer look at the ERP-Activities as incumbent and diversified approaches of SME policies.<sup>6</sup> On the Länder level we will try to give a general overview to different approaches of direct financial support.

Why are SME – at least rhetorically – such an important target group in German economic policy? Four reasons have been mostly used (Klemmer et al., 1996; Federal Ministry for Labour and Economics [BMWA], 2002):

- asymmetric difficulties to attract necessary resources for growth processes,
- higher risk proneness due to dependence on single products and persons,
- importance for regional development due to less mobility than multinational firms and greater willingness to social responsibility, e.g. apprenticeships, and
- relevance for competition in domestic and foreign markets.

<sup>3</sup> The definition of the federal ministry for labour and economics counts all companies with a turnover below 50 mill. € and a number of employees below 500 to this group.

<sup>4</sup> SME programmes can be found in labour market policy as well as in environmental or defence policies (Klemmer et al., 1996).

<sup>5</sup> Currently, many initiatives to reduce bureaucratisation have been justified by arguments to support SME.

<sup>6</sup> There are also many SME-related elements in R&D and regional development policy, which will be included in the following sections on those specific policy fields.

During the last years, SME face worse market conditions, as internationalisation led to more competition and the need to diversify locations, requirements of financial markets call for new ways of risk management and the acceleration of innovation processes cause new challenges for the exploitation of new knowledge (Klemmer, 1997; Klemmer et al., 1996). Thus, design and contents of SME policy instruments had to be adapted.

On the federal level, financial support is particularly granted by ERP funds. After World War II, the US European Recovery Program (ERP) – the “Marshall Plan” – supported the recreation of (West) German industry (Kokalj, 1994). Supported firms had

to pay for the goods by fuelling a fund at German Federal Bank. This fund has been used to offer SME primarily low-interest loans. Between 1993-1999, 400,000 loans have been given with a total amount of € 49,4 Billion (Prognos, 2001). Currently, six main areas have been supported by this fund (BMWA, 2002):

- private equity,
- start-ups,
- SME, which are located in GRW regions, but do not get direct support by GRW programmes,
- environmental investments,
- innovation investments,
- venture capital.

Chart 8: Distribution of ERP to Single Programme Areas, 2000 (BMWA, 2002)

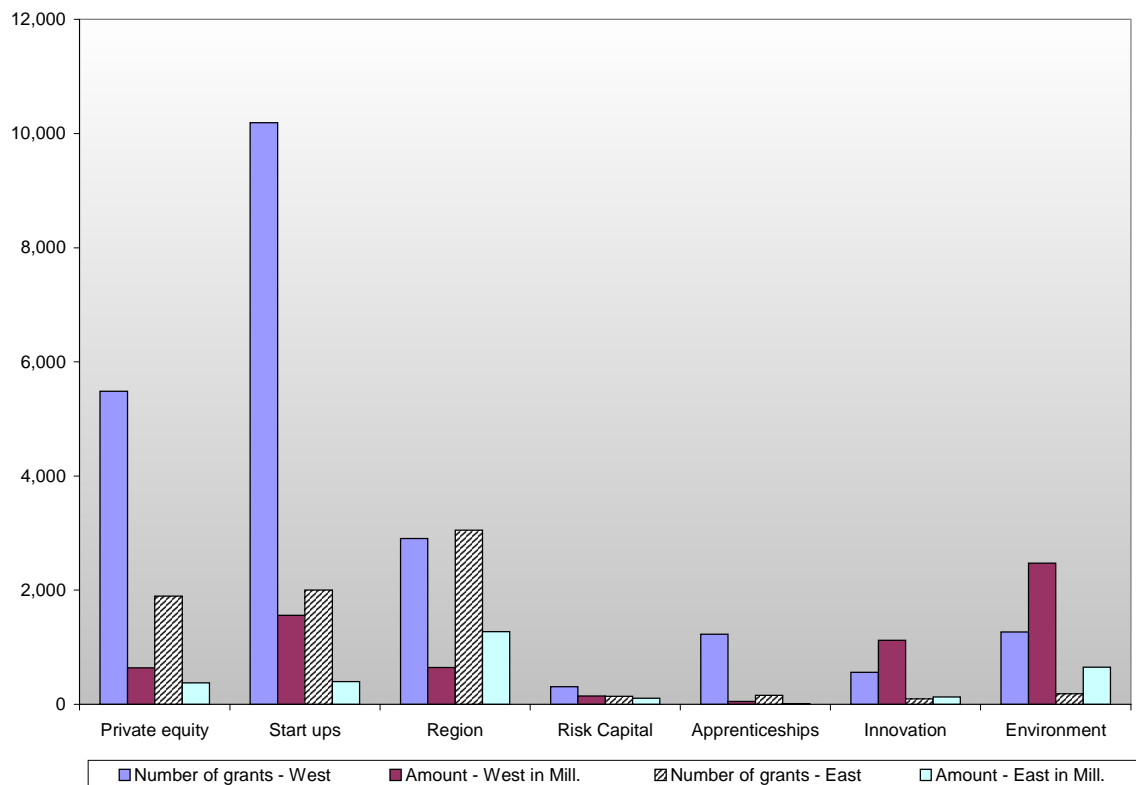


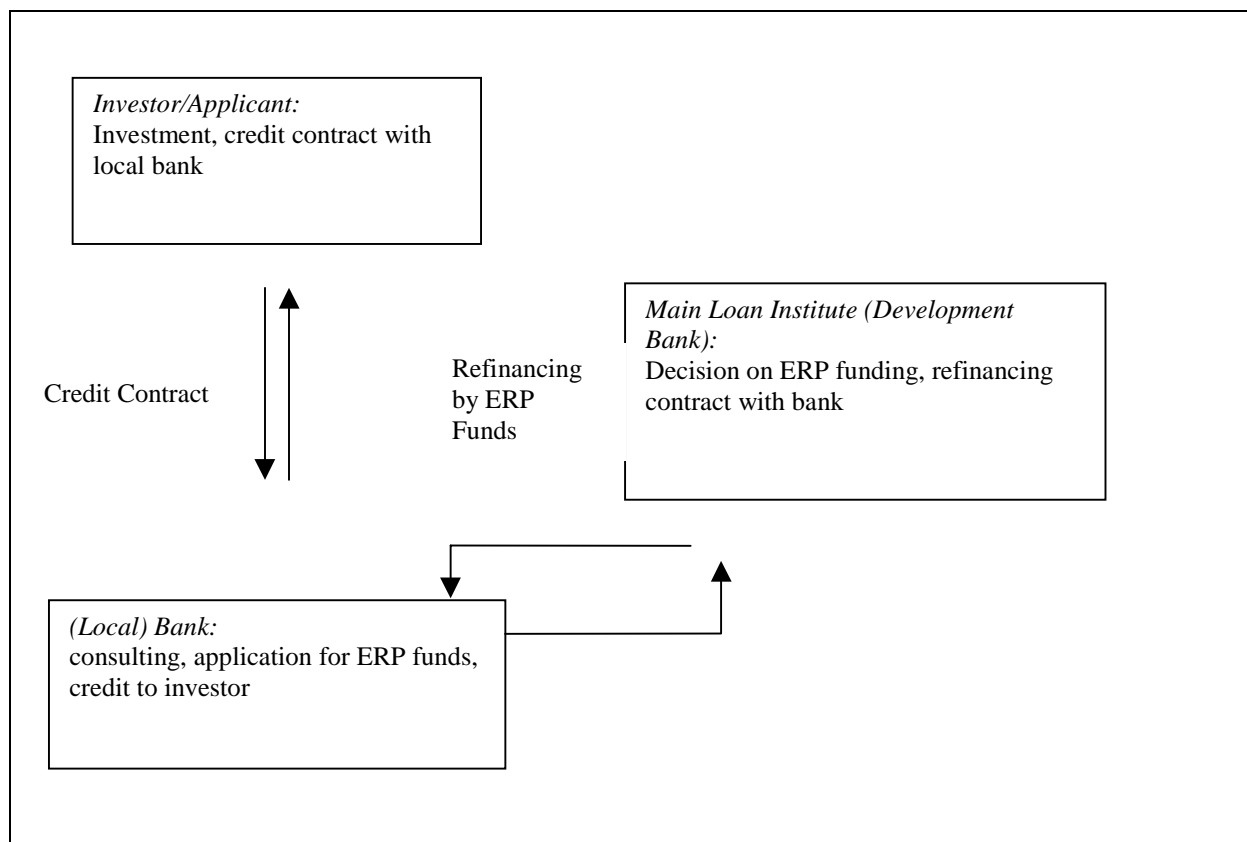
Chart 8 illustrates the allocation of the fund to the different areas. In West Germany, start-up programmes are still the most relevant type of support. Due to bad economic climate and problems on private stock markets, the amount of money for these projects decreases by 26% compared to the year before. Most of the start-ups belong to retail and business sectors. It

has been estimated that more than 300,000 workplaces were secured or created by this support. Priorities of support to SME in manufacturing sectors can be observed in those ERP elements that are directly designed for Eastern German companies or are mostly used by Eastern German firms.

The regional distribution of the support mirrors the spatial pattern of industrial development. The highest share (13.6%) of the money went to companies in Baden-Württemberg with priorities to innovation and private equity projects, Bavarian firms are the most important addressee for innovative venture capital projects and Northrhine-Westphalian firms are particularly supported by environmental and start-up projects. In the Eastern Länder, most of the money went to SME in GRW regions, as all Eastern regions belong to supported areas. This support had been

restricted by new EU guidelines. Therefore, it decreased in 2000 by more than 30% compared to the year before. Most important addressee of ERP money in Eastern Germany was Saxony with priorities to regional and private equity support. While most of the supported firms in Western Germany stressed that their support served to speed up and extend investment projects, for Eastern German firms the public support was a crucial prerequisite for even think of the investments.

Illustration 1: Implementation Process of ERP Support



SME can apply for these low-interest loans via their local bank (Illustration 1).<sup>7</sup> This system is particularly attractive to German SME with close connections to their local bank, which organise all financial activities of the SME and serve as an important source for information and consulting. This special relationship between bank and SME (*Hausbanksystem*) leads to preferential access of the bank to internal data and influence on business strategies (Owen-Smith, 1994). Within the last decade, the share of private banks within ERP projects has been continuously decreasing and was mainly concentrated to large projects, while

savings banks and local cooperative banks gained importance (Prognos, 2001). Alternatively, SME can apply directly to state-owned Development Banks, which run these and related programmes. In 2003, the two main state-owned Development Banks for financing SME and start-ups – *Kreditanstalt für Wiederaufbau* (KfW) and *Deutsche Ausgleichsbank* (DtA) – merged to the so-called “KfW-SME Bank” (*Mittelstandsbank*). These banks are able to design tailor-made combinations between their own modules of SME support and pure federal instruments.

SME are not only supported by funds. During the last decades, a diversified system of associations and programmes emerged improving the access of SME to technological and business expertise, networks of companies along and beyond the value chain, and

<sup>7</sup> See for a closer look at the implementation process (initiation and consulting, application, realisation and repayment), Prognos, 2001.

international markets. Important nodes in this system are the sectoral and professional associations like the Federation of Engineering Industries (VDMA), Society for Chemical Engineering and Biotechnology (DECHEMA), or the Association of German Engineers (VDI). Typical examples of cooperation between self-organised private institutions and public authorities are organisations like the Rationalisation Committee of the German Economy (RKW) and programmes like TOP (*Transfer von Wissen; Optimieren von Prozessen, Praxis erleben*). RKW was founded in 1921 by entrepreneurs like Werner von Siemens and served as a think tank and knowledge network particularly for SME. Companies are member of the Committee. Governments, trade unions and employers' associations are involved into the organisation as partners. The organisation is present at the Länder level by sovereign associations. RKW offers consulting, organises programmes for further education, supports pilot research projects and serves as an information broker for SME. Furthermore, the organisations at Federal and Länder level are involved into the implementation of public programmes. TOP is a programme funded by the Federal government and fees of private participants. Companies invite decision-makers of other companies to present their experiences and solutions in the context of innovative processes, business strategies or new technologies. Common learning processes, the diffusion of benchmarks and the emergence of networks of practice are important objectives of these activities. In 2003, almost 100 hosts invited 21,000 visitors in Germany. Since 1997, European Commission funded network projects between national TOP initiatives.<sup>8</sup>

The Länder run programmes to support SME on their own. These programmes cover a wide range of different approaches and instruments (ZfgK, 1996ff). The most common instruments refer to

- information and consulting against the background of new requirements to risk management by rating agencies and risk assessment within Basle II Accord,
- low-interest loans,
- public guarantees to reduce the risk of private banks, and
- secondary equity loans.

Secondary equity loans are comparatively new instruments of SME policy. They belong to so-called "Mezzanine-Capital", which are hybrid forms of financing investment between conventional loans and active venture capital (Rothgang et al., 2003; Gereth, Schulte, 1992). Secondary equity loans allow the inclusion of a loan into the liable equity, which is important for most German SME, as they have comparatively low rates of private equity and difficulties in attracting credit capital. These gaps

between credit capital and financing requirements are particularly relevant for SME in manufacturing sectors, as capital intensity is in most cases higher than in the services sector. The success of these instruments is still uncertain, as many SME and promoting agencies are not familiar with them and the SME have to accept higher interest rates than for conventional subsidised loans. Compared to UK and US, the use of mezzanine instruments in Germany is still far lower and less diversified. Details on single instruments are given within the case studies.

Like the federal government, Länder use state-owned Development Banks as intermediaries to implement or support SME programmes.<sup>9</sup> The Länder are shareholders of the bank, and close links exist between the regional Ministries of Economic Issues and the Development Banks.<sup>10</sup> Due to pressure by the European Commission, a separation between commercial and mainly public objectives will have to be implemented within in the banks in the next years.

Looking at the impact of SME policies on federal and Länder level, four lines of argumentation can be observed in the literature:

1. impact on the number of start-ups and equity structure of supported firms,
2. problems due to low transparency of programmes and responsibilities on federal and Länder level,
3. doubts on the accuracy and efficiency of single instruments, and
4. doubts on the impact of intermediaries on the competition on financial markets.

(1) Evaluation studies show that instruments like secondary equity loans or state supported venture capital increase the private equity rate of supported firms (Kampmann; Lorenzen, 1998; Prognos, 2001; Rothgang et al., 2003). As many SME reveal difficulties in improving their private equity rate – due to long time until considerable increase of assets, high commercial risks and dependency on single persons and products –, these instruments increase the probability of survival of the SME. Furthermore, additional supply of information and consulting, connected with public campaigns to show the attractiveness of entrepreneurship, lead to new awareness of opportunities and risks of managing SME. Many start-ups have been motivated by expectations of high future profits through IPO, and the number of start-ups decreased sharply after the crash of private stock markets (Rammer, 2002). Within the software industry, however, as one example for high-tech industrial development with diversified applications in different industries, the start-up rate in 2001 was still almost 70% higher than in 1997. Many of these start-ups have been promoted and

<sup>8</sup> TOP has been introduced in several European countries and Canada.

<sup>9</sup> Further partners are the RKW.

<sup>10</sup> The other shareholders are in most cases local savings banks and indirectly local municipalities and districts.

consolidated by public programmes and requirements for solid business plans. This impact has to be differentiated between East and West Germany. While in East Germany, start-up rates are still comparatively low and have only weak ties to industrial networks, many programmes on federal and Western Länder level improve the access of new firms to already existing networks and expertise. This observation confirms the impression that financial and consulting support by ERP projects can only affect the performance of SME additionally while location and in-firm factors mainly determine the capability to survive and expand.

(2) SME programmes and instruments can be found both on federal and Länder level in many different policy fields, and they are run by different organisations (Klemmer et al., 1996). For SME, it is very difficult to identify, which programme suits best to their needs and how to apply successfully. Despite many private and public suppliers of consulting to the different programmes, the uncertainty on the success of application and administrative burdens deter in particular small

and incumbent SME, whose managers miss the routines with supporting infrastructures and are keen on being independent. Attempts like the supply of the Federal Ministry for Economics and Labour to collect all relevant programmes within one common pool available on the Internet (*Förderdatenbank*) are important steps towards more transparency, but not complete (Wilson; Souitaris, 2003). Further attempts to increase transparency refer to the merger of Federal Development Banks to a “KfW-SME Bank” creating an image of one specific institution (“one stop shop”) for all aspects. Competitors, however, on private and Länder level complain on restrictions to competition for SME financing. As a result of this multitude of different programmes and suppliers, design and amount of many projects depend on personal contacts and non-intended flows of information.

(3) Connected to the problem of a multitude of different instruments, the question of accuracy and efficiency of single instruments has to be posed (Chart 9, 10 and 11).

