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Article

Technology neutral public support: An important pillar of East German industrial research

Weekly Report

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Weekly Report

Technology neutral Public Support —An Important Pillar of East German Industrial Research

Industrial research in East Germany mostly takes place in small and medium-sized Enterprises (SMEs) and non-profit external industrial research institutions, whereas in West Germany industrial research mainly takes place in large companies. The German Federal government, along with Länder governments, subsidize industrial research in East Germany—within the framework of technology neutral public support programmes—spending about half a billion EUR annually. This approach, which subsidizes a broad spectrum of product and process innovations through project grants, has been proven, by and large, successful. Publicly supported industrial SMEs increased employment, gained access to new markets, as well as improved their productivity and profit situation. This is the finding of a study for the Federal Ministry of Economics and Technology conducted by the German Institute for Economic Research (DIW Berlin).

In order to promote the growth of East German businesses, priority should be placed on research and development (R&D) and innovation. For this reason, the German government—which has expanded SMEs support to West Germany—needs to continue preference to East Germany.

In the international context, Germany mainly maintains its competitiveness through its efficient, innovative and research-intensive industry.¹ East Germany's economic catching-up process can only be improved if its manufacturing sector grows and research intensity increases. One major way to achieve this is technology neutral public support through the German Federal and Länder governments. In a study commissioned by the Federal Ministry of Economics and Technology, DIW Berlin examined the success rate of this support during the 2000-2008 period.² This study focuses on the effects of these programmes on subsidized companies and the importance of public R&D funding for the development of the manufacturing sector in East Germany. Subsequent to these findings, proposals for further technology open

¹ See Belitz, H., Gornig, M., Schiersch, A.: Deutsche Industrie durch forschungsintensive Güter erfolgreich. Wochenbericht des DIW No. 9, 2010.

² See Belitz, H., Eickelpasch, A., Lejpras, A., Berteit, H., Toepel, K., Walter, G.: Bedeutung von FuE für die Entwicklung des verarbeitenden Gewerbes in Ostdeutschland und Wirkungen der technologieoffenen Programme zur Förderung der Industrieforschung. Politikberatung kompakt Nr. 58/10, Berlin 2010. This study ties in with a study from 2001. See Belitz, H., Berteit, H., Fleischer, F., Stephan, A.: Wirksamkeit der Programme zur Förderung von Forschung, Technologie und Innovation für die Entwicklung der ostdeutschen Wirtschaft, Berlin 2001.

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policy

Table 1

Key figures of the East and West German manufacturing sector 2000 and 2008

	East Germany		West Germany	
	2000	2008	2000	2008
Persons engaged (in 1000)	1 037	1 057	7072	6 604
Index: 2000=100	100	102	100	93
Share of total persons engaged (as percentage)	13.9	14.2	22.3	20.1
Persons engaged per 1000 inhabitants	60	64	109	101
Gross value added in real terms (in million Euro)	40 800	59 052	385 190	437 574
Index: 2000=100	100	145	100	114
Share of gross value added (as percentage)	14.5	18.0	24.5	24.5
Gross value added in real terms per working hour (in Euro)	24 417	35 696	37 155	46 525
Index: 2000=100	100	146	100	125

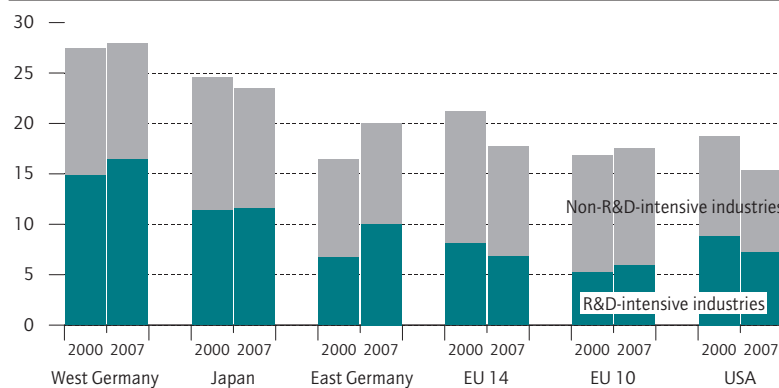
Sources: Regional accounts, statistical offices of the Federal States; **DIW Berlin 2010**
 calculations by DIW Berlin.