Chart 9: Average employment effect per project, 1996-1999 (Prognos, 2001)

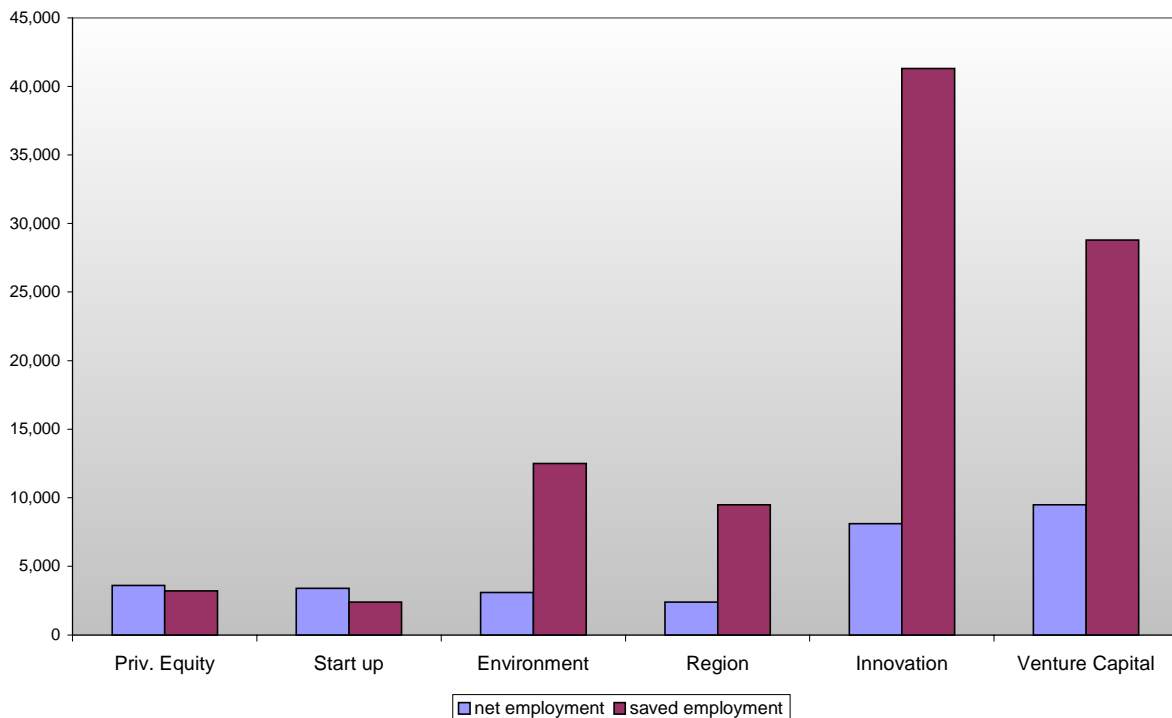


Chart 10: Annual Growth Effects of ERP in Single Sectors, 1996-1999, in % (Prognos, 2001)

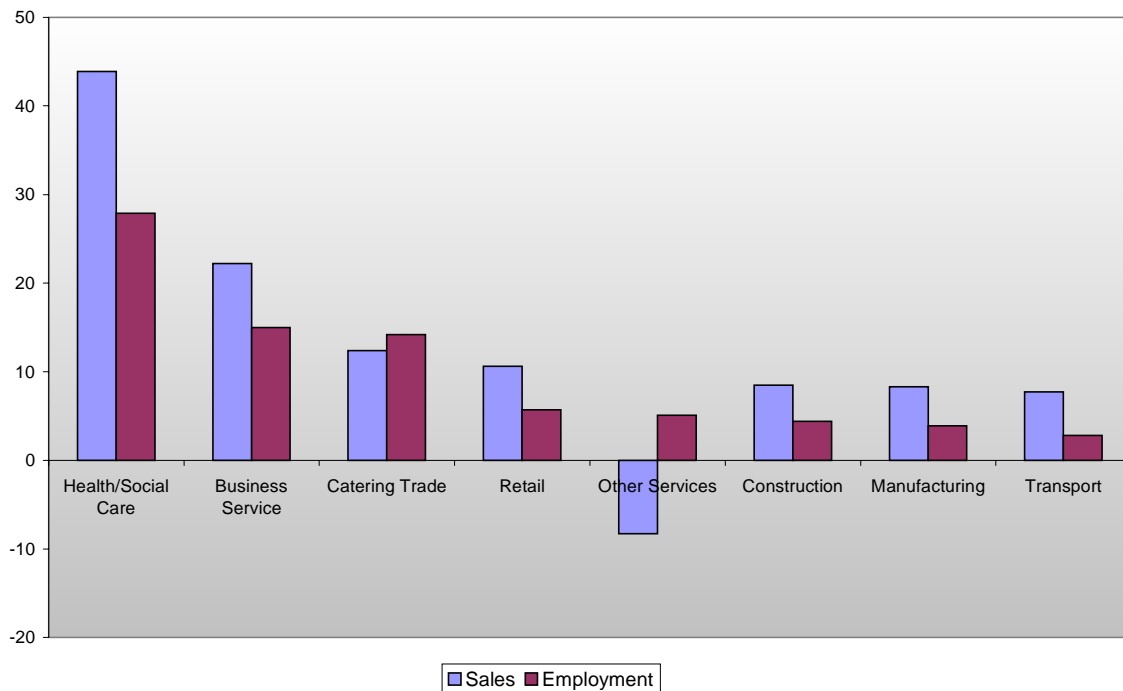
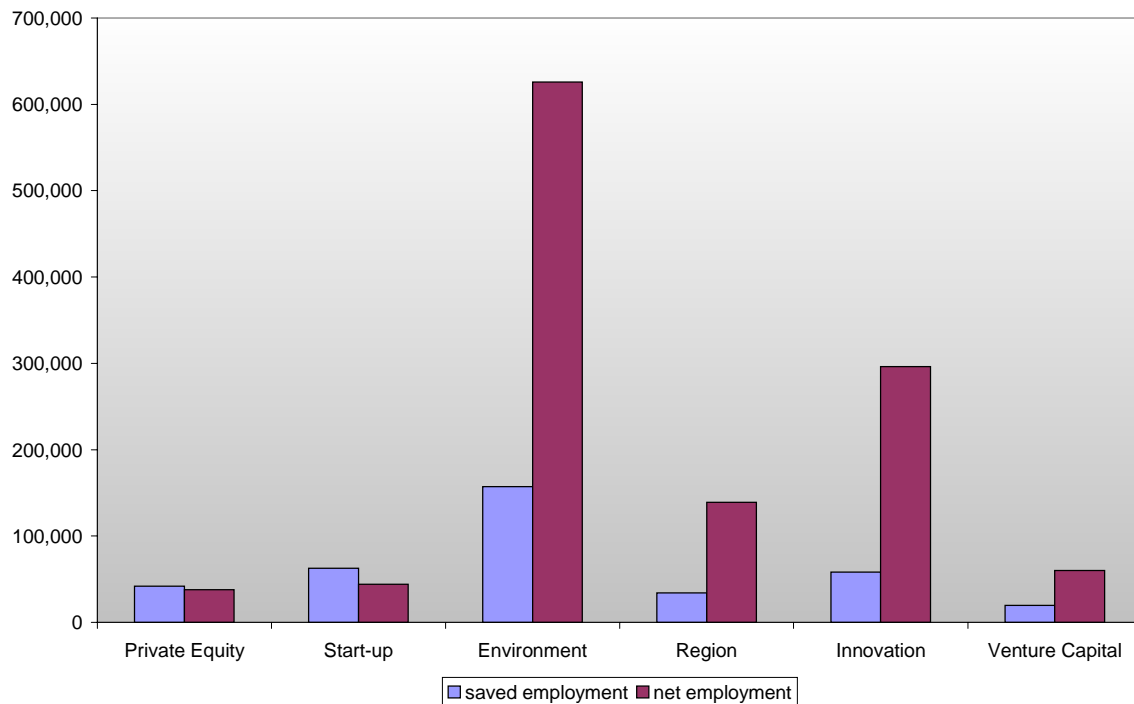


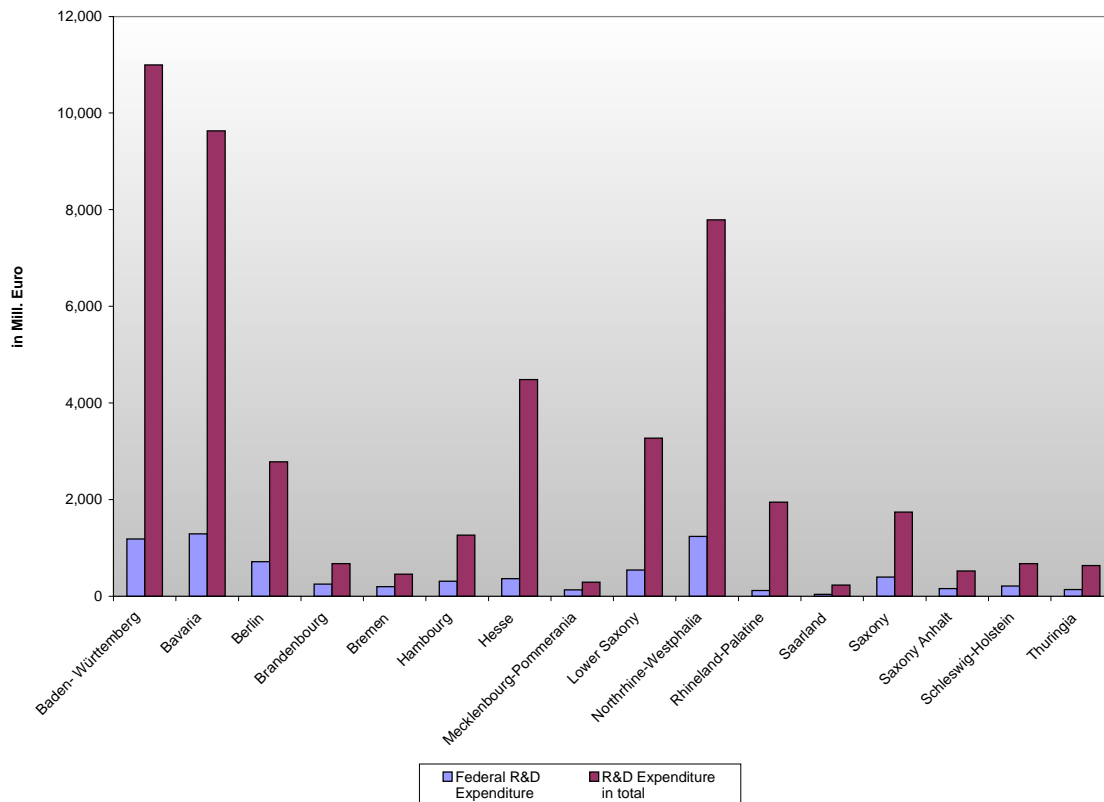
Chart 11: Subsidisation per workplace, DM/employee (Prognos, 2001)



The situation of SME differs according to sectors, regions, market development and in-firm resources. Evaluation studies show that firms with higher shares of private equity and with comparatively higher numbers of employees are less dependent on public support, and the employment and sales effects for these firms are lower (Prognos, 2001). Therefore, opportunistic

exploitation of public schemes cannot be excluded in these cases. Furthermore, there are considerable differences in the assessment of the instruments by the SME. For most SME, low interest loans are still the most attractive and important way of support. Venture capital and the new mezzanine instruments are not so highly valued, as many SME managers are not familiar with these

Chart 12: R&amp;D Expenditure (Performance of R&amp;D) by Land in 1999 (BMBF, 2002)



instruments, and there are uncertainties on the positive effects (Rothgang et al., 2003). Within the near future, however, the changed environment of financial markets with new requirements on risk management will lead to an increasing use of these newer instruments. In general, evaluators recommend a concentration of support to few, but accurately designed, instruments and better criteria for selecting firms.

- (4) One specific aspect of German SME policy is the decisive role of coordination between state-owned Development Banks managing the public programmes on the one hand side and private or local banks serving as close advisors to the SME management on the other. This system is challenged by two main structural changes. Firstly, internationalisation of financial markets caused strategic changes in the private banking sector. Many banks reduced their credit volume available for SME and the intensity of their consulting, while many local and cooperative banks jumped into this gap and gained importance for these firms (Prognos, 2001). Future will show, whether new requirements of risk management by Basle II Accord and changes in the German financial market will make it harder for SME to get attractive credit conditions.<sup>11</sup> If this would be the

case, it is argued that Development Banks will have an increasing responsibility to overcome credit shortages. Secondly, the increasing intensity of influence by state-owned banks on federal and Länder level on the development of single sectors and regions makes it more difficult to distinguish between necessary intervention to overcome market failure by private markets and politically motivated crowding-out of traditional local, cooperative and private market structures. A clear separation between additional support to cope with specific problems of SME and public intervention into functioning markets is still missing.

## 2.2. Innovation policies

Within German innovation policies, shifts of priorities and paradigms can be observed during the last decade (Kuhlmann, 2003; Schmoch et al., 2000). In general, the justification of innovation policies refers to characteristics of knowledge as public good leading to private under-investment in R&D. As a reaction, a diversified system of public and private R&D emerged (Chart 12), consisting of public infrastructure into basic research (Max Planck, Blaue Liste, universities), infrastructures for applied research (Fraunhofer, Universities of Applied Science), and private R&D funded exclusively by private companies or partly funded by governments (Kuhlmann, 2003).

<sup>11</sup> Against the background of the bad economic performance of the German economy, some authors assume a situation of „credit crunch“, when even an expansive monetary policy does not improve the provision of companies with credits.



Chart 13: R&D Expenditure (Performance of R&D) by West German Länder (incl. Berlin) in 1999 (BMBF, 2002)

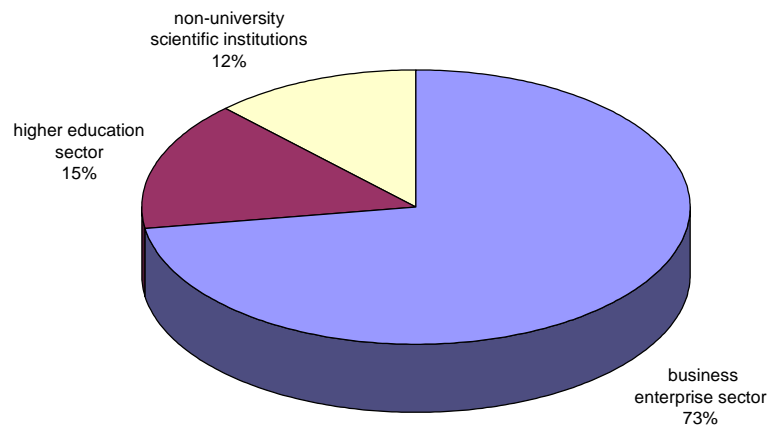
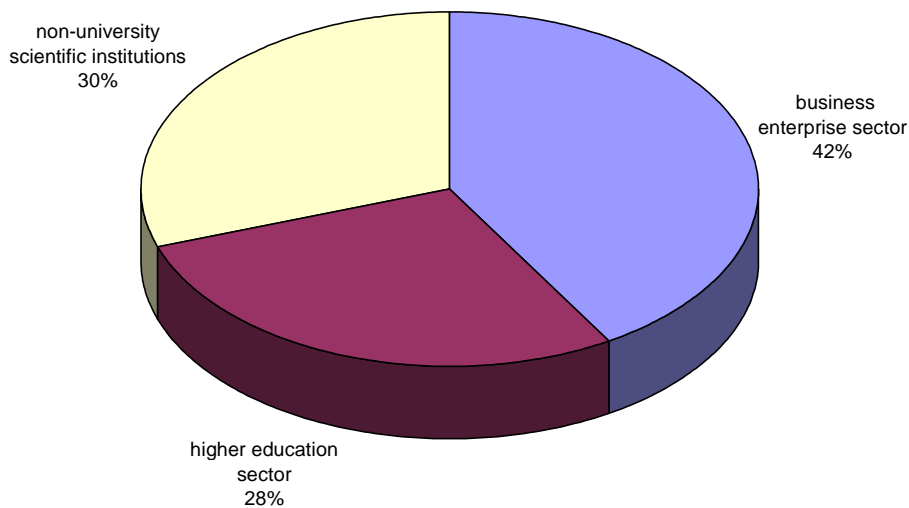


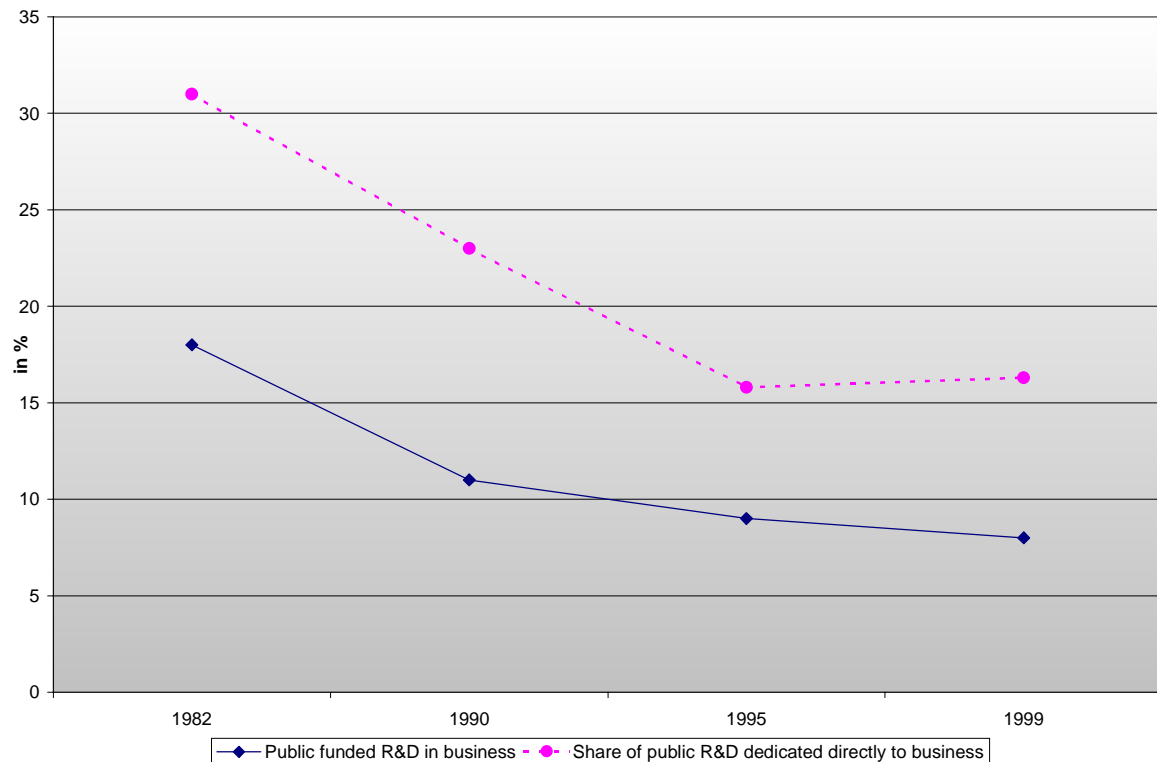
Chart 14: R&D Expenditure (Performance of R&D) by East German Länder in 1999 (BMBF, 2002)



Within R&D sector there is a remarkable difference between East and West German Länder. While in West Germany the business enterprise sector performs approx.  $\frac{3}{4}$  of R&D activities dominate in Eastern part of Germany the higher education sector and non-university scientific institutions the R&D engagements (Chart 13 and 14).

Public institutes for basic and applied research are funded by Federal and Länder budgets with the federal budget as main financial source for big research organisations like Max-Planck Society, Fraunhofer Society, and Helmholtz Society. Federal and Länder governments jointly fund university infrastructure with Länder sovereignty on all conceptual issues.

Chart 15: Share of Business R&D within Public R&D Funding Programmes in Germany  
(Czarnitzki et al., 2003)



During the last years, Federal and Länder governments change the design of funding for basic and applied research organisations. Instead of annual budgets to obtain the organisational organisations (institutional support), parts of these annual budgets have been used for competitions between the institutes or departments on single programmes and projects (Kuhlmann; Bühler, 2000; Benzler; Wink, 2002). Criteria of impact on industrial development – e.g. licenses sold to companies, joint research projects or number of spin offs – are important parameters within these competitions.

Public funding of private R&D in companies has become less and less relevant in Germany (Czarnitzki et al., 2003). In 1999, public governments (federal, regional and local level) invested 16 billion € in R&D, mostly in public organisations of basic and applied research. 16.3% (2.6 billion €) went to private companies. The public sector funded 33% of all R&D investments in Germany, the lowest share after World War II. This decreasing relevance of public-funded R&D is mirrored in the share public of investments into R&D going to private companies, decreasing from 31% in 1982 to 16% in 1995 and since then more or less constant (Chart 15).

The share of public budgets within private R&D falls as well from 18% in 1982 to 8% in 1999.

Compared to other industrialised countries, Germany is in this context far behind countries like US, UK, France and Italy,<sup>12</sup> whereas Japan is at the bottom of an OECD ranking (Chart 16 and 17).

The share of total R&D (public and private) to GDP was in 1999 2.5%, a small increase to years before due to more private investments, but far behind the 3.0% objective of the EU Summit in Lisbon.