East Germany's economic catching-up process is driven by the manufacturing sector.

Figure 1

International comparison of the East German value added share¹ of the manufacturing sector and research-intensive industries

In per cent



¹ Value added in overall economy at current prices (without real estate activities).

Sources: EUKLEMS Database 11/2009; OECD STAN 2009, Regional accounts, Statistical offices of the Länder; calculations and estimations by **DIW Berlin 2010**

The value added share of the manufacturing sector in East Germany is distinctly higher than in the USA and the EU average.

and governmental aid from the German Federation are presented.

East German Manufacturing Sector: Catch-up Engine, but structural deficits remain

East German manufacturing was a major contributor toward East Germany's general economic catching-up between 2000 and 2008. Including Berlin, East

Germany's gross value added of the manufacturing grew, in real terms, about 45 per cent, its share in the gross domestic product (GDP) from 14.5 per cent to 18.0 per cent. In West Germany the share of manufacturing in GDP remained at 24.5 per cent (table 1). Labour productivity (gross value added per working hour) in East Germany's manufacturing sector reached 77 per cent of the West Germany's level in 2008; in 2000 it barely reached 66 per cent.

The value added share of the research-intensive manufacturing grew in East Germany from 6.8 per cent in 2000 to 10 per cent in 2007. The research-intensive industries include the chemical industry; electrical machinery and apparatus; machinery and equipment; transport equipment; office machinery and computers; communication equipment; and medical and precision instruments. The gap with West Germany has reduced over the course of going from 14.9 per cent in 2000 to 17.5 per cent in 2007. A further positive development is the relatively high share of the East German research-intensive industries in an international comparison. In the "old" EU members states, without Germany (EU-14), the share was 6.8 per cent, in the USA it was 7.2 per cent (figure 1). A convergence with West German industry is also noticeable in the export orientation. For the period from 2000 to 2008, East German³ export share grew from 36 per cent to 45 per cent; the West German⁴ one from 52 per cent to 57 per cent.

Despite this positive development, East German industry is still smaller in comparison than West German's. In 2008, the portion of employees in the manufacturing sector per 1000 inhabitants in East Germany was 64—considerably fewer than the 100 employees per 1000 inhabitants in West Germany. Additionally, there are several structural deficits: East German labour productivity is still lower than that of West Germany, the share of the research-intensive industries is smaller, manufacturing companies are more production oriented and engage in exporting less frequently. All those disadvantages can be attributed to the small-scale business structure. In 2008, 63 per cent of all East German employees in the manufacturing sector worked in companies with fewer than 250 employees; in West Germany this was only 41 per cent. In West German industry, production mainly takes place in larger firms, which can take advantage of economies-of-scale. There are only a few globally operating companies with high quality activities such as management, marketing, as well as research and development, located in East Germany.

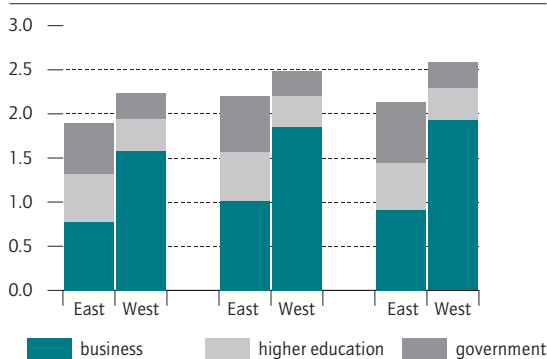
³ New Länder and East Berlin.

⁴ Old Länder and West Berlin.

Figure 2

R&D expenditure in percentage of GDP in East and West Germany 1995, 2000 and 2007

East Germany including Berlin



Sources: SV Wissenschaftsstatistik; German Federal Statistical Office, Federal Ministry of Education and Research. **DIW Berlin 2010**

East German Research intensity is half as it is in West Germany.