As already mentioned, 2.6 billion € went from public budgets to private companies. 2.2 billion € of this money was coming from federal budget with 1.1 billion € from Ministry for Defence and 0.5 billion € from Ministry for Economics and Ministry for Education and Science each. The most common instruments used on the federal level are:

- direct R&D investments (mostly used by Ministry for Defence),
- direct funding of R&D projects within sectorial programmes,
- indirect, but specific R&D support within certain technology fields,
- sectorial R&D support for civil aircraft construction by the Ministry for Economics, and
- indirect instruments of R&D support.

<sup>12</sup> The high shares of the first three countries are explained by the strong relevance of investments by the departments for defence.

Chart 16: Percentage of R&D Expenditure Financed by Industry and Government, 2000 (OECD, 2003)

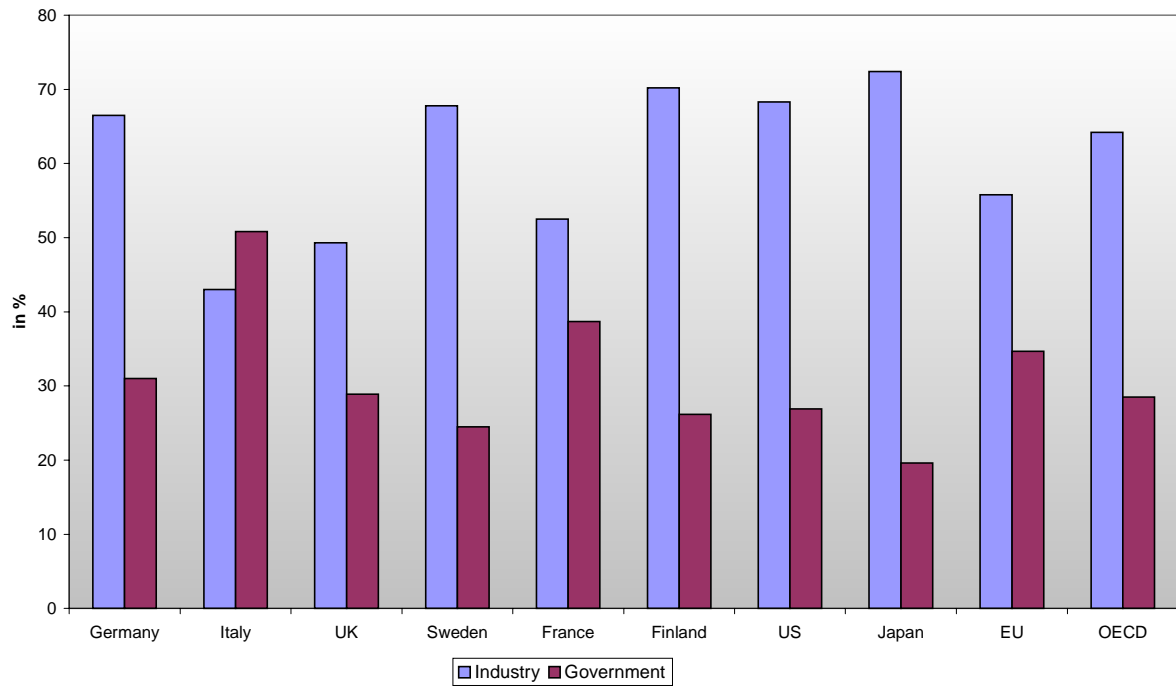
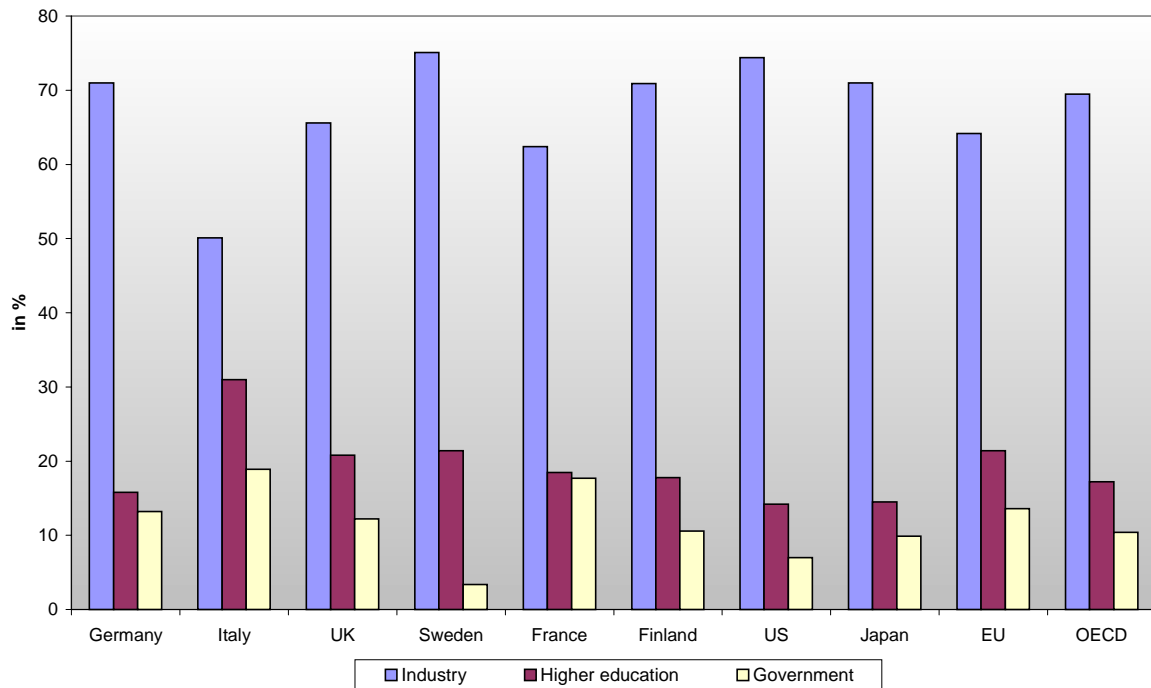


Chart 17: Percentage of R&D Expenditure Performed by Industry, Higher Education and Government, 2000 (OECD, 2003)



All of these instruments are used to fund directly specific projects or researchers.<sup>13</sup> Between these instruments, structural changes can be observed. Instruments of direct support are still the dominant form of funding, but their share decreased within the 1990s continuously. In particular, during the last years, public military R&D has been reduced, while public direct civil R&D had been reduced sharply between 1982 and 1991, and since then their share increased only modestly. This negative development was mainly caused by reductions of subsidies to huge technological projects for nuclear, fossil and other sources of energy, transport and mobility and space. Instead, smaller projects within information technology, biotechnology, micro-system application and production research gain more importance. For industrial SME, this shift of budget priorities creates new opportunities to be promoted, as the capital intensity of those technologies, which are nowadays mainly supported, is considerably lower.<sup>14</sup> Considering the sectorial distribution of R&D investment and the relative importance of the single sectors, it can be observed that those sectors where the technological competitiveness of German industries in the international context and the R&D investments of German firms are highest, public R&D programmes are least relevant (Czarnitzki, 2003).

In contrast to this, the share of so-called “indirect activities of R&D support” increased during the 1990s dramatically.<sup>15</sup> Most of this increase is caused by the dominant utilisation of indirect instruments in Eastern Germany, while the utilisation of these instruments in Western Germany only modestly increased since 1995. This group of instruments, starting from R&D cooperation, R&D projects and personnel in SME, technology-oriented start-ups to technology transfer and innovation, covers a wide range of single instruments. In 1999, 430 million € have been used for indirect activities to support R&D on the federal level with support of R&D cooperation and technology-related start ups as most common forms. One of the most established instruments of supporting R&D cooperation, in particular important for industrial SME, is the so-called “Industrial Joint Research” within the Working Group of Industrial Research Associations “Otto von Guericke e.V.” (AiF).<sup>16</sup> Here, industrial SME got the opportunity of working together with public research institutes, developing common routines of communication and research and using this experience to look for joint research projects beyond this organisation. This instrument is comparatively cheap for the taxpayer, as only public researchers are partly subsidised, while the companies had to pay for themselves. This enforcement of sharing responsibility to the research projects serves as

an incentive to the SME not just only to utilise public money opportunistically but also to look for future developments for their own advantage. Chart 18 presents an overview to the indirect R&D funding activities by the Federal Ministry for Economics and Labour. We will turn to the other mentioned instruments later in this section.

Competitive elements have not only been realised by a shift of money from institutionalised funding of public basic research institutes to funding of thematic programmes where research institutes have to compete for funding. Another way to force competition into innovation policy was the implementation of contests between regions to build up appropriate concepts and networks to develop new technological fields (Kuhlmann, 2003). These contests follow two main arguments of innovation economics. Firstly, they reflect the necessity of competition to create incentives to mobilise the superior knowledge of researchers, companies and other regional actors and to overcome asymmetric distributions of knowledge between public funding principal and R&D agent. Secondly, they take into account the relevance of interaction to enhance the knowledge base within a region (or sector). Not only one researcher has to be promoted but structures that help researchers in public institutions and companies to build up absorptive capacities and create incentives to share and improve knowledge (Cappellin, 2003; Koschatzky et al., 2000). Therefore, networks are funded. One prominent example in this context is the BioRegio Contest, which was implemented by the Ministry for Education and Science in 1997.<sup>17</sup> This contest not only pushed the finally selected five regions to look for new concepts for the development of their biotechnological sectors, but also those regions who were not successful but at least got the experience how to mobilise social capital and interaction for an autonomous development. Positive experiences encouraged the Ministry to introduce further contests in different fields of technologies (Kuhlmann, 2003). The Ministry for Economics and Labour got its own programmes to improve networking between academia and SME by using contests. The most important programme for industrial SME in this context is PRO INNO (PROgramme INNOvation Competence SME).<sup>18</sup> Its objective is the enhancement of technological competence of SME by reducing entry barriers of SME to R&D and supporting cooperation between SME and research institutes. Most of the supported firms are coming from mechanical engineering, medicine, measurement and control engineering technologies, more than half of them are in the Eastern Länder.<sup>19</sup>

<sup>13</sup> Investment grants and tax credits as instruments to promote R&D have been abandoned in 1992.

<sup>14</sup> High shares of SME have been reached in research programmes for micro-system technology, biotechnology and production technology. See for the bias favouring larger companies within the traditional instruments of direct R&D funding Klodt, 1998.

<sup>15</sup> In 1999, the budget used for these instruments was 2.5 times higher than in 1990.

<sup>16</sup> See for more detail Blum et al., 2001, Klemmer et al., 1996.

<sup>17</sup> Regions had to present concepts for the regional development of bioscience sectors and their market exploitation. Five winner regions got 100 million DM (Dohse, 2000).

<sup>18</sup> Another programme in this context is InnoNet, aiming at networks to exploit knowledge and specific project support for young SME in Eastern Germany.

<sup>19</sup> Companies in Western Germany get 35% of expenditures (Berlin 40%; Eastern Germany 45%), research institutes up to 75% with a maximum of 270,000 DM per project. See for more detail Blum et al., 2001.

Chart 18: R&D Funding within Indirect Business Supporting Activities, in million DM (Blum et al., 2001)

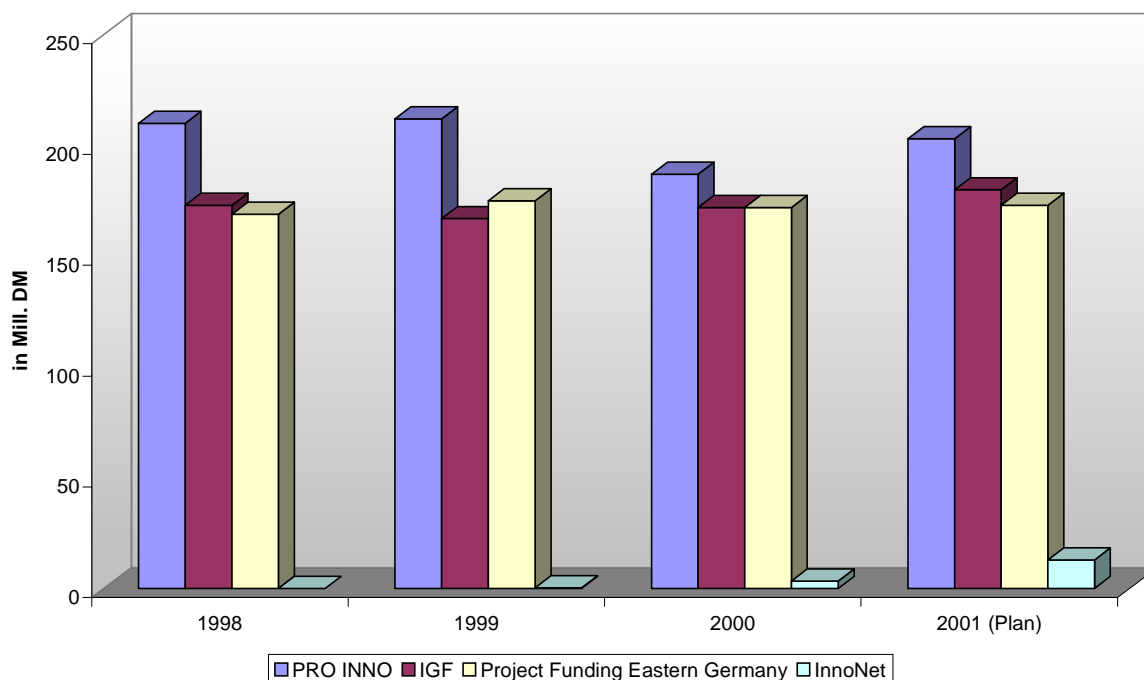


Table 1: Examples for areas of Federal-Länder interaction (modified taken from Wilson, Souitaris, 2002)

INTERNAL TO GOVERNMENT	EXTERNAL
<p><b>Innovation infrastructure</b></p> <ul style="list-style-type: none"> <li>▪ Federation-Länder Commission for Education Planning and the Promotion of Research</li> <li>▪ Planning Committee on Higher Education Building</li> <li>▪ Standing Working Group on Multimedia</li> <li>▪ Standing Conference of Land Ministers for Education and the Arts</li> <li>▪ Bundestag-Bundesrat Mediation Committee</li> <li>▪ Publication of regular budget and policy papers</li> </ul>	<ul style="list-style-type: none"> <li>▪ Science Council</li> <li>▪ Main Committee of the Federal Institute for Vocational Education</li> </ul>
<p><b>Promotional programmes</b></p> <ul style="list-style-type: none"> <li>▪ Committees and Working Groups of officials</li> <li>▪ Standing Conference of the Land Economics Ministers</li> <li>▪ Publication of regular budget and policy papers</li> <li>▪ Federation-Länder Planning Committee and Sub-Committee on Regional Economic Infrastructures</li> </ul>	<ul style="list-style-type: none"> <li>▪ Ministry for Economics' Federation-Länder-Industry Committee</li> </ul>
<p><b>Individual projects</b></p> <ul style="list-style-type: none"> <li>▪ Terms and conditions of contracts (which forbid double public funding)</li> <li>▪ Informal contacts</li> </ul>	<ul style="list-style-type: none"> <li>▪ Informal contacts to industry</li> </ul>

Since the late 1970s the Länder developed own technology-oriented programmes (Czarnitzki et al., 2001, Tidelski, 2002). Within the federal system, there are some joint governmental decision-making procedures of federal and Länder representatives in the field of innovation policy, particularly concerning provision of infrastructures (Wilson; Souitaris, 2002). In the context of promotional programmes, more informal committees and working groups between

federal and Länder level are used to share expertise on best practises and ideas on new programmes.<sup>20</sup> Table 1 shows several examples of Federal-Länder interactions in the field of innovation policy stressing

<sup>20</sup> This informal coordination based on mutual advantages has been estimated as more stable than the more formalised way of coordination through Federal-Land Commissions. See for empirical results Wilson, Souitaris, 2002.

the intensity and diversity of cooperation based on informal and formal institutions. Within the last years, competition between the Länder increased and more and more actors (on the Länder level) look for reforms of the formalised and institutionalised system of joint decision-making procedures (Jeffery, 2002; Reinhard, 1999).

Within the innovation and technology-oriented programmes on the Länder level, a great variety of instruments can be observed. Due to budget restrictions and federal responsibility for defence and the huge technology projects (e.g. aircraft, aerospace, nuclear energy) the Länder are less relevant in the field of direct funding of R&D projects. Their focus is more directed towards physical infrastructures – e.g. technology transfer centres, science parks, or public incubators –, enhancing the access to private capital and support of innovation networks. While in the 1970s and 1980s infrastructure investments and their spatial distribution were the dominant topics for Länder and local governments (Sternberg, 1989; Staudt et al., 1994), their attractiveness decreased due to lack of demand by start-up and industrial companies, deficits of regional integration and ongoing dependence of the firms on public funding (Benzler; Wink, 2000; Sternberg et al., 1997). Instead, two main fields have been developed during the last decade. Firstly, the intended promotion of sunrise industries with bright future perspectives should not only be supported by physical infrastructures, but also by soft factors like access to regional innovation networks, consulting services and better access to capital markets. Secondly, incumbent firms, in particular SME, should be encouraged to invest in R&D. Restricted access to financial markets due to the higher risks of R&D projects and low private equity of SME has been seen as a major barrier for SME to R&D.

Therefore, instruments already mentioned in the context of SME policies like low-interest loans, venture capital and mezzanine instruments are used to cope with this problem (Kampmann; Lorenzen, 1998; Rothgang et al., 2003). The design of the instruments differs between the Länder according to the industrial structures and institutional settings. Small and metropolitan regions primarily use instruments, which combine lower interests with stronger standards of R&D progress (qualified repayment schemes) and increase the number of individually specific elements within their promotional programmes. Again, state-owned Development Banks play a key role as important intermediary institutions offering consulting and financing services. Further details on the instruments in use will be given within the case studies.