Little industrial research in East Germany

The research intensity of East Germany's economy—measured as intramural R&D expenditures of companies over the real GDP, in per cent—fell from 1.0 to 0.9 per cent between 2000 and 2007 (figure 2). In West Germany, the R&D-intensity increased from 1.8 per cent in 2000 to 1.9 per cent in 2007. In West Germany, almost 90 per cent of private sector R&D employees are employed in the manufacturing sector; however, in East Germany barely three-quarters. In general, the development of the East German manufacturing sector is more favourable than in the total East German economy. R&D employment increased by 15 per cent between 2000 and 2008 (excluding West Berlin: 2,221 R&D employees); in the total economy, on the other side, it increased only by 8 per cent (1,750 R&D employees).⁵ R&D employment especially increased in middle-sized and large companies. However, when compared with West Germany, East German industrial research lags in several ways:

- There are few R&D performing large companies in East Germany. In 2008, two thirds of the R&D employees were working in SMEs. In West Germany, it was only twelve per cent.

⁵ See Konzack, T., Herrmann-Koitz, C., Horlamus, W.: Wachstumsdynamik und strukturelle Veränderungen der FuE-Potenziale im Wirtschaftssektor Ostdeutschlands und der neuen Bundesländer. FuE-Daten 2005-2008. EuroNorm GmbH, Berlin 2009.

Table 2

R&D personnel as a percentage of total employment in research intensive industries 2007

	East Germany	West Germany
R&D intensive industries	4.7	7.3
Chemical industry	5.1	8.7
Office machinery and computers	9.2	22.9
Communication equipment	14.1	12.3
Medical and precision instruments	9.2	7.6
Machinery and equipment	3.1	3.9
Electrical machinery and apparatus	1.5	3.1
Motor vehicles	1.8	10.9
Other transport equipment	2.0	7.9

Sources: Regional Accounts, statistical offices of the Federal States; NIW (SV Wissenschaftsstatistik); calculations by DIW Berlin. **DIW Berlin 2010**

In high-technology sectors in East Germany, the share of research personnel tends to be lower.

- East Germany's R&D intensity is low in comparison to that of West Germany, particularly in two structurally important and highly productive industries: motor vehicles and chemical (table 2).

Approximately ten per cent of R&D employees were employed by non-profit external industrial research institutions (IRI) in 2008. IRIs emerged from the GDR's⁶ institutes of the academies of sciences and the research establishments of state holding companies. Most IRIs are non-profit organisations; however, they do not receive basic financing from either the German Federal or Länder governments, unlike the Fraunhofer Institutes. The IRIs are important providers of R&D services for industrial companies (mostly SMEs). Their employment increased by over 30 per cent between 2000 and 2008.

Similar innovative behaviour by East and West German establishments

Further information about the East German innovativeness is provided by comparing innovative behaviour and economic performance of East and West German firms. The underlying data is here the IAB Establishment Panel.⁷ According to this,

⁶ GDR is the former German Democratic Republic.

⁷ The IAB Establishment Panel is a representative, annually conducted survey of German establishments with at least one employee being subject to social security contribution. The IAB Establishment Panel started in 1993 for West Germany and expanded to East Germany in 1996. In the meantime, nearly 16,000—about 6,000 East German and 10,000 West German—establishments from all industries and of all size classes participate in this survey annually. The analyses were conducted by the DIW Berlin via controlled remote data processing.

Table 3

East and West German R&D and innovation behaviour of manufacturing establishments

	East Germany	East Germany
	2007, extrapolated average	
Share of establishments with...		
new innovative products	48.2	47.7
completely novel products	13.5	11.6
new processes	16.9	24.0
R&D activities	10.3	11.4
Share of establishments cooperating in R&D with ...		
other businesses	5.3	5.5
universities/colleges	5.1	4.7
external consultants (consulting, engineering offices)	3.4	3.7
Share of R&D personnel ¹	1.5	1.3

¹ Those personnel which are solely occupied with R&D are calculated with factor 1. Those who work occasionally in R&D are calculated with factor 0.5.

Source: 2007 wave of the IAB Establishment Panel data, calculations by DIW Berlin. **DIW Berlin 2010**

East and West German research and innovation behaviour of industrial businesses harmonized.

innovation activity by East German plants is not significantly different from West German counterparts. This can be seen through a simple comparison: In 2007, the share of the establishments with product

innovations in all manufacturing establishments of a particular region (innovator quota) was 48 per cent in both East and West Germany. The share of establishments with completely novel products (i.e., products new to the market) was 13.5 per cent in East Germany and 11.6 per cent in West Germany (table 3). Even when controlling for firm-related and regional factors like size, age and industry, the results remain largely unchanged. It is only with the introduction of products new to the market that East German establishments are ahead of the West German ones. Obviously, East German plants are more likely to implement radical innovations in order to access new markets.

Still lower economic performance of East German innovators

East German innovating establishments exhibit, on average, slower employment growth, lower sales productivity and export intensity—this still holds when controlling for firm-specific and regional attributes (table 4). This might be related to the fact that East German plants are suppliers and often do not have brand recognition as a final producer.

Table 4

East and West German innovation output of innovative manufacturing establishments

East and West German innovation output of innovative manufacturing establishments

	employment growth 2005 to 2008	turnover growth 2004 to 2007	productivity 2007	export intensity 2007
Model:	(1)	(2)	(3)	(4)
East Germany	-0.042**	0.02	-0.179***	-0.115***
West Germany		<i>reference category</i>		
Number of employees 2005 (log)	0.013	0.098***	0.366***	20.732***
Number of employees ² 2005 (log)	-0.003*	-0.010***	-0.020***	-1.043***
Share of the employees with university degree 2005	0.286***	0.086	1.090***	55.483***
Age of establishment				
Up to 5 years (d)	0.123***	0.142***	0.107	2.875
Above 5 years (d)		<i>reference category</i>		
Headquarters	-0.012	-0.003	0.149**	1.023
Subsidiary	-0.003	-0.026	0.367***	-1.112
Independent establishment		<i>reference category</i>		
State of technical facilities (from 1=recently developed to 5=extremely outdated)	-0.031***	-0.002	-0.052**	1.228
Intercept	0.144***	-0.153*	10.508***	-80.432***
N	1 521	1 299	1 358	1 474
Adjusted R ²	0.039	0.065	0.423	
Pseudo R ²				0.080

Dependent variables are measured as follows: (1) log (employment 2008/ employment 2005), (2) log(sales 2007/ sales 2004), (3) log(productivity 2007), and (4) export share in 2007, as percentage. The models (1) to (3) are estimated using the OLS. The model (4) is estimated employing a tobit regression.

Beyond the listed variables, the models also include industry-specific and regional dummy variables.

(d) discrete change of the dummy variables from 0 to 1. *, **, and *** refer to 10, 5, and 1 per cent significance levels.

Sources: Waves 2005, 2007 and 2008 of IAB Establishment Panel date, calculations by DIW.

DIW Berlin 2010

Innovation output of the East German manufacturing establishments is lower than that in West Germany. Frequently functioning as supplier plays here a formative role.

Furthermore, there are fewer capable clusters in East Germany. Consequently, East German companies benefit less from the geographical proximity to important regional actors, like clients, suppliers and contractors. Due to the lower economic performance, East German innovators face greater difficulties than their West German competitors when trying to self-finance R&D and innovation expenditures.

Promotion of industrial R&D in East Germany

In order to strengthen R&D and innovation, the German Federal and Länder governments support East German companies and research institutions in several ways. The spectrum of the state led innovation and research policy support system is very broad: It encompasses financial support of R&D and innovation activities in firms and research institutions; support of cooperation, networking and cluster formation, technology oriented start-ups, as well as institutional support for research institutions and knowledge transfer facilities. The prevailing support form in East Germany is the technology neutral support by granting of funds which is highly suitable for promoting SMEs' R&D and innovation activities.

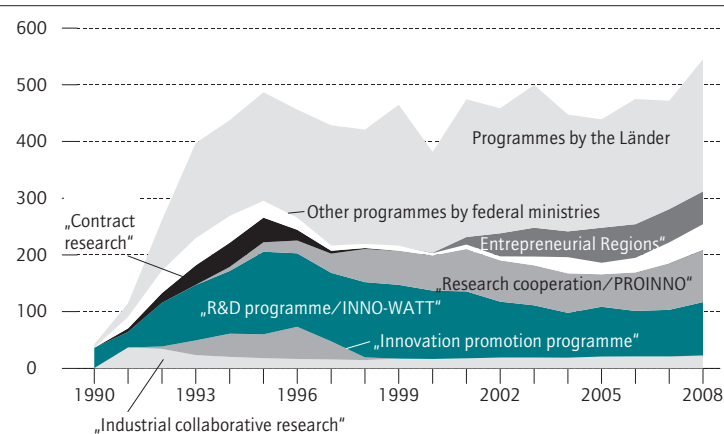
The Federal Ministry of Economics and Technology's support of single-company R&D projects (the "special R&D promotion programme" and the "INNO-WATT" programme) was a main building block of the technology open promotion of R&D, technology and innovation at the federal level during the 2000 to 2008 period. Within these programmes, R&D funding was granted to East German companies and non-profit external industrial research institutions.