As in the context of SME policies, the impact of German innovation policies on industrial development has been assessed controversially. These assessments have to be seen differentiated according to different

fields of innovation policies:

1. distribution of responsibilities between federal and Länder level,
  2. public basic and applied research,
  3. direct R&D promotion,
  4. indirect activities to promote R&D, and
  5. physical infrastructures.
- (1) Two criticisms refer to the share of responsibilities between federal and Länder level. Firstly, the joint commissions and committees restrict competition between Länder on certain areas of infrastructure, e.g. higher education. The willingness to restrict competition between Länder is particularly rooted in the objective of “harmonised living conditions between the German regions”, which will be expressed in more detail in the next chapter. Secondly, parallel activities on federal and Länder level reduce the transparency of promotional options to the addressees, in particular to SME (Klemmer et al., 1996). Parallel funding in all Länder for similar fields of technology, e.g. the attempts of all Länder to be Biotech or Multimedia-Location, causes inefficient utilisation of money, while re-distributive systems between the Länder reduce incentives for critical proofs of efficiency (Benzler; Wink, 2002). Opposed to these critical views, the increasing competition between the Länder to attract R&D research and exploitation capabilities caused new ideas within innovation policy.
- (2) Germany has an established system of diversified basic and applied research. Against the background of new challenges by globalisation and changes within knowledge production, this system has been evaluated during the last five years (Blum et al., 2001; German Science Council, 2001; Federal-Länder-Commission, 2001; Kuhlmann, 2003). For most of the research organisations, this evaluation process meant also an opportunity of (re-)defining their role within the system of public research in Germany. Besides discussions on scientific excellence, the exploitability and exploitation of the knowledge produced in these organisations was a crucial topic for the evaluation. Institutional reforms in this context refer to changes of Intellectual Property Rights, organisations to exploit patents out of the university or other parts of the public research system, or incentives for spin-offs out of research institutes. It has been doubted whether these reforms really improve the exploitation of new knowledge (Blum; Müller, 2003). In many fields of basic research where final application depends on sales to public or partly public demanders, e.g. biotechnological medical treatments, defence technologies, limited public budgets threat to

restrict the attractiveness for national and international researchers (see e.g. Cooke, 2003).<sup>21</sup>

- (3) Direct promotion of private R&D is still the instrument with the highest amount of money spent by public governments. Nevertheless, the efficiency of these investments has been doubted. In general, any direct promotion causes problems of asymmetric distributions of information – adverse selection and moral hazard – leading to opportunistic behaviour by suppliers in those sectors, which are attractive for politicians. The concentration of investments to technologies with high capital intensity causes a strong bias favouring larger companies (Klodt, 1998). In those sectors with dominant public demanders, e.g. defence technologies, limited competition prevents the emergence of internationally competitive company structures. Only recently, a greater diversity of technologies supported by direct promotion facilitates the market entry of SME and increases competition (Czarnitzki et al., 2003).
- (4) The indirect activities of R&D promotion have been assessed as comparatively successful (Blum et al., 2001; Dohse, 2000). In particular, the introduction of contests improved the incentive structure and long-term effects of public subsidies considering the need of interactive networks and systemic structures to enhance and exploit the knowledge base. Considering the multitude of single instruments on the federal and Länder level, a concentration on certain instruments has been recommended. Public support always should only work as a means to enhance the prerequisites of new initiatives. The commitment of subsidies to certain milestones and degressive funding are therefore important elements within this group of instruments.
- (5) Nearly every municipality or district in Germany has now at least one technology transfer-centre, science park or business development area. Evaluations of these infrastructures, however, reveal that only few of them really meet the expectations. In particular, infrastructures in rural areas do not attract enough demand to achieve the expected output of continuously renewed industrial expertise. Instead, they have to cope with empty spaces or low fluctuation within the centres. Inter-local or interregional competition further impedes the coordination of sectoral priorities or the cooperation with research institutes in other regions. Due to the orientation to public salary and contract schemes, the management of technology transfer-centres often has only limited incentives to build up profit centres and improve entrepreneurial qualities within the companies supported (Benzler; Wink, 2000 with further links). Successful centres

show a clear profile, support their companies not only with physical infrastructure, but access to regional networks and connect academic and business development. Actual regional science policy aiming at the improvement of location factors for industries is still restricted to few regions where multinational companies play an important role as client within supplier chains or partner within R&D projects (Cooke et al., 2003). The current situation with restricted public budgets, limited access to private capital markets and consolidation in sectors of new technologies will lead to a stronger separation between successful and failing development models.

### 2.3. Regional policy

A constitutional objective of public policy in Germany is to promote economic and social cohesion by reducing regional disparities and creating equivalent living conditions in the regions. These fundamental targets should be achieved with the help of Territorial Development Policy (Raumordnung) and regional economic policy also affecting the location conditions for industrial firms. In line with the country's federal structure, the activities of *Territorial Development Policy* extend from the Federal Government level via the federal states (Länder) to the local government units. The headlines for the objectives of Territorial Development Policy in the Federal Republic are "sustainable development" and a "substantial reduction of disparities" between the growing and lagging regions. Therefore, territorial planning has to co-ordinate the social, economic and environmental interests in territorial development. Against this background, Territorial Development Policy can be interpreted as the political endeavour, on the basis of policy guidelines, to influence the land utilisation and settlement size as well as the distribution of the public infrastructure. The Territorial Development Policy activities of the Federal Government attempt to coordinate the relevant programmes of the various departments, because political authority with direct or indirect regional effects is allocated to different departments (horizontal coordination).

The Federal Government has no constitutional power to carry out comprehensive Territorial Development Policy (only overall orientation framework), it attempts – in collaboration with the Länder – to develop Federal Territorial Development Policy programmes, in order to gain influence on regional planning by defining general and non-binding guidelines. Vertical coordination between the Federal Government and Länder is achieved by the conference of ministers for Territorial Development Policy, which brings together the relevant ministers at Federal and Länder level. In addition to the Environment-Orientated Landscape Planning (Landschaftsplanung),

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<sup>21</sup> This might have important consequences for the pharmaceutical sector as one part of the chemical sector, which belongs to the three dominant industrial sectors in Germany.

Territorial Development Policy in Länder takes the form of so-called Regional Planning (Landesplanung) or Regional Development Planning (Landesentwicklungsplanung). Particularly, these tasks include the definition of legally binding objectives in the form of regional plans. Both Regional Development Planning and Local Government Planning are constitutionally in a position to define specific planning goals both in terms of content and location. On local government level, the authorities have the constitutional power to carry out Territorial Development Policy. This is defined in the Urban Development Planning Law (Bauleitplanungsrecht, Bauleitplanung = land utilisation plan and building scheme). Through Urban Development Planning the local authorities can influence future urban development and land use.

*Regional structural policy* in the form of the Joint Task on Improving Regional Economic Structures (Gemeinschaftsaufgabe "Verbesserung der regionalen Wirtschaftsstruktur", GRW) is characterised as an "allocative region-orientated equalisation policy" (Klemmer 1986, p. 26). It primarily attempts to reduce economic disparities by mobilising regional growth and development potential. Article 1 of the Law on the Joint Task declares that the regions whose economic development is considerably below the Federal average and which show a problematic concentration of companies with structural weaknesses must be supported (Yuill et al. 1997, p. 237 ff.). Regional economic policy is executed, as in the case of Territorial Development Policy, by the Federal Government, the Länder, and local authorities. The Federal Government and Länder are involved in the decision-making in the Joint Task, and the financing is shared equally between the Federal government and the Länder. The Länder are responsible for implementing regional economic policy. This is not embedded in a Framework Legislation established by the Federal Government, but the Outline Plan of the Joint Task incorporates the Regional Development Programmes of the Länder. Regional policy on Länder level is not restricted to carrying out the activities relating to the Joint Task, because the Länder can support regional development with different measures beside the Joint Task.

Cooperation between Federal Government and the Länder in regional policy making is achieved in the so-called Planning Committee (Planungsausschuss), which drafts the four-year and the annual Framework Plans. The committee is made up of representatives of the 16 Länder, each with one vote, and the Federal Government with 16 votes. Decisions are based on the three-quarters majority principle, i.e. the Federal Government cannot pass a resolution against the majority of the Länder. Regional economic policy on local authority level mainly consists of making sites available, developing new industrial areas, and implementing infrastructure and local taxation policy.

The local authorities are basically autonomous in the selection of their tools and the direction of their activities. However, the Länder governments attempt to gain influence on local economic policy not only through fiscal adjustment but also through the coordination of inter-authority activities.

The key characteristics of Joint Task are summarised in Table 2.

Table 2: Key characteristics of Joint Task

	Joint Task (JT)
Objectives	▪ Reduction of regional disparities (income, employment)
Instruments	▪ Financial incentives for public (infrastructure) and private investments
Co-ordination between TDP-CT	▪ Ex post
Level	▪ Federal, regional

Additionally the Joint Task considers:

- environmental policy constraints,
- cooperation with the labour market policy, and
- positive side effects on SME and technology transfer.

When an investment promises particularly positive effects on other policies' objectives, this is taken into consideration in regional economic policy at a central level. Therefore the Länder (de-central level) try to consider the positive side effects on other political objectives.

The development of the expenditures of the regional economic policy in East and West Germany for the period 1999-2001 can be summarised as follows: a total of nearly 133 mill. € are allocated to the Western Länder. Because of the serious structural problems, the budget for the new Länder, nearly 861 mill. €, is considerably higher than in the old Länder. Beginning with the 20<sup>th</sup> Framework Plan, the European Structural Funds (ESF) cover East Germany. The main fields of assistance by the European Structural Funds are (Toepel, 1996, p. 325, DIW, 1997, p. 801):

- productive private investment (25,3 percent),
- investment in economy-related infrastructure (25,2 percent),
- development and protection of rural areas and the environment (14,6 percent),
- investment in agriculture and food processing (13 percent),
- education and development of human resources (12,9 percent),
- combating long-term unemployment and facilitating the occupational integration of young people (7,7 percent).



Regional economic policy in Germany (in the new Länder since 1994) is based on the designation of specific assisted areas; and financial assistance thus depends on the seriousness of regional problems in these areas. The designation of the assisted areas of the Joint Task is based on commuter patterns (labour market regions). Since unification in 1990 the entire area of the new Länder has been a designated area. The new Assisted Areas Map, which came into effect in 1997 and is valid until the end of 1999, differentiates between two types of problem areas in the new Länder (JT 1997, 26<sup>th</sup> Framework Plan, JT 2002, 32<sup>th</sup> Framework Plan):

- A-areas are the worst-off regions of East Germany
- B-areas are also less developed regions in East Germany and Berlin, but they are considered economically stronger (Berlin, Dresden, Leipzig, Jena, Erfurt (part), Weimar (part), Schwerin, Halle, Gotha and Eisenach).

A-areas receive the highest award rates of all Joint Task areas: small and medium-sized enterprises (SME) receive a maximum of 50% investment grant, while the award maximum for firms with large scale production is 35%. In B-areas SME receive a maximum 43% and large firms a 28% investment grant. Public infrastructure investments may receive an 80% investment grant in both development areas. In contrast, problem areas in the old Länder (C-areas) can receive a maximum of 28% (SME) or 18%, so there is a preference in favour of the new Länder.

Whether regions are designated areas or not depends on a set of specific regional indicators that has been altered several times since the beginning of the Joint Task. After the most recent changes, the labour market regions are assessed using the following indicators: an infrastructure indicator, a qualitative labour market indicator (the gross annual income per employee), and quantitative labour market indicators (average unemployment rate, and the expected job development). These indicators are aggregated (weighted differently) to a global indicator. Using this indicator, the labour market regions are ranked and made designated areas. In the new Länder the A or B classification of development areas depends on different criteria. The single indicators are weighted as 40:40:10:10.

As mentioned, the Joint Task is an "allocative region-orientated equalisation policy" (Klemmer 1986, p. 26). It still primarily attempts to reduce economic disparities by mobilising regional growth.

Therefore the Joint Task offers financial assistance for private and public (infrastructure) investment. Due to interest in an increase in cost effectiveness, the Joint Task supports only basic activities. These are industry and service export activities. Nevertheless, to avoid conflicts between the European support and the Joint Task these principles are now interpreted less strictly. Therefore the orientation toward real capital support and basic activities is more relaxed, because economy-related human capital investments, some services and crafts production activities receive financial assistance too. The opportunities for R&D support and the investment assistance for non-economic infrastructure and environmental protection were improved as well.

#### 2.4. Preliminary conclusions

The brief overview to main instruments of German industrial policy illustrates the multitude and diversity of approaches and instruments. During the last years, conceptual shifts have been realised within innovation policy – strengthening capacities of networking and reducing the scope of direct contractual promotion – and SME policy with an intensification of instruments to improve the availability of private equity by development banks, while the priorities within regional economic policies have been slightly shifted towards criteria and interpretations of EFRD. But nevertheless, German industrial policy is still characterised by specificities established earlier in the last century:

- the relevance of private and public-private partnerships for networking and provision of information,
- the relevance of development banks (KfW, DtA, KfW-SME bank),
- the continuous support of certain sectors with direct R&D contractual aid (aircraft, military defence, energy), and
- the networking between private companies and public basic research institutes via Industrial Joint Research.

Table 3 and 4 show some of the basic instruments, their objectives and legal requirements. As there are a lot of different objectives defined within the programmes, the most important objectives have always been used based on official sources of ministries and associations.

Table 3: Instruments and Objectives of German Industrial Policy on the Federal level

<i>Instruments/ Objectives</i>	<i>Direct contracted aid</i>	<i>Investment grant</i>	<i>Low interest loans</i>	<i>Mezzanine instruments</i>	<i>Infrastructure</i>	<i>Information and consulting</i>	<i>Interregional contests</i>
<i>Private investments</i>		Joint Task	ERP Funds				Pro Inno, InnoNet
<i>Human resources and qualification</i>		Joint Task	ERP funds,		Industrial Joint Research, Universities, Public Basic Research (PBR) Institutes	Industry associations, TOP, RKW	
<i>SME</i>			ERP funds, KfW SME Programme, KfW programme “Capital for Labour”	Secondary Loans by KfW-SME Bank	Industrial Joint Research	TOP, RKW	Pro Inno, InnoNet
<i>Private equity</i>				Public guarantees, secondary loans by DtA or KfW		DtA, KfW	
<i>Venture capital</i>				Venture Capital Funds, e.g. TBG		Public Venture Capital Funds (TBG)	BioRegio; InnoRegio, InnoNet
<i>Innovation</i>	Public R&D contract research	Joint Task	ERP funds			Industry Associations, PBR Technology Transfer Centres	BMBW Competence Centres, BioRegio; InnoRegio, InnoNet
<i>Start ups</i>		FUTOUR (technology- oriented start-ups)	ERP funds, DtA Start up programmes	FUTOUR (technology oriented start- ups)		Business Angels	EXIST
<i>Exploitation of new knowledge</i>					PBR Technology transfer agencies, competence networks	TOP, RKW	EXIST, BioRegio, Pro Inno
<i>Networking</i>		ProInno			PBR Technology transfer agencies	TOP, RKW	EXIST, BioRegio, Bio Profiles, Inno Regio
<i>Environmental priorities</i>	Public R&D contract research		ERP funds				
<i>Regional cohesion</i>			ERP funds		PBR institutes, universities		
<i>Internationa- lisation</i>	Support of EU R&D contract research				PBR institutes	TOP Europe	
<i>Special areas</i>	Military defense, aircraft and space industry						

Table 4: Instrumental Approaches and General Legal Requirements of German Industrial Policy

	<i>Direct contracted aid</i>	<i>Investment grant</i>	<i>Low interest loans</i>	<i>Mezzanine instruments</i>	<i>Infrastructure</i>	<i>Information and consulting</i>	<i>Inter-regional contests</i>
<i>Legal Requirement</i>	Annual Budget	JT Planning Committee, EU Acceptance, Annual Budgeting	ERP Administration Law, Annual Budgeting	Annual Budgeting, Coordination with Development Banks	Annual Budgeting	Coordination with private associations, development bank laws, formal privatisation of consulting and implementation agencies	Annual budgeting

### 3. Länder programmes and initiatives – Case Studies

#### 3.1. Northrhine Westphalia (NRW)

As already mentioned at the beginning, Northrhine-Westphalia (NRW) faces specific challenges of industrial structural changes. NRW has the largest population of all German Länder (more than 17 million inhabitants) with the Ruhr Area as a core urbanised area. Between the early 19<sup>th</sup> century and the 1970ies the Ruhr Area was the industrial heartland of Germany with economic domination by large old-industrial companies from the steel and coal mining sector. As a consequence, labour markets in the Ruhr Area are still characterised by challenges of structural unemployment:

- a high qualification mismatch,
- a high share of long-term unemployment,
- a high share of older unemployed male persons,
- higher unemployment of young follow-up generation immigrants,
- retarded unemployment of female persons,
- comparatively weak role of SME as demanders for labour due to domination of large companies, and
- comparatively weak role of advanced services sector due to proximity to urban centres as Düsseldorf and Cologne.

Further problems will be caused in the near future by demographic changes, as ageing processes began earlier and are more intensive than in other German regions. Besides the specific regional challenges in the Ruhr Area, sectoral crises in different industries – e.g. textile and clothing, furniture, and automotive supply – led to severe structural changes of the industrial pattern in other parts of NRW. Thus, facilitating the transition between old industries and new sectors and developing a new industrial basis closely linked to advanced services have been identified as major tasks of NRW industrial policy. As in the sections on the Federal policy, we will have a separate look at activities in the fields of SME, innovation and regional economic policy (for the following NRW, 2002).

### SME policies

Due to the domination of large old-industrialised companies in the Ruhr Area the number of SME in NRW is lower than in other Western German regions like Baden-Württemberg. The perspective of secure jobs in large companies decreased incentives to self-employment or start-up new companies. For a long time, policies did not encourage SME and start-ups, but protect the privileges of established large companies referring to availability of infrastructures or the severity of environmental standards. With the downturn of the established sectors and companies, lack of entrepreneurship became an important deficit of industrial development in NRW.

Thus, a special focus of NRW economic policy refers to the support of SME and to incentives for start-ups and self-employment. With the help of two lead initiatives, existing and new instruments shall be connected and awareness for new priorities in economic structures shall be raised:

#### (1) Start up network GO!

Within GO! several objectives and instruments with a focus on start-ups have been concentrated:

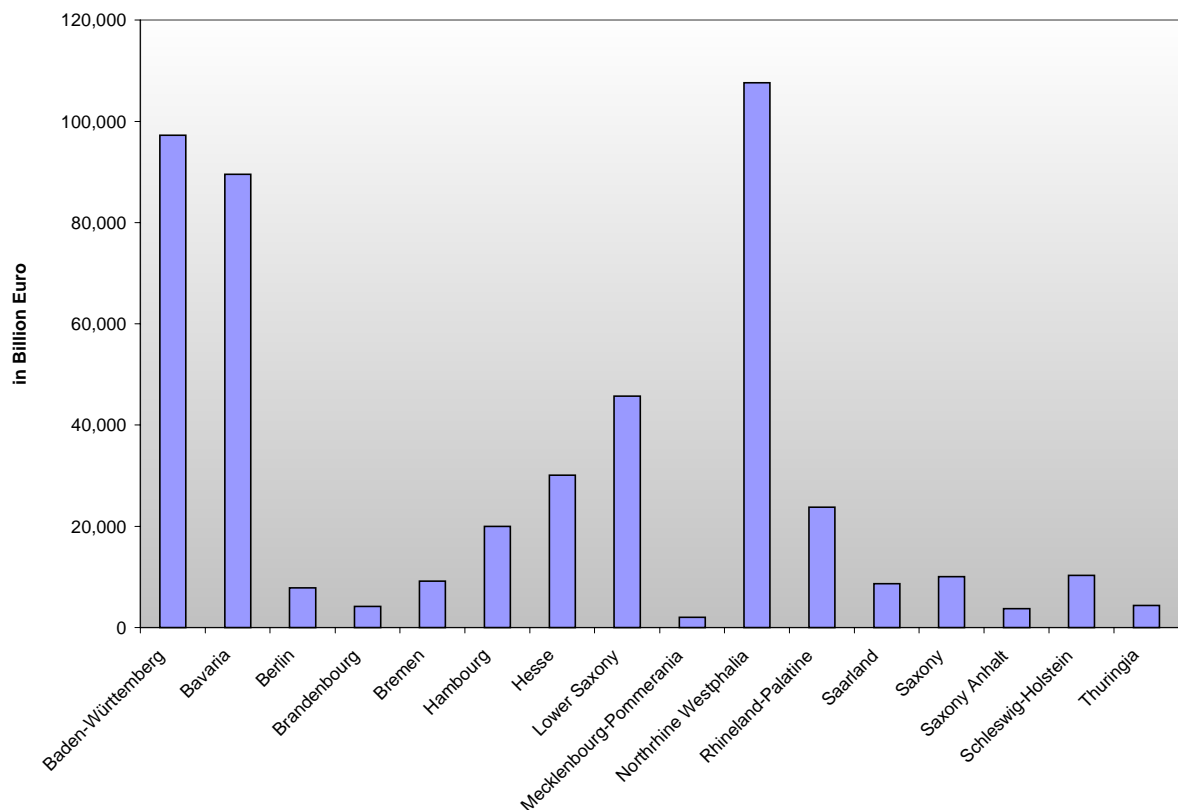
- an image campaign to raise awareness for the attractiveness of entrepreneurship and the support schemes of the Land, including advertisements, projects at schools and universities,
- a decentralised system of consulting networks at the local level, including business angel schemes and expertise by chambers and by private associations like the RKW,
- financial incentives for start-ups.