Further steps have been taken through programmes that support regional and supra-regional R&D cooperation via subsidies for project partners' (research institutions and companies) R&D expenditure, as well as via subsidies to initiate and manage such networks and collaborations. The Federal Ministry of Economics and Technology's most comprehensive support programme—the "PRO INNO/PRO INNO II" programme—promotes R&D cooperation projects between firms and research institutions, with the share of grants for East Germany during the evaluation period equalling about 50 per cent. The Federal Ministry of Education and Research focuses its technology open promotion on regional innovation networks and the support of public research institutions.

Figure 3

East German technology neutral granted funds 1990 to 2008

In million Euros



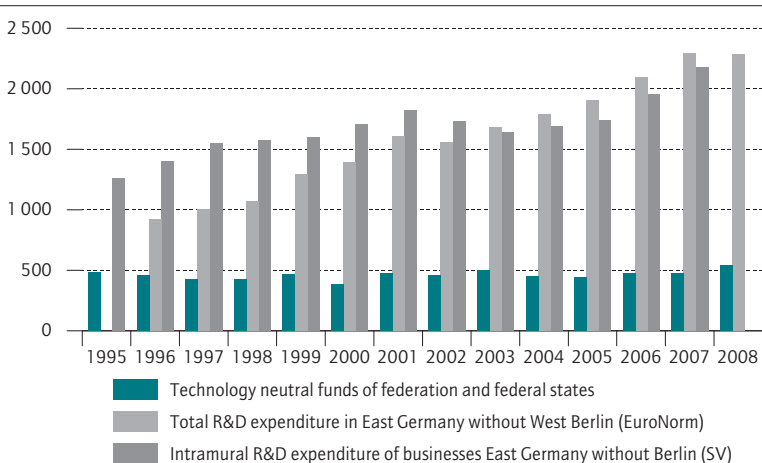
Sources: Federal Ministry of Economics and Technology, Federal Ministry of Education and Research, calculations by DIW Berlin. **DIW Berlin 2010**

Upward trend: 545 million Euros were granted to technology neutral support research programmes in 2008.

Figure 4

East German business R&D expenditures and grants of technology open support programmes in 1995 to 2008

In million Euros



Sources: Federal Ministry of Economics and Technology; Federal Ministry of Education and Research; Länder, SV Wissenschaftsstatistik; EuroNorm, calculations by DIW Berlin. **DIW Berlin 2010**

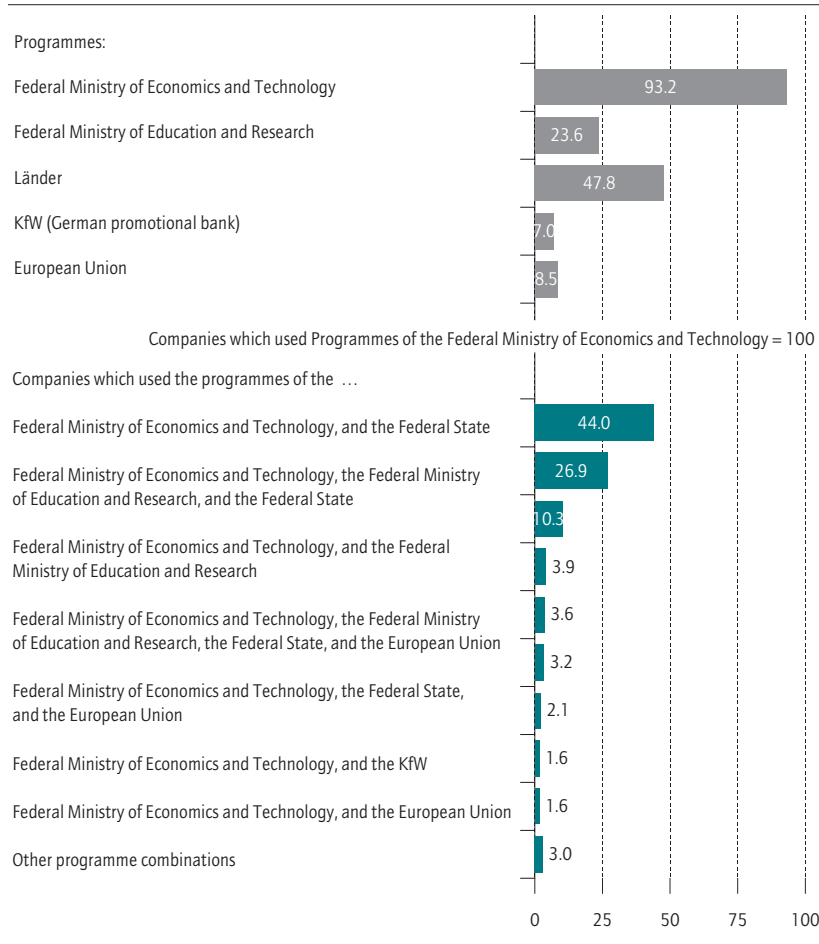
Technology neutral co-financing quota decreased.

The East German Länder direct their support at strengthening the specific industries and technology fields, as well as at selecting regional priorities. Both the Federal and Länder governments have largely comparable promotion modalities.

Figure 5

Utilization of the R&D or innovation support through manufacturing companies

In per cent



Source: DIW Berlin surveys conducted in autumn 2009.

DIW Berlin 2010

Almost all supported manufacturing companies took advantage of the Federal Ministry of Economics and Technology grant programmes.

The total amount of funding dedicated to technology neutral support was about 380 million Euros in 2000. It expanded to 545 million Euros in 2008. The increase by the Federal Government was slightly greater than that of the Länder (figure 3). At the federal level, the Federal Ministry of Economics and Technology’s share still outweighs that of the Federal Ministry of Education and Research.

The Federal Ministry of Economics and Technology designed for East Germany two programs:

- First was the “FuE-Sonderprogramm Neue Bundesländer”, which was ultimately replaced with “INNO-WATT”. These are the

dominant instruments, with a total budget of 840 million Euros through 2008.

- The second largest programme, “PRO INNO/PRO INNO II”, supported companies with 649 million Euros.
- The third largest programme, with grants in excess of 200 million Euros, is the “InnoRegio” of the Federal Ministry of Education and Research.

The share of co-financing of technology neutral support programmes in the expenditure on R&D performed in businesses fell slightly during the period under examination (figure 4).

Technology neutral support is tried and tested

In order to explore the effects of the R&D support schemes on R&D and innovation activities, in 2009 DIW Berlin conducted a survey of companies and non-profit external industrial research institutions that were subsidized between 2000 and 2008 by the Federal Ministry of Economy and Technology as well as the Federal Ministry of Education and Research within the framework of the technology open support R&D programmes. A total of 855 companies and institutions took part. The response rate was 25 per cent (70 per cent for the non-profit external industrial research institutions). For those companies that perform R&D continuously, the response rate was one third. Most of the subsidized companies and institutions that participated in the survey are from the manufacturing sector. About one third of the respondents are in knowledge-intensive services. About seven per cent are non-profit external industrial research institutions.

Few windfall gains

Almost all industrial SMEs that were supported by innovation policy programmes were promoted by the Federal Ministry of Economic and Technology; half of the SMEs were promoted by their respective Länder government and one quarter by the Federal Ministry of Education and Research (figure 5). The non-profit external industrial research institutions took advantage of a wider range of support than did industrial SMEs or R&D service companies. More frequently programmes from the Federal Ministry of Education and Research, their local Länder government, as well as the European Union, were used.

Nearly 81 per cent of the manufacturing companies find that the public support contributed to their R&D undertakings (figure 6). For many firms, R&D pro-

motion means planning reliability as public funding for R&D projects is typically granted for two or more years (46 per cent). Furthermore, support programmes helped a wide array of companies to expand their R&D activities (43 per cent) or to undertake additional R&D activities (37 per cent). Finally, 38 per cent of the companies found new partners for R&D cooperation in the framework of the subsidized projects.

Using an econometric model,⁸ the influence of the public R&D funding intensity (R&D subsidies in relation to sales) and the effects of other factors on the privately financed R&D intensity (self-financed R&D expenditure over sales) is estimated. The results show that public funding positively influences firm self-financed R&D (table 5). Therefore, one can assume that research support and self-financed R&D complement each other and, thus, public promotion does not displace privately funded R&D⁹.