#### (2) SME Offensive MOVE

Like GO! this initiative includes different instruments and approaches to improve the conditions for SME in NRW:

- “business dialogs NRW” (*Wirtschaftsdialoge NRW*), where decision-makers of the regional ministries discuss with local decision-makers of SME on new approaches of political support,
- simplification of public administrative procedures for SME,
- access of SME to public procurement,
- concentration and streamlining the instruments of financial support to SME.

Chart 19: Export by German Länder in 2000 (SMWA, 2001)



Special priorities in the context of SME policies are laid in the fields of internationalisation and access to private equity. As NRW is the leading export Land in Germany (Chart 19) and one of the leading exporters in the world,<sup>22</sup> several instruments have been used to improve the awareness of companies to the development of internationalised markets and the capabilities of companies to present themselves in other important world trade regions:

- information events, organised together with local chambers and development agencies,
- an internet portal for international markets ([www.nrw-export.de](http://www.nrw-export.de)),
- benchmarking and best-practice contests for internationalisation of SME,
- joint representation on international fairs, and
- political support by international economic delegations to important world trade regions.

Against the background of new challenges for financing SME after the implementation of Basle II Accord, campaigns to raise awareness and improve information in the companies and new Mezzanine instruments have been introduced:

- information campaigns refer not only to events, but also to a consulting network “Initiative Quality Assurance NRW (*Initiative Qualitätssicherung*

*NRW e.V.*) of banks, accountants, consultants, companies, associations and public authorities, which aims at the development of early warning indicators to improve the risk management systems of SME,

- secondary loans serving as surrogate of private equity,<sup>23</sup>
- reduced liability within credit contracts up to 80% of the credit sum,
- guarantees by a private bank for guarantees NRW (organised by private companies and associations)<sup>24</sup> or – for guarantees above 750,000 € – by the Land government, and
- “pure-cover models”, where SME pay liability premiums to a fund, which serves to compensate risks of “lost credits”.

All these instruments of improving the private equity of SME shall be implemented with the help of a new Development Bank for Structural Policies. Due to the need of separation between the commercial parts of the NRW Development Bank (Westdeutsche Landesbank) and those parts following objectives of regional development policies, a reorganisation of the public development bank system will be inevitable and lead to a concentration to the implementation of public objectives. Besides the cooperation with NRW Development Bank, secondary loan funds and other

<sup>22</sup> According to WTO statistics, NRW exported merchandise goods and service of 116.6 billion €, and would be in a global ranking of countries on No. 14.

<sup>23</sup> A fund for secondary loans in NRW Objective 2 Regions has been implemented with 77 million € (50% NRW, 50% EU) in March 2002.

<sup>24</sup> These guarantees are backed up to 65% of the risk by Federal and Land guarantees.

Mezzanine instruments have been introduced in cooperation with one of the federal development banks (*Deutsche Ausgleichsbank*).

### **Innovation Policies**

Due to the long time of concentration to old and established industries, new universities, public Science and Technology institutes and technology transfer centres have been built up and established only during the last three decades. Against this background, one major objective of NRW industrial policy refers to the improvement of linkages between companies, public R&D institutions, technology transfer centres and consultants. Future technologies and industries shall be developed building up on old industrial expertise and the comparatively new R&D infrastructures on the local and regional level. The Technology and Innovation Programme (TIP) is a framework of diversified activities in the field of industrial innovations. "Fields of competence" serves as a buzzword to describe the NRW approach to improve network linkages between the local actors dealing with innovation and to concentrate these networks on sectors with strategic importance future and already given potential in the affected areas. For the Ruhr Area the following sectors have been identified as fields of competence:

- new industrial materials,
- micro-electronics,
- logistics,
- water supply and energy,
- design,
- mining technology,
- medicine technology,
- new chemical industries,
- IT security,
- micro-systems-technologies.

Other *lighthouse* projects refer to Cologne as metropolitan media location, the creation of life science clusters in different NRW areas (*Bio-Gen-Tec*, *HealthCare*, *MeTNet*) and the furniture industries in Eastern Westphalia (*Zukunftsinitiative Möbelindustrie*).

Due to the positive experiences of Federal government with interregional contests to overcome information asymmetries in the process of selecting R&D and networking projects, similar contests have been introduced in NRW. Examples in this context refer to the FutureContest Ruhr Area (*Zukunftswettbewerb Ruhr*) to gain new projects in the area with highest rates of unemployment, the *Initiative Secure-it* to build up IT security infrastructures and the *e-logistics contest* to gain new ideas on the development of this sector.

Besides these approaches to initiate the emergence of local clusters and networks, specific instruments offering access to capital and consulting expertise shall overcome general barriers to generation and exploitation of new technological knowledge. For

SME, the already mentioned Mezzanine instruments shall enhance their rating reducing costs of additional credits. One of the priorities within the "start up network GO!" is oriented to the prerequisites and options of university spin-offs. Additionally, the programme PFAU to cover the financial basis of university spin-offs and start-ups offers financial incentives to realise start-ups. New technological knowledge can not only be diffused to industries by start-ups and spin-offs but also by patents and contract research.<sup>25</sup> A centralised system of exploiting university patents by the development agency ZENIT GmbH shall overcome barriers to cooperation between research sector and companies.

ZENIT GmbH is one prominent example of the role of development agencies for implementing innovation strategies. Public authorities use the legal body of private companies to cooperate with private companies and associations and to bundle all implementing activities for certain programmes outside the ministry. ZENIT offers consulting expertise for SME and start-ups, runs and supports NRW innovation programmes. Other examples of development agencies run by public authorities are Projekt Ruhr GmbH or Media Cologne. A new Life Science Agency GmbH shall collect three initiatives in the fields of biotechnology, medicine technology and pharmaceutical industries and support the emergence of five clusters of competence in NRW. This new agency shall be organised as public private partnership stressing the approach of close connections between political decision-making and companies in the NRW industrial policy.

### **Regional economic policies**

Regionalisation is an important topic for NRW policies. Due to its size with more than 17 million inhabitants, devolution and strengthening capacities in smaller territorial units are objectives supported by different programmes. To make it easier to distinguish these smaller territorial units from the Länder level we will use the term "sub-regions". In the context of industrial policy, two main activities can be observed, which will be explained in the following:

- (1) implementation of European and Federal regional economic policy for old industrialised regions, supported by ERDF Objective 2,
- (2) programmes to strengthen sub-regional industrial capabilities by clustering approaches.

Due to heavy problems with the transition from old industries to new sectors, several sub-regions in the Ruhr Area and former coal mining areas around Aachen have been supported within ERDF as

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<sup>25</sup> The NRW government refers to statistics by the Institute on SME Research stating that the share of academics in the total number of self-employed persons in NRW increased by 34.5% between 1995 and 2000, while the average increase for Germany was only 13.5%.

Objective 2-Regions.<sup>26</sup> For the programme 2000-2006 public funds of 2 billion € shall be available, fuelled by EU (50%) and German budgets. Priorities within the programme aiming at the creation or protection of 138,000 workplaces refer to the following fields:

- financial support to companies and start-ups,
- innovation networking by joint initiatives for life long learning or SME takeovers,
- development of business infrastructures,
- special support to target groups with low employability.

These activities shall be coordinated with programmes of innovation policies supporting the emergence of local competence fields and gaining ideas about innovative projects via interregional contests like the FutureContest Ruhr Area. Again, the utilisation of intermediary organisations like the Projekt Ruhr GmbH is one decisive element of the implementation process. Financial support shall be connected with sub-regional capacity building and the emergence of networks beyond organisational and administrative borders. In particular, in the case of the Ruhr Area with many municipalities ignoring the advantages of cooperation (sub-)regional development policies are used to increase incentives to overcome rivalry between local representatives. Looking at the development of regional economic policies for old-industrialised regions, changes can be recognised referring to three different aspects (Wink, 2001):

- the broadening of development objectives, originally focusing on supporting real capital investments, nowadays extended to labour market and human resources policies, cultural and services developments, and cooperation,
- the shifting from project-based support to more systemic approaches with (sub-)regional development concepts, and
- the shifting of strategic focus from bottom-up regional growth investments to the emergence of endogenous growth capacities by networks, institutions and systemic linkages within the affected regions.

Besides the implementation of EU and federal programmes, NRW supports programmes to build up endogenous economic and institutional capacities in the other (sub-)regions. This kind of regionalisation follows a policy approach, which sees industrial clusters with linkages between firms of similar industrial sectors as nucleus for (sub-)regional economic development. Thus, round tables have been implemented to create incentives and fora for representatives of firms, chambers of commerce, associations of employers, and regional development agencies to look for common solutions for (sub-)

<sup>26</sup> Areas in Eastern Westphalia and Northern Eifel were supported until 2000 and still got transitional funds.

regional development problems. Joint initiatives for vocational training and further education or marketing activities in foreign markets are examples for outcomes of these round tables. As any kind of emerging clusters will take time, it is not yet possible to evaluate the performance of these initiatives. It has, however, been demonstrated that problems of this approach are caused by lacks of short-term incentives to cooperate, bureaucratic burdens due to round tables and fears of non-sustainability of these institutions.<sup>27</sup>

Summing this brief overview to approaches in NRW up, three important points have to be made:

- (1) Besides the implementation of programmes on EU and Federal level, the Land tries to define its own priorities in objectives and instruments. In particular, the determination of lighthouse technologies and sectors shall serve as a distinction to the broader Federal programmes.
- (2) Within the industrial policy, objectives and instruments have been shifted. Instead of capital investments and focusing on big multinational companies, programmes to support SME and to develop new leading-edge technologies are at the core of industrial policy.
- (3) Supportive programmes not only refer to the success of single projects or firms, but shall contribute to systemic improvements within (sub-) regions creating prerequisites for new fields of internationally competitive expertise. These changes mirror changes on the Federal and EU level but are embedded into an already existing pool of development agencies and banks.

### 3.2. Saxony

The region in our sample was under socialist regimes until 1989 and therefore was faced with the need to reorganize its economic structure and innovation systems. Saxony borders with Poland and Czech Republic. For the European Union Saxony may take over an important bridgehead function to the markets of Eastern Europe. The Free State of Saxony has the largest population (4,4 million inhabitants) and is with 242 inhabitants per km<sup>2</sup> the most closely settled Land of all East German Länder. Simultaneously Saxony is the most strongly industrialised economic region in East Germany. GDP and turnover as well as export rates and investment rates indicate the leading position of Saxony among the East German Lands (Chart 20 and 21).

<sup>27</sup> It remains an open question, whether external initiatives by policies are necessary and successful when firms refuse to organise themselves in a (sub-)regional cluster or network. See for a critique on external political initiation of clusters, networks and industrial districts Cappellin; Orsenigo (2000).

Chart 20: GDP and turnover in East German Länder in 2002 (BMWA, 2003)

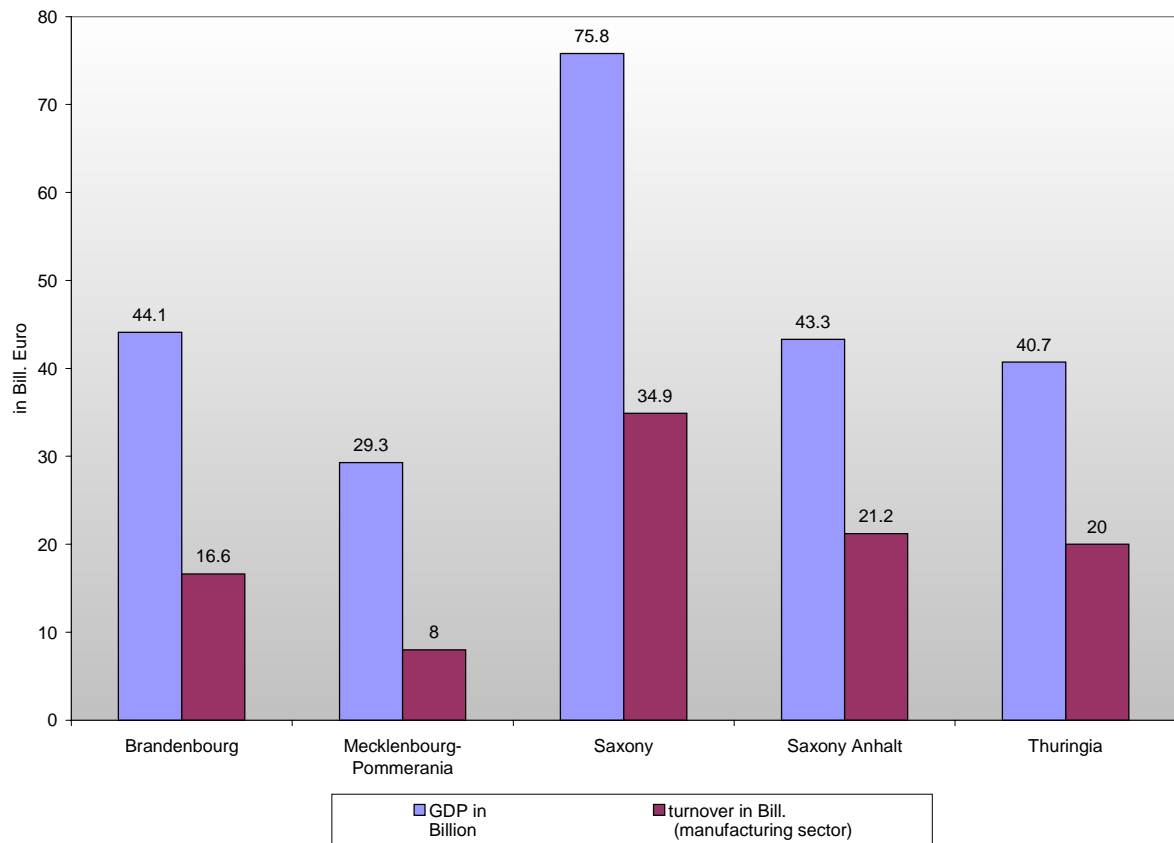
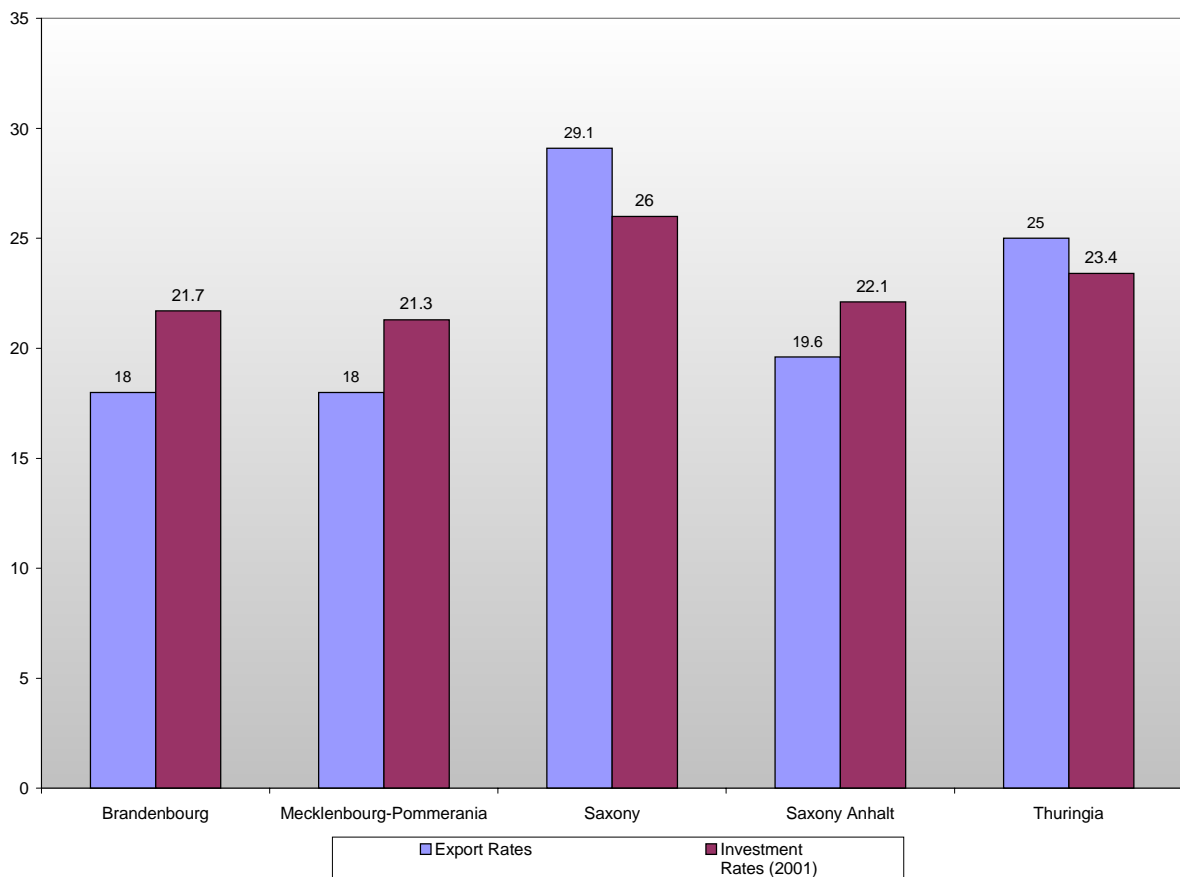
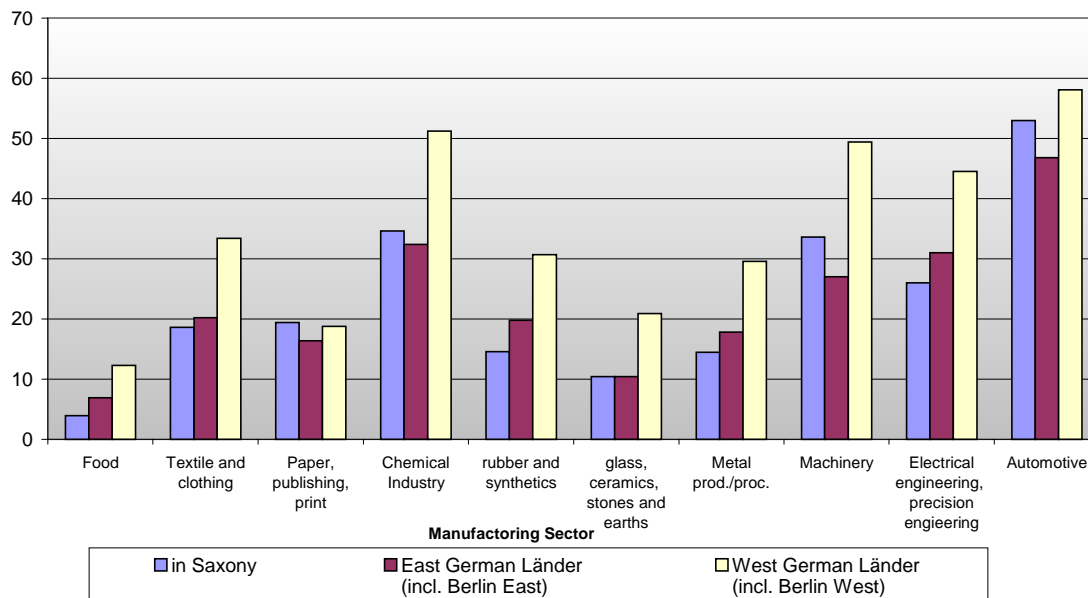


Chart 21: Export Rates and Investment Rates in East German Länder in 2002 (BMWA, 2003)



Saxon exports are concentrated on chemical industry, machinery and automotive sector (Chart 22) while food and agricultural products are of minor importance.

Chart 22: Share of Export in selected German Manufacturing Sector in 2000 (SMWA, 2001)



Saxony has to be seen as an industrial heartland of the Eastern Länder with a long tradition of industrial expertise. After re-unification, large investments by leading multinational companies, e.g. Volkswagen in Dresden and Mosel (Zwickau), Porsche and BMW in Leipzig, Infineon in Dresden-Leipzig, indicate the importance of industries for the economic development in this region. As Chart 23 shows, Saxony has still above 30% of its employment in the manufacturing sectors, belonging to the group with the highest shares in Germany together with Thuringia, Saarland, and Bavaria and only exceeded by Baden-Württemberg with its well-known industrial districts.

Thus, improving the economic conditions for companies in the manufacturing sectors is a key objective of Saxonian economic policy. We will again briefly highlight the programmes and instruments following the distinction in SME, innovation and regional economic policy (for the following SMWA, 2002).

### SME policy

Despite the high flow of investments in Saxony by multinational companies attracted, SME policies play

an important role in this Land. Two main approaches can be observed in this context:

#### (1) Implementation of Federal SME programmes

As already described above, there are several programmes on the Federal level especially targeting at SME and some of them are concentrated to applicants from the Eastern Länder. The ERP instruments as one of the largest funds in this field are managed by Federal development banks like KfW and DtA coordinating their support with local banks. Chart 24 shows the investments effect of ERP-funds for Saxony and the other East German Länder.

Because of the strong dominance of SME in East German enterprise structure observed, especially the New Länder benefit of the augmented federal programmes (e.g. PRO INNO-programme innovation competence SME) tailored for SME.

The Saxon government provides information and consulting on these programmes, as many firms in the Eastern Länder are still not familiar with the Federal support structure. Thus, the Land and its organisations serve as an information broker between Federal and private level.



Chart 23: Share of Employment in Manufacturing Sector, in 2000 (Federal Statistical Office Germany, 2002)

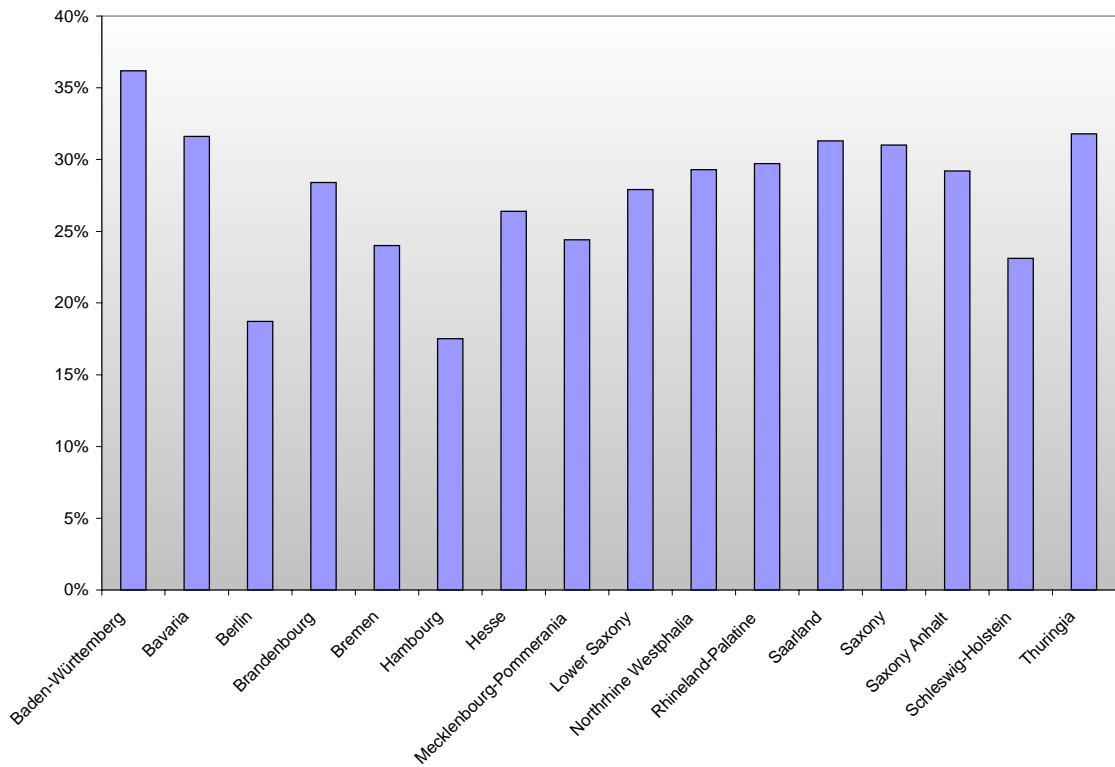
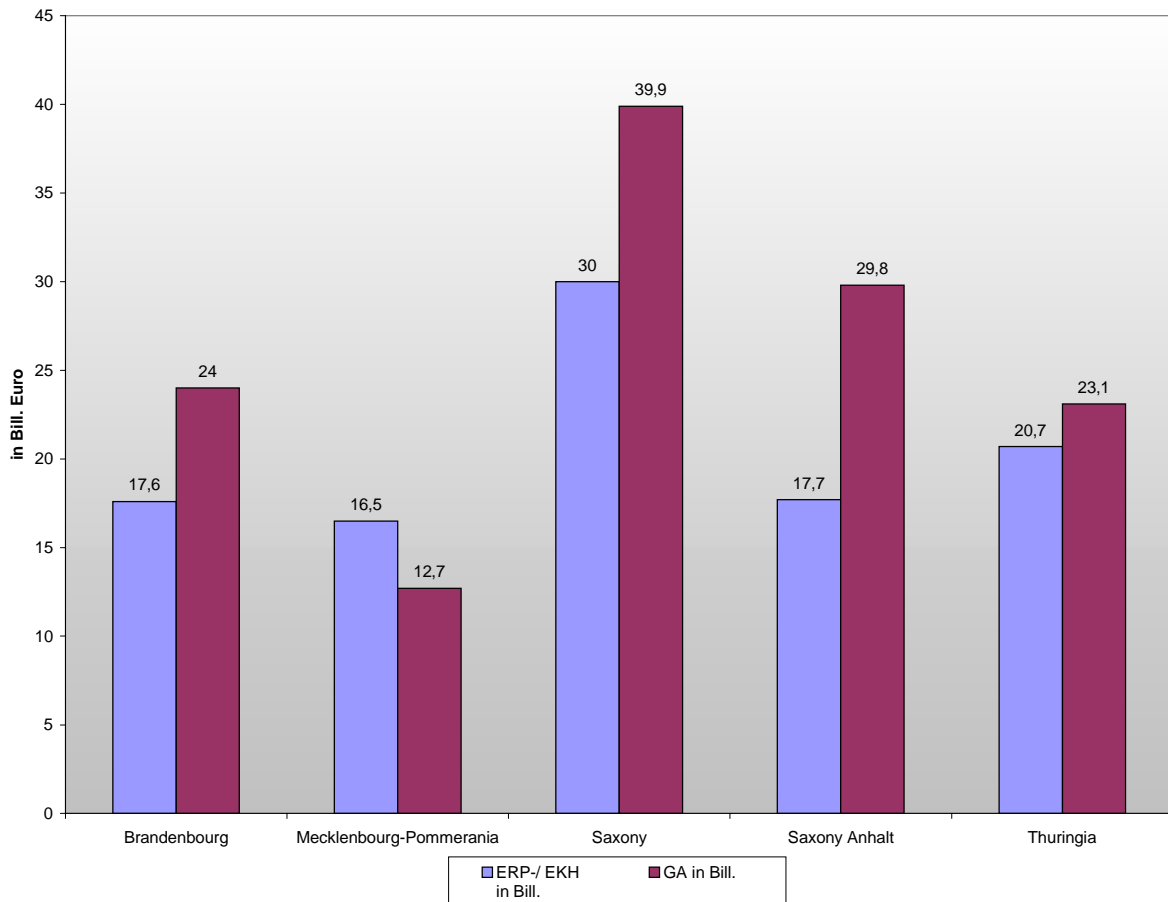


Chart 24: Investments supported by ERP-Expenditure and JT in East German Länder (1990-2003) (BMWA, 2003)



(2) Cluster initiatives

Cooperation is seen as a crucial prerequisite to overcome the typical barriers for firm development of SME like access to markets and capital, bargaining power in relationship to suppliers and clients and strategies to raise attractiveness for well-qualified human capital. Several initiatives to build clusters of cooperation have been started mostly on a sectorial level and supported by the Land. The largest ones are:

- Automotive Suppliers Saxony 2005
- Machinery in Chemnitz
- Network Gießereitechnik (Leipzig region)
- Saxon Initiative Textile
- Company Network in Textile sector (Cultivation and R&D in processing of flax and hemp fibre), Saxony-Linen

Whithin this context the Innovation and Labour Foundation of Saxony (Stiftung Innovation und Arbeit Sachsen - IAS) plays an important role in initiating and supporting the building up of enterprise networks (see below). As in the case of NRW, it is too early to evaluate these initiatives. Contrary to NRW, however, private initiative has been more important to start-up and sustain these initiatives.

**Innovation Policies**

There are many parallels in this field to the approaches on the Federal level and in NRW. Three main elements have to be distinguished:

(1) Implementation of Federal programmes

Saxony is the leading land in attracting federal R&D funds in East Germany as NRW for West Germany does (Chart 25).

As already mentioned above, some of the Federal programmes to improve innovation are focused on the specific challenges in Eastern Länder (e.g. Inno-Regio, Inno-Net). In the Eastern Länder private R&D investments are comparatively low, and many public institutes for basic or applied research provide excellent research but are only weakly tied to the regional economy. Thus, programmes like Inno-Regio and Inno-Net shall improve the linkages between firms and between firms and R&D providers to increase the absorptive capacities and levels of productivity in Eastern German firms and to create new incentives for more private investments in R&D in Eastern Germany. InnoRegio is a interregional contest with a total volume of 255,6 mill. € (1999-2006). Saxony initiates 7 projects and comprise with 42% a remarkable part of the expenditure. The programme includes the following projects (Chart 26).

Chart 25: Federal R&D Expenditure (resources for Education, Science, R&D) by Land in 1999 - financing of R&D - (BMBF, 2002)

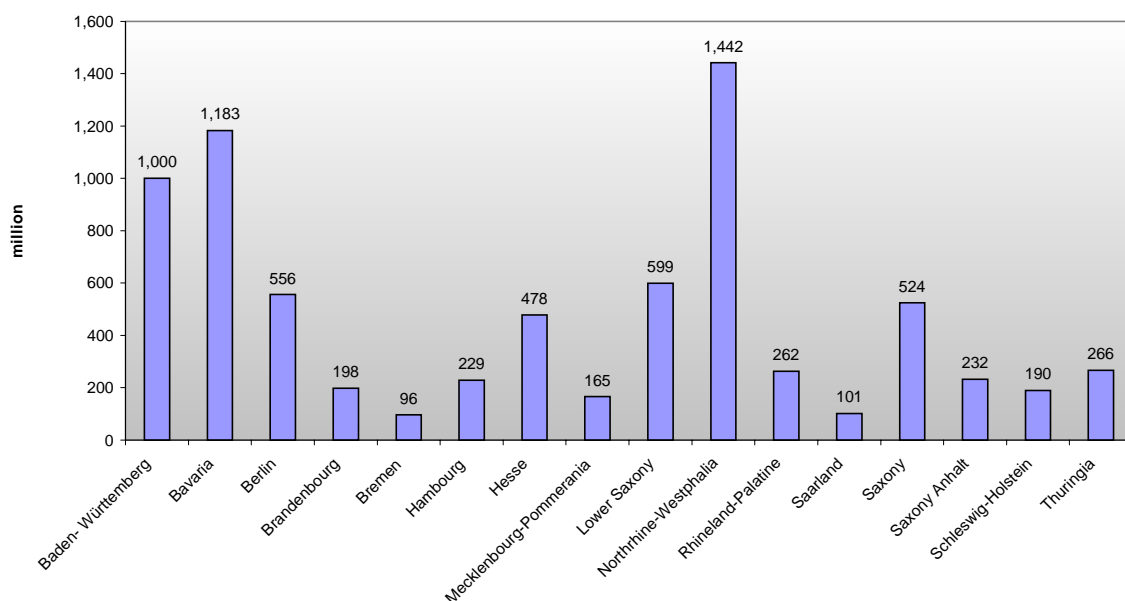
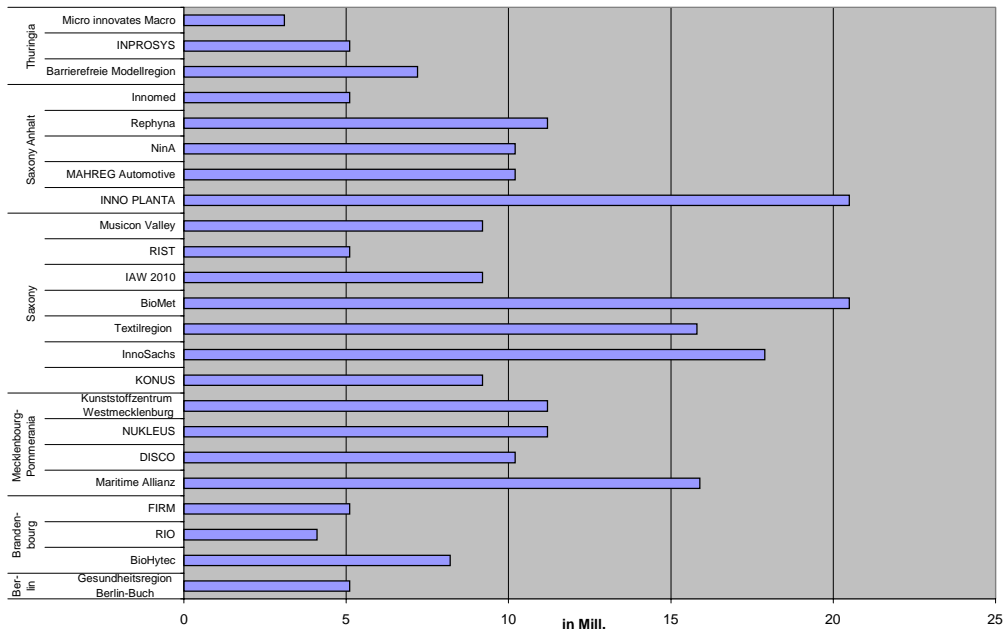


Chart 26: Inno Regio Expenditure by project and East German Land (Innoregio 2003)



Again, the Saxon government and its organisations serve as an information broker between the Federal government, the development bank on the Federal level and the firms in the regions.

Focusing on New German Länder Saxony is not only leader in attracting federal funds but also in performing R&D while comprising almost a half of the R&D expenditure of the New Länder (Chart 27).