R&D intensity increased, R&D cooperation pronounced

The evidence on the stimulus of public promotion is also attained through the analysis of business development. The R&D employment intensity of the subsidized companies grew significantly over the sample period (table 6). In the manufacturing sector, it increased from 11 per cent (2000) to 13 per cent (2008).

Companies and research institutions intensely cooperate with other firms and research institutions. Two fifths of the manufacturing companies provide R&D services also for other firms; half contracted out R&D to higher education institutions and other firms, but less frequently to research institutions. Almost all manufacturing companies collaborated with other companies, universities and research institutions. Barely 70 per cent of the firms have cooperation partners located in East Germany; 45 per cent cooperate with partners in West Germany. The vast majority of the non-profit external industrial research institutions cooperate with partners in West Germany, while only a third cooperates with foreign partners.

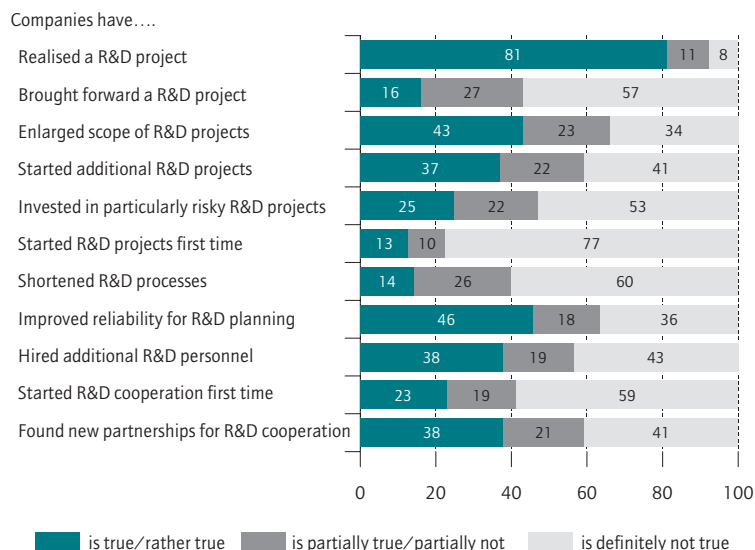
⁸ Here, a tobit model was used, which allows to analyse the influence of several independent variables on a dependent variable with a limited range (in this case from 0 to 100).

⁹ The predecessor study that examined the R&D-promotion during the 1993-1999 period and other evaluations came to similar results. See Belitz, H. et al. (2001) I.c., Lo, V., Kulicke, M., Kirner, E.: Untersuchung der Wirksamkeit von PRO INNO—PROgramm INNOvationskompetenz mittelständischer Unternehmen. Modul 2: Analyse von in den Jahren 2001/2002 abgeschlossenen FuE-Kooperationsprojekten. Stuttgart, Fraunhofer IRB 2006.

Figure 6

Manufacturing businesses perspective on the importance of the promotion

In per cent



Sources: DIW Berlin survey conducted in autumn 2009.

DIW Berlin 2010

Without support programmes there is less research.

Table 5

Influence of the self financed R&D intensity on the support intensity in 2008

Tobit Model estimation results

	Model 1	Model 2
revenue share of the support	1.118***	1.083***
export ration	0.053**	0.054**
age of business		
up until 5 years (d)	-1.79	-2.204
above 5 years (d)		<i>reference category</i>
number of employees (ln)	-1.604***	-3.583*
number of employees2 (ln)		0.262
consortium (d)		-1.612
received R&D commissions (d)		3.591***
constant cooperation in R&D (d)		-2.338
competition position in R&D (1=poor, 5=exceptional)		1.083*
constant	9.457***	10.481*
N	373	373
Log-likelihood	-1360.1	-1354.0
Chi ²	121.2***	133.6***

The dependent variable is the self-financed R&D intensity, meaning the share of the R&D expenditures subtracted from revenue support.

(d) Stands for a discrete alteration of the Dummy-variable from 0 to 1. * p<0,10; ** p<0,05; *** p<0,01.

Source: DIW Berlin surveys conducted in autumn 2009.

DIW Berlin 2010

Support intensity positively influences businesses self-financing R&D capacity.