Chart 27: R&D Expenditure (Performance of R&D) in East German Länder in 1999 (BMBF, 2002)

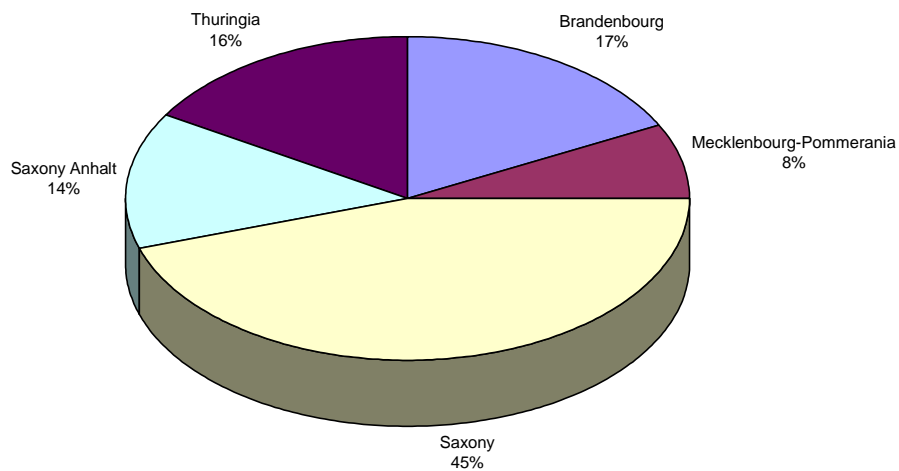
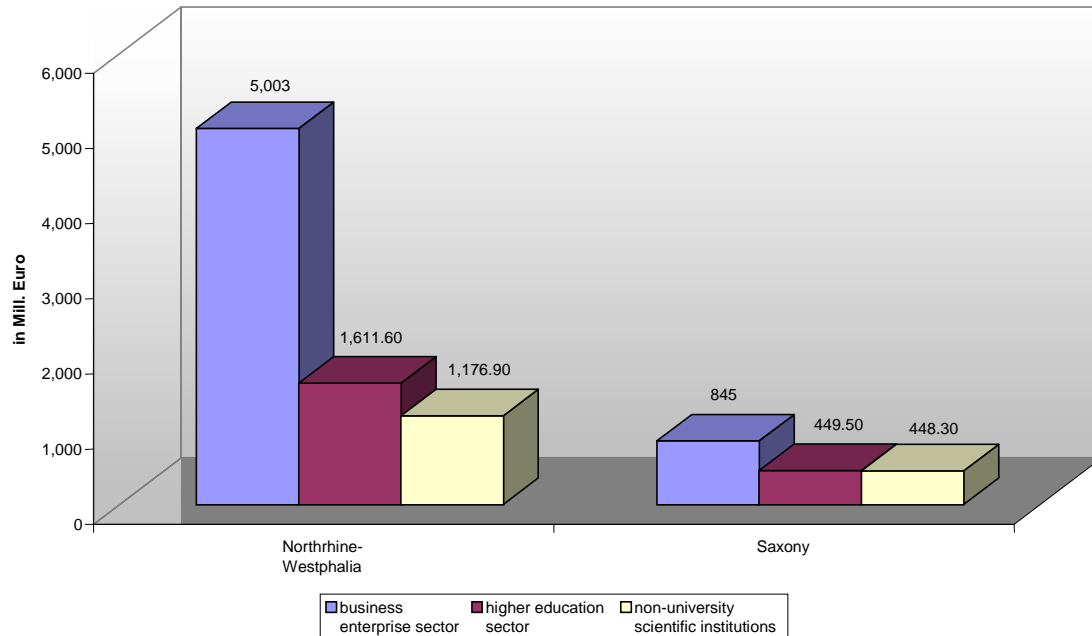


Chart 28: R&D Expenditure (Performance of R&D) in Northrhine-Westphalia and Saxony in 1999 (BMBF 2002)



The economic potential in Saxony is based on its high level of knowledge and its relatively well equipped Research infrastructure resulting among others from the R&D structure of the former German Democratic Republic (GDR). Under the Eastgerman socialist regime beside Berlin Saxony possessed the highest concentration of education and Research institutions. The research infrastructure and prerequisites for innovation activities can be seen as relatively well established in Saxony (for the following Riedel 2002):

- 5 universities and 5 technological oriented universities for applied science,
- 50 non university-scientific institutions
  - MPI, Fraunhofer-Gesellschaft
  - research institions of the Leibniz research community
  - non-profit and profit research Ltd.
  - 5 research centre tied with university of applied science
  - research instituts network supported by federal or saxon funds
- 4 Technology consulting centres (Technologieberatungscentren)
- 2 Patent information centres (Patentinformationszentren)
- 22 Technology start up centres (Technologiegründerzentren)

While in Saxony more than a half of the R&D expenditure are expended by non-university scientific institutions and higher education sector in Northrhine Westphalia (and in West Germany in general) the business enterprise sector is the dominating sector in performing R&D (Chart 28).

The reason for this differences can be seen in the special structure of East German R&D institutions and particularly on the foundation of Research Ltd. an important part of them settled in Saxony. The institutional origin of these organisations is based on former East German research centre, R&D-departments of the large enterprises (“Kombinate”) as well as research institutions from former state-controlled academy of science (“Akademie der Wissenschaften”). The main emphasis of the Research Ltd. are:

- Product engineering
- Information technology
- Material Science
- Medical instruments
- Physical and chemical technology.

The Research Ltd. is an important element to complete the R&D infrastructure in Saxony and plays an imortant role for the link between R&D and enterprise sector particularly to provide R&D for SME that possess not sufficient one’s own R&D resources.

The role of the Research Ltd. within the R&D structure is reflected in the strategic orientation of the technology policy in Saxony. The Saxon Innovation policy focus mainly on:

- institutional support and project oriented promotion of Research Ltd.,
- stimulation of Co-operation between research Ltd. and business enterprise sector, and
- the support of SME and particularly technology oriented SME as there is - with some exception - a lack of large companies with intensive FuE activities)

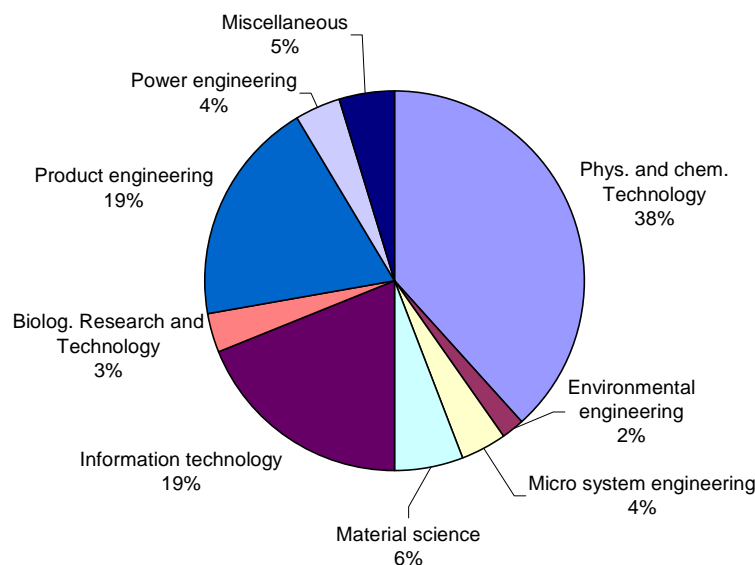
These aims are implemented in the following programmes based on guidelines of the Freestate of Saxony:

- promotion of the development of new products and processes (project support at individual business level)
- promotion of innovative, technology oriented co-operation-projects in the field of future technology that according to the “Guideline for technology policy in Saxony” are:
  - material science
  - physical and chemical technologies
  - biological research and technology
  - micro system engineering
  - information technology
  - production engineering
  - power engineering
  - environmental engineering
  - medical technology

- project support “Promotion of technology centres” in Saxony
- fostering the protection of innovations (promotion of patent)
- Support for the employment of research assistants
- Grants for investments in non-university economic related research institutions (investment support)

In the last year, the emphasis of support has shifted. While in the 90<sup>th</sup> the direct support of Research Ltd. dominates the scenery this kind of promotion has decreased in favour of individual projects and co-operation projects (Riedel, 2002). Beside this modification the distribution of R&D funds by technology sector has changed in the last years, too. While in the earlier 90<sup>th</sup>, R&D in physical and chemical technologies, production engineering, information technology and micro system technology had the same importance, over the years R&D in physical and chemical technology have taken a leading role, decreasing considerably the importance of production engineering. Since the Saxon government does not define financial ceiling (fixed quotas) for the several technology sectors the distribution of saxon FuE-funds indirect reflects the demand of R&D resources by companies and therefore simultaneously the main focus of innovation activities in Saxony (see the figures in Chart 29).

Chart 29: Distribution of Saxon funds for R&D projects by technology sector, 1992-2000 (Nothnagel et al 2001)



(2) Financial support to R&D investments

One of the most barriers for SME to provide own R&D has been identified in capital markets abstaining from credits with high risks and low shares of private equity involved. Thus, Saxony offers financial support by low-interest loans and grants with qualified repayment schemes. Problems of knowledge asymmetries between demanders of capital and the (public) suppliers shall be reduced by intensive monitoring of progress during the project measured by milestones. In comparison to Mezzanine instruments, the utilisation of low-interest loans have been well established for a long time and the SME can obviously identify the advantage to a private loan, whereas in the case of Mezzanine money that would depend on the additional credits available due to the higher private equity. Compared to other Länder, the costs of monitoring are lower as many firms are locally concentrated and the Land is smaller than Länder like Baden-Württemberg, Bavaria, and NRW (Rothgang et al., 2003).

(3) Innovation and Labour Foundation of Saxony (Stiftung Innovation und Arbeit Sachsen, IAS)

This foundation has been introduced as a public-private partnership with the Saxon government, several large firms, trade unions and chambers as members. The Foundation is a non-profit organisation which organise the implementation of the structural

funds in the regions of Saxony. It acts as an intermediary (in the sense of an employment pact) between state, commercial and social partner and regional actors. The aim of IAS is to secure and raise employment in the regions by initiating and testing new ideas through company-related pilot and model projects. This institution serves as a forum for networking and diffusion of new knowledge.

**Regional Economic Policy**

For Saxony as an Eastern Land, most of the money for the regional economic policy is coming from JT (Joint Task „Improving the Regional Economic Structures”) and ERDF (European Regional Development Funds) (Chart 30).

Until 1994, programmes were made entirely by the Federal Ministry for Economics, and the two sources of money were put together. Since then, Land authorities build up there own operational plans for the implementation of ERDF funds and JT. As many of the differences between JT and ERDF have been diminished in the last years (referring to restrictions to basic (export) activities, economic infrastructures, and private investments), a coherent development strategy could be elaborated focusing not only on capital investments, but also to local capabilities, intermediary institutions and the creation of firm networks.

Chart 30: ERP and Regional Programme Expenditure by East German Länder (1990-2003) (BMWA, 2003)

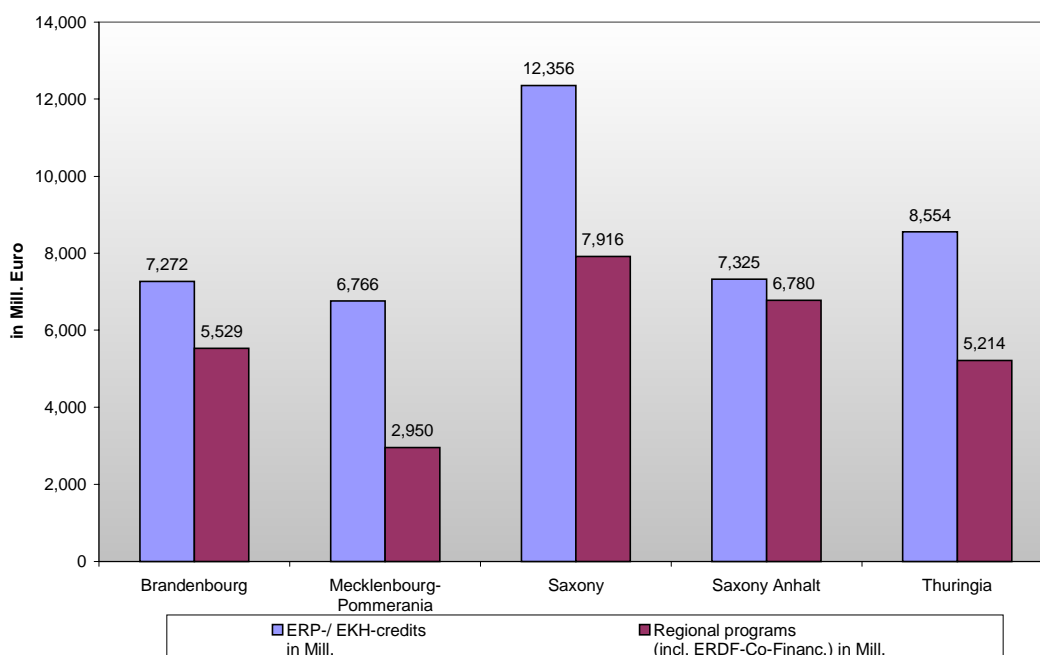
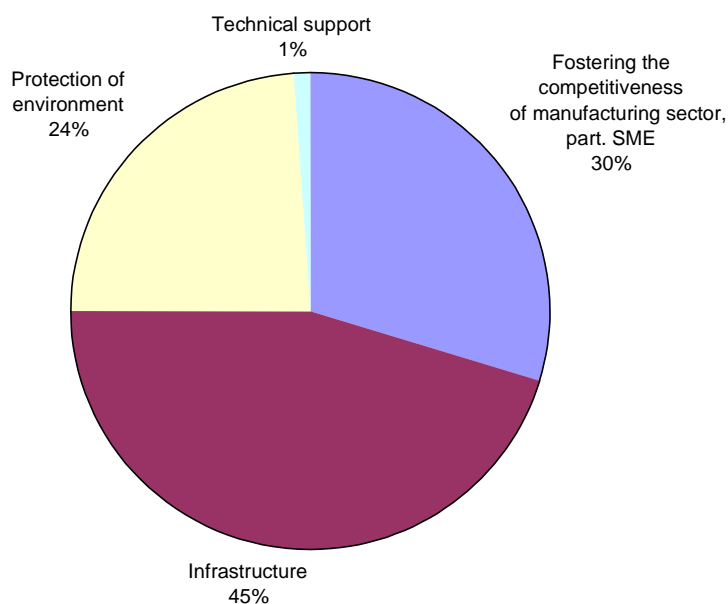


Chart 31: Distribution of ERDF funds in Saxony, 2000-2006 (SMWA, 2003)



One of the instruments focusing on innovative and regional aspects is InnoSachsen - a regional programme of Saxony for Innovative Actions under the European Regional Development Funds (for the following Stiftung IAS 2003).<sup>28</sup> The Innovative actions' objectives are to reduce the developmental disparities between weak structural Saxon regions - so called areas with particular development tasks (Gebiete mit besonderen Entwicklungsaufgaben - GmbE) - and economically well developed regions within Saxony, the creation of regional development strategies, the evaluation of their effectiveness in pilot projects and the dissemination of outcomes within Saxony, Germany and other regions. The programme aims

- to support the development of regional human resources through further education
- generate the prerequisites for an easy access to knowledge and know-how particularly for SME as backbone of the GmbE's production structure and
- to introduce sustainable development to increase the competitiveness

in selected areas (GmbE) located within the objective 1 area in Saxony. The programme is characterised by a broad consensus (Saxon Government, regional councils, IAS) in order to secure the sustainable development of the programme's drafting and the implementation of the programme's projects. In 2000, Saxony had assigned 5 regions as GmbE:

- Erzgebirge
- Oberlausnitz-Niederschlesien
- Riesa-Grossenhain
- Suedraum Leipzig

<sup>28</sup> The programme was approved at the end of 2001 with a total amount of 3.0 mill. € for the period 2002-2004.

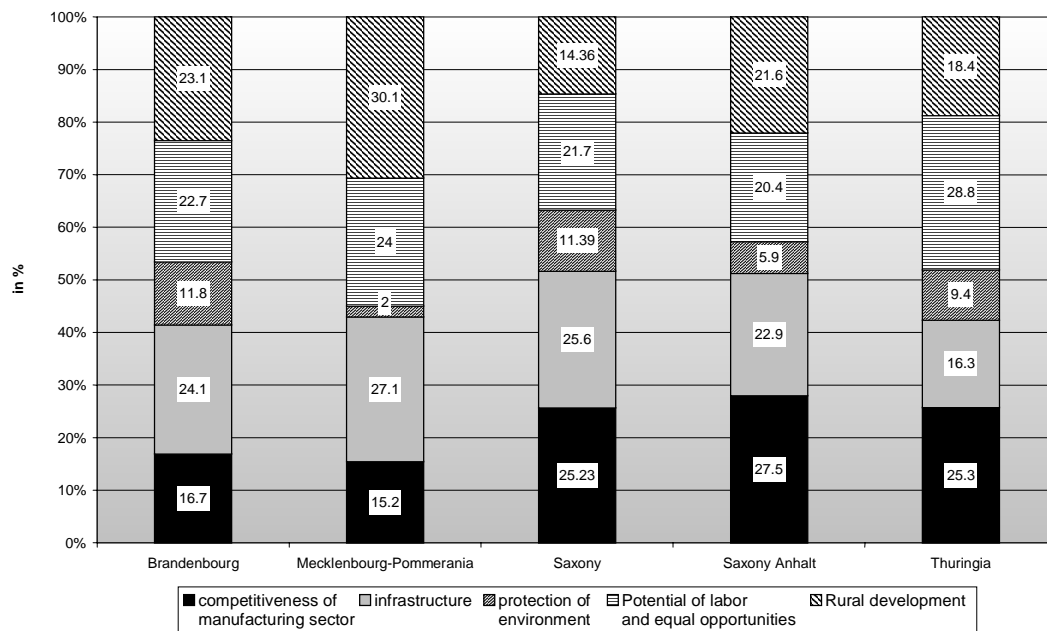
- Torgau-Oschatz-Doebeln

The weakness of these regions particularly consist in the absence of larger enterprises as main force for economic development and also in the unfavourable geographic location comparing to the prospering agglomeration centres as well as in the unfavourable infrastructure, lacking technological know-how and the financial weakness of the enterprises. The emigration of skilled employees and young people because of the bad labour market situation imposes additional risks for further development. Potentials for regional development consist in flexible SME structures, in their innovative potential and in the level of its human capital as well as existing enterprise networks and institutions of technology transfer for stimulating innovation. Opportunities may additionally arise through cross border co-operations with regard to EU-Enlargement in the border regions. Considering the distribution of ERDF funds (of 3057,6 mill. € in total) in Saxony for 2000-2006 some main focus can be identified (Chart 31).

The figure shows a clear concentration on fostering infrastructure and competitiveness of manufacturing sector. In relation to the East German Länder Saxony expends of the ERDF-funds for the protection of environment above the average but looking at to European Agricultural Guidance and Guarantee Fund (EAGGF) realizes less effort in rural development (Chart 32).<sup>29</sup>

<sup>29</sup> While ERDF is mainly directed to support the competitiveness of the manufacturing sector, infrastructure and protection of environment, ESF is aimed to foster the potential of labor and equal opportunities and EAGGF to rural development.

Chart 32: Distribution of EU-funds in East German Länder, in % (Bratzke et al. 2001)



Looking finally at the basic features of Saxon industrial policy, three aspects have to be stressed:

- (1) Compared to the Western Länder, the implementation of Federal programmes is far more important. The share of Federal money to support firms is higher and firms have fewer information about the programmes.
- (2) The attraction of multinational investments as guiding investments stimulating location decisions by suppliers and other foreign investors is more important than in Western Länder, as investment grants are higher and many industrial structures are still in a status of emergence.
- (3) Saxony follows the examples of Bavaria and Baden-Württemberg, establishing a large foundation to support innovation processes, stimulating investments by leading industrial companies inducing supply-chain-networks, and focusing on development in urbanised areas and industrial centres like Dresden-Leipzig.

Table 5 summarises some of the main instruments and objectives on the Länder level based on material from Saxony and NRW. As there are a lot of similarities between the instruments and programmes on the Länder level (Rothgang et al., 2003), this information should be cum grano salis representative for all Länder. Priorities on the Länder level refer more to information and consulting and modern forms of public subsidisation. All in all, however, many parallels can be observed between approaches on the Federal and Länder level.

#### 4. Conclusions and outlook

The aim of this paper was to present an overview to industrial policies in Germany with special focus on

the relationship between Federal and Länder level. We have identified several changes in political concepts focusing nowadays more on approaches to improve capabilities by better access to capital markets (Mezzanine instruments), by regional innovation networks or by bridging the gap between industrial companies and public research institutes and universities. But what makes the distinction between the German case and other European countries? We think of five points in this context:

- (1) the strong role and institutional capacities of the Länder making them independent stimulators (or barriers) of industrial development,
- (2) the importance of private expertise and public-private partnerships including intermediary functions of employers associations, development banks, committees and foundations,
- (3) the importance of cooperation between Federal and Länder level in conceptualising and implementing programmes, particularly given in the JT,
- (4) the complexity, overlaps and variety of the support structure making it almost inevitable for private actors to look for consulting on suitable programmes, and
- (5) the long history of many specific organisations and instruments like the RKW, Industrial Joint Research, or the Fraunhofer Society stressing the path-dependency of industrial policy in Germany.

This last point indicates that despite all the observed changes and new challenges by internationalised competition specificities will survive and still characterise a “German way of industrial policy”.



Table 5: Instruments and Objectives of German Industrial Policy on the Länder level

<i>Instruments/ Objectives</i>	<i>Direct contracted aid</i>	<i>Investment grant</i>	<i>Low interest loans</i>	<i>Mezzanine instruments</i>	<i>Infrastructure</i>	<i>Information and consulting</i>	<i>Interregional contests</i>
<i>Private investments</i>		Joint Task, Company Support RIGA (Saxony)	ERP Funds, Start- up and growth (Saxony)		Development Agencies	Development Agencies	Future Contest Ruhr (NRW)
<i>Human resources and qualification</i>		Joint Task			Universities	Development Agencies, Regional Industry associations, Regional RKW, Regional Alliances (Foundation and Innovation and Labour Saxony)	InnoSachsen (Saxony)
<i>SME</i>		Company Support RIGA (Saxony)		Pure Cover Models (NRW), Guarantees, secondary loans		Development Agencies, Regional Industry associations, Regional RKW, Regional Alliances (Foundation and Innovation and Labour Saxony), MOVE (NRW)	Future Contest Ruhr (NRW)  InnoSachsen (Saxony)
<i>Private equity</i>				Pure Cover Models, Guarantees	Development Banks and Agencies	Development Agencies	
<i>Venture capital</i>				Public VC Funds	Public VC Funds		
<i>Innovation</i>				Secondary Loans, Guarantees	Technology Transfer, Agencies, Regional PBR	Technology Transfer Agencies	IT security, e-logistics (NRW)  InnoSachsen (Saxony)

<i>Start ups</i>			Start up and growth (Saxony), GO! (NRW)	Guarantees, Pure Cover Models	Business Angels, Development Agencies	Development Agencies, Regional Industry associations, Regional RKW, Regional Alliances (Foundation Innovation and Labour Saxony), GO! (NRW)	
<i>Exploitation of new knowledge</i>				Guarantees	Technology Transfer Agencies (ZENIT NRW)	Technology Transfer Agencies	
<i>Networking</i>					Business Dialogues, Development Agencies	Regional Industry associations, Regional RKW, Regional Alliances (Foundation Innovation and Labour Saxony)	Future Contest Ruhr (NRW)
<i>Environmental priorities</i>					Development Agencies, Public Authorities	Development Agencies	
<i>Regional cohesion</i>		JT				Local Alliances	Future Contest Ruhr (NRW) InnoSachsen (Saxony)
<i>Internationalisation</i>					Common Internet Portal	Joint Fare Representation, International Delegations	
<i>Special areas</i>		Fields of Competences	Lighthouse Projects			Fields of Competences (NRW)	

## Bibliography

- Bade, F.-J.; Niebuhr, A. (1999): Zur Stabilität des räumlichen Strukturwandels, *Jahrbuch für Regionalwissenschaften*, Vol. 19, 131-156.
- Beise, M., 2002: *Lead Markets*, ZEW Economic Studies, Mannheim.
- Benzler, G.; Wink, R., 2000: Gründer- und Technologiezentren – Relikt einer "old economy", *Wirtschaftsdienst*, Vol. 80, 423-430.
- Benzler, G.; Wink, R., 2002: *Balanced Scorecard: Strategisches Instrument der Innovationspolitik*, *Wirtschaftsdienst*, Vol. 82, 53-60.
- Berndt, C., 2001: *Corporate Germany between globalization and regional place dependence. Business restructuring in the Ruhr Area*, Basingstoke.
- Berthold, N.; Drews, S., 2001: *Die Bundesländer im Standortwettbewerb*, Gütersloh.
- Blum, U. et al., 2001: *Systemevaluation der wirtschaftsintegrierenden Forschungsförderung*, Final Report of the Commission, Berlin.
- Blum, U.; Müller, S., 2003: *The role of intellectual property rights regimes for R&D cooperation between industry and academia*, in: Benzler, G.; Wink, R. (Eds.): *Academia-Business Links. Strategies and Lessons Learnt*, Basingstoke.
- BMBF – German Federal Ministry for Education and Research, 2002: *Basic and Structure Datas 2001/2002*, Bonn 2002.
- BMWa – German Federal Ministry for Economic and Labour, 2003: *Wirtschaftsdaten Neue Länder*, Berlin.
- BMWa – German Federal Ministry for Economic and Labour, 2002: *ERP Budget Plan*, Berlin.
- Bund-Länder-Kommission für Bildungsplanung und Forschungsförderung, 2001: *Zusammenfassung der Empfehlungen zur Evaluation der gemeinsam geförderten Forschung in Deutschland. Empfehlungen der Evaluatoren, Stellungnahmen der Evaluierten, erste Maßnahmen*, Berlin.
- Cappellin, R., 2003: *A methodology for the evaluation of gaps between supply and demand for technology transfer services to small and medium-sized firms*, in: Benzler, G.; Wink, R. (Eds.): *Academia-Business Links. Strategies and Lessons Learnt*, Basingstoke.
- Cappellin, R.; Orsenigo, L., 2000: *The territorial dimension of modern industry and the scope of regional industrial and labour market policies*, in: Klemmer, P.; Wink, R. (Eds.): *Preventing unemployment in Europe. A new framework for labour market policy*, Cheltenham et al., 166-187.
- Cooke, P., 2003: *Regional science policy and the growth of knowledge megacentres in bioscience clusters*, *International Journal of Technology Management*, 22.
- Cooke, P.; Heidenreich, M.; Braczyk, H., 2003: *Regional Innovation Systems*, 2nd Edition, London.
- Czarnitzki, D.; Licht, G.; Rammer, C.; Spielkamp, A., 2001: *Rolle und Bedeutung von Intermediären im Wissens- und Technologietransfer*, *ifo-Schnelldienst*, 54, 40-49.
- Czarnitzki, D.; Doherr, T.; Fier, A.; Licht, G.; Rammer, C., 2003: *Öffentliche Förderung der Forschungs- und Innovationsaktivitäten von Unternehmen in Deutschland*, Mannheim.
- Bratzke, P.; Steffen, M.; Stuber, M.; Ziegler, A., 2001: *Die Umsetzung der EU-Strukturfonds in den neuen Bundesländern 2000-2006 – Gestaltungschancen in Ziel 1-Gebieten*. DGB-Informationen zur Wirtschafts- und Strukturpolitik 2001. URL: <http://www.dgb-sachsen.de/news/download.htm> (12.06.2003).
- DIW, 1997: *Der Einsatz der Europäischen Strukturfonds im Freistaat Sachsen: Zwischenevaluierung für die Jahre 1994 bis 1996*.
- Dohse, D., 2000: *Technology Policy and the Regions – The Case of the BioRegio Contest*, *Research Policy*, Vol. 29, 1111-1133.
- Eickelpasch, A.; Kauffeld, M.; Pfeiffer, I., 2002: *Das Inno-Regio-Programm: Umsetzung der Förderung und Entwicklung der Netzwerke*, *DIW-Wochenbericht*, No. 21.
- European Commission, 1995: *Deutschland – Neue Länder. Gemeinschaftliches Förderkonzept 1994-1999*, Luxembourg.
- European Commission, 2001: *Employment in Europe 2001. Recent Trends and Prospects*, Luxembourg.
- Farina, C.; Preissl, B. (2000): *Research and Technology Organisations in National Systems of Innovation*, Berlin.
- Federal Statistical Office Germany, 2002: *Statistisches Jahrbuch*, Wiesbaden.
- Gereth, B.; Schulte, K.W., 1992: *Mezzanine-Finanzierung*, Bergisch-Gladbach.
- Gerling, K.M., 2002: *Subsidization and structural change in Eastern Germany*, Berlin et al.
- Grande, E., 1996: *Das Paradox der Schwäche. Forschungspolitik und die Einflusslogik europäischer Politikverflechtung*, in: Jachtenfuchs, M.; Kohler-Koch, B. (Eds.): *Europäische Integration*, Opladen, S. 373-399.
- IFO, 1997: *Der Europäische Fonds für Regionale Entwicklung (EFRE) in Thüringen. Zwischenbericht des Mitteleinsatzes von 1994 bis 1996*, Gutachten im Auftrag des Thüringer Ministeriums für Wirtschaft und Infrastruktur, Dresden.
- IFO, 1997: *Der Europäische Fonds für Regionale Entwicklung (EFRE) in Thüringen. Zwischenbericht des Mitteleinsatzes von 1994 bis 1996*, Technischer Bericht, Gutachten im Auftrag des Thüringer Ministeriums für Wirtschaft und Infrastruktur Dresden 1997.
- Innoregio, 2003: *Innoregio-Förderung*. URL: <http://www.innoregio.de/foerderung.php> (16.06.2003).
- Jeffery, C.J., 2002: *German federalism from cooperation to competition*, in: Umbach, M. (Ed.): *German federalism: Past, present and future*, Basingstoke.
- JT – Joint Task „Improving the Regional Economic Structures“, 1997, *Framework Plan, Sechszwanzigster Rahmenplan der*

- Gemeinschaftsaufgabe "Verbesserung der regionalen Wirtschaftsstruktur" für den Zeitraum 1997-2001.
- JT – Joint Task „Improving the Regional Economic Structures“, 2002, Framework Plan, Sechszwanzigster Rahmenplan der Gemeinschaftsaufgabe "Verbesserung der regionalen Wirtschaftsstruktur" für den Zeitraum 2002-2005.
- Kampmann, N.; Lorenzen, H.P., 1998: Innovationsförderung für kleine und mittlere Unternehmen, KfW-Beiträge zur Mittelstands- und Strukturpolitik, 5, 4-9.
- Karl, H., 2000. Regional Economic Policy in Eastern Länder.
- Karl, H., 1996: Entwicklung der regionalen Wirtschaftspolitik in Deutschland, in: Handbuch der regionalen Wirtschaftsförderung, ed. by Eberstein, H., Karl, H (Ed.) Köln, 3<sup>rd</sup> Ed., AII, 1-100.
- Karl, H., Klemmer, P., 1995: Coordination problems between the regional and environmental policy in the FRG, Essen.
- Katzenstein, P.J., 1987: Policy and politics in West Germany. The growth of a semi-sovereign state, Philadelphia.
- Klemmer, P.; Friedrich, B.; Lageman, B. et al., 1996: Mittelstandsförderung in Deutschland – Konsistenz, Transparenz und Ansatzpunkte für Verbesserungen, Essen.
- Klemmer, P., 1986: Regionalpolitik auf dem Prüfstand, Köln.
- Klemmer, P., 1998: Wandel in der Konvergenzforschung, in: Heilemann, U.; Kath, D.; Klotten, N. (Eds.): Entgrenzung als Erkenntnis- und Gestaltungsaufgabe, Berlin, 33-57.
- Klodt, H., 1998: German technology policy: Institutions, objectives and economic efficiency, Zeitschrift für Wirtschaftspolitik, Vol. 47, 142-163.
- Kokalj, L., 1994: Industriepolitik in Deutschland, Japan und den USA, Dissertation, Bonn.
- Koschatzky, K., 2000: Networks in innovation research and innovation policy – an introduction, in: Koschatzky, K.; Kulicke, M.; Zenker, A. (Eds.): Innovation networks. Concepts and challenges in the European perspective, Heidelberg, 3-23.
- Kuhlmann, S., 2003: Evaluation of research and innovation policies. A discussion of trends with examples from Germany, in: Benzler, G.; Wink, R. (Eds.): Evaluating Innovation Policies – New Objectives, New Methods, New Results, Special Issue of International Journal for Technology Management, 26, 3-4.
- Kuhlmann, S.; Bühner, S., 2000: Erfolgskontrolle und Lernmedium: Evaluation von Forschungs- und Innovationspolitik, Vierteljahreshefte zur Wirtschaftsforschung, 69, 379-394.
- KVR – Kommunalverband Ruhrgebiet, 2000: Perspektive Ruhr. Strukturpolitik an der Ruhr. Programme, Konzepte, Akteure, Essen.
- Nägele, F., 1996: Regionale Wirtschaftspolitik im kooperativen Bundesstaat, Opladen.
- Nothnagel, P., Voigt, Chr., Pfalzgraf, B., 2001: Technologieförderung und Technologiepolitik im Freistaat Sachsen, Sächsisches Staatsministerium für Wirtschaft und Arbeit (SMWA) und Sächsische Aufbaubank (SAB), Dresden.
- NRW – Ministry for Economics and Labour, 2002: Jahreswirtschaftsbericht, Düsseldorf.
- OECD – Organisation of Economic Cooperation and Development, 2003: Main Science and Technology Indicators, Paris.
- Owen Smith, E., 1994: The German Economy, London.
- Peters, H.R., 1977: Konzeption und Wirklichkeit sektoraler Strukturpolitik, in: Bombach, G. (Ed.): Probleme des Strukturwandels und der Strukturpolitik, Tübingen, 119-162.
- Prognos, 2001: Evaluierung der ERP-Förderprogramme, (Authors: H. Bornemann, B. Schultz, S. Berndes, O. Arndt, A. Doniec), Cologne et al.
- Rammer, C., 2002: Unternehmensdynamik in forschungs- und wissensintensiven Wirtschaftszweigen, Mannheim.
- Reinhard, M., 1999: The co-evolution of policies at national, regional and European level. Country report: Germany, Munich.
- Riedel, J. (2002): Technologie- und Innovationspolitik in Sachsen, WSI-Diskussionspapier Nr. 106, Düsseldorf.
- Riedel, J., Scharf F., 1998a: Die Europäischen Strukturfonds in den neuen Bundesländern: I. Zur Standortbestimmung der ostdeutschen Wirtschaft im europäischen Kontext, IFO-Schnelldienst, No. 1 and 2, 7-17.
- Riedel, J., Scharf F., 1998b: Die Europäischen Strukturfonds in den neuen Bundesländern: II. Zielsetzungen, Förderstrategie und Wirkungen des Mitteleinsatzes, IFO-Schnelldienst, No. 4, 17-29.
- Rothgang, M.; Trettin, L.; Lageman, B., 2003: How to regain funds from technology promotion programs? Results from an evaluation of the financial instruments used in public R&D funding of incumbent SME, in: Benzler, G.; Wink, R. (Eds.): Evaluating Innovation Policies – New Objectives, New Methods, New Results, Special Issue of International Journal for Technology Management, 26, 3-4.
- Schmoch, U.; Licht, G.; Reinhard, M. (Eds.), 2000: Wissens- und Technologietransfer in Deutschland, Stuttgart.
- Schroeder, I.K., 1996: Die Industriepolitik in Sachsen nach der Wende, Munich.
- Statistical Office Saxony (2002): Wirtschaft in Sachsen, Kamenz.
- SMWA - Saxon Ministry of Economy and Labour, 2003: Operationelles Programm zur Strukturfondsförderung des Freistaates Sachsen, 2000-2006, CCI-Nr.: 1999 DE 16 1 PO 006, vom 06.02.2003.
- SMWA - Saxon Ministry of Economy and Labour (Ed., 2002): Förderfibel Sachsen 2002/03, Dresden.
- SMWA - Saxon Ministry of Economy and Labour, 2001: Wirtschaft und Arbeit in Sachsen 2001, Entwicklung von Wirtschaft und Arbeitsmarkt. Zahlen und Fakten, Dresden.
- Science Council – Wissenschaftsrat, 2001: Systemevaluation der HGF – Stellungnahme des

- Wissenschaftsrates zur Hermann von Helmholtz-Gemeinschaft Deutscher Forschungszentren, Berlin.
- Soskice, D.; Hall, P. (eds.), 2001: *Varieties of Capitalism*, London.
- Starbatty, J.; Vetterlein, U., 1998: Forschungs- und Technologiepolitik, in: Klemmer, P. (Ed.): *Handbuch Europäische Wirtschaftspolitik*, München, 665-733.
- Staudt, E.; Bock, J.; Mühlmeier, P., 1994: Technology centres and science parks: Agents or competence centres for small business? *International Journal of Technology Management*, 9, 196-213.
- Sternberg, R., 1989: Innovation centres and their importance for the growth of new technology-based firms. Experiences gained from the Federal Republic of Germany, *Technovation*, 9, 681-694.
- Sternberg, R.; Behrendt, H.; Seeger, H.; Tamasy, C., 1997: Bilanz eines Booms: Wirkungsanalyse von Technologie- und Gründerzentren in Deutschland, Dortmund.
- Stiftung IAS – Innovation and Labour Foundation of Saxony, 2003: *InnoSachsen. Regionalprogramm des Freistaates Sachsen für innovative Maßnahmen*. URL: <http://www.innosachsen.de>. (12.06.2003).
- Tetsch, F. et al., 1996: *Die Bund-Länder-Gemeinschaftsaufgabe Verbesserung der regionalen Wirtschaftsstruktur*, Köln.
- Tidelski, O., 2002: *Dezentrale Innovationspolitik. Entwurf einer anreizgerechten Reform am Beispiel Nordrhein-Westfalens*, Frankfurt.
- Toepel, K., 1996: Evaluation measures of the structural funds interventions in the New German Länder – An Overview, *Vierteljahreshefte zur Wirtschaftsforschung*, Vol. 65, 322-333.
- Wilson, D.; Souitaris, V., 2002: Do Germany's federal and land governments (still) co-ordinate their innovation policies? *Research Policy*, 31, 1123-1140.
- Wink, R., 2001: Regionalisierte Arbeitsmarktpolitik – Beschäftigungsimpulse zwischen ordnungs- und strukturpolitischem Anspruch, in: Eckey, H.-F. et al. (Eds.): *Ordnungspolitik als Antwort auf wirtschaftspolitische Herausforderungen*, Stuttgart, 447-465.
- Yuill, D., Bachtler, J., Wislade, F., 1997: *European regional incentives 1997-98*, East Grinstead.
- ZEW – Centre for European Economic Research, 2003: *Zur technologischen Leistungsfähigkeit der bundesdeutschen Wirtschaft*, Mannheim.
- ZfgK – Zeitschrift für das gesamte Kreditwesen, 1996ff: *Die Finanzierungshilfen des Bundes, der Länder und der internationalen Institutionen – Gewerbliche Wirtschaft*, each No. 1 of special editions.
- Zimmermann, V.; Andres, M., 2001: *Das Innovationsverhalten von kleinen und mittleren Unternehmen*, Wirtschaftsdienst, Vol. 81, 532-540.

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