Table 6

Employment and revenue of the subsidized manufacturing companies 2000 and 2008

	2000	2008	Index 2008 (2000 = 100) ¹
R&D personnel in percentage of the employees	10.9	13.4	123
R&D expenditure in percentage of the revenue	7.0	8.1	116
Support intensity in percentage of the total R&D expenditure	21.0	23.0	109
Revenue per employee (thousand Euros)	97	139	144
Employee per business (number)	30	43	143
Sales to customers ... (percentage of the revenue)			
In the near surrounding	9.1	6.3	69
Other East German destinations	25.1	16.3	64
In West Germany	42.5	46.2	109
Abroad	23.3	31.2	134

¹ Only cases with data for two years were included.

Source: DIW Berlin surveys conducted in autumn 2009.

DIW Berlin 2010

The supported businesses grew and increased their productivity.

search institutions, the situation is, in this regard, similar.

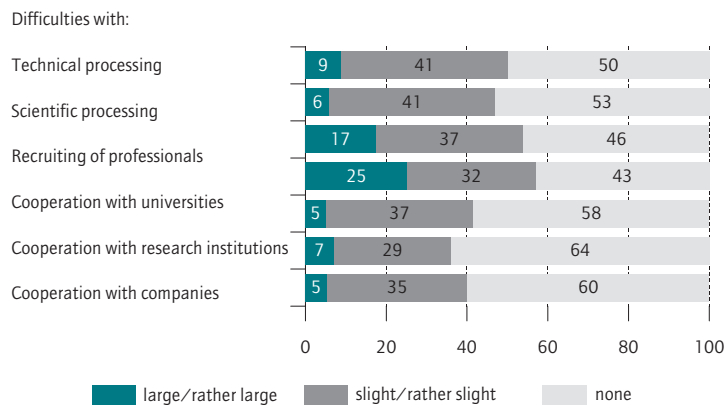
According to the respondents, R&D contributed to firm development and competitiveness. For instance, the mean size of the subsidized SMEs expanded from 30 to 43 employees between 2000 and 2008. Sales productivity increased, on average, by 40 per cent. The share of the sales to clients in West Germany increased over the same time from 43 per cent to 46 per cent; and the turnover share to foreign clients—from 23 to 31 per cent. Thereby, sales, exporting and employment evolved above average in highly innovative companies.

The importance of innovations for companies' competitiveness is clearly seen in the improvement of product novelty: Companies that developed new products between 2000 and 2008 assessed their competitive position better than those which developed existing products further or which did not introduce any novelties at all.

Figure 7

Difficulties of manufacturing companies with their R&D activities

In per cent



Source: DIW Berlin survey conducted in autumn 2009.

DIW Berlin 2010

Only a few businesses have difficulties with their R&D performance. Support programmes contribute to this.

Positive capacity development of non-profit external industrial research institutions

By developing technological solutions for industrial clients or by offering preconditions for the application of new technologies, the non-profit external industrial research institutions contribute to enhancing SMEs' competitiveness. Thus, they do not just contribute to one specific region, but are effective nationwide. Approximately 40 per cent of their sales stems from West Germany and abroad. The increased performance of these institutions is reflected in the growth of the total sales and employment, which increased one-fourth between 2000 and 2008.

Promotion diminishes financial bottlenecks and increases competitiveness

Only a handful of companies had difficulties with the execution of the subsidized R&D projects ("large" and "rather large" difficulties in figure 7), whether technical or scientific treatment or cooperation. Comparatively high is the share of firms that complain about the lack of qualified personnel (25 per cent) and insufficient funding for R&D projects (17 per cent). For non-profit external industrial re-

Industry oriented innovation policy to be continued

East German industry has dynamically developed over the last decade and the capacities in industrial research have grown as well. However, shortcomings still exist: In relation to the population, East Germany's manufacturing sector is lower than the one in West Germany. East Germany's R&D-intensity is half of the West German level. Industrial research mostly takes place in SMEs and non-profit external industrial research institutions, whereas in West German manufacturing R&D is performed predominantly in large companies.

The Federal and Länder governments subsidize East German industrial research mostly in the framework of their technology neutral support programmes with approximately half a billion Euros annually. Without this support there would be significantly less research in East Germany. Yet, the well-developed East German public research infrastructure is not able to make up for the limitations in applied industrial research.

Future support strategy should prioritize the promotion of companies and research institutions which are the main actors of innovation-driven growth in East Germany, that is, R&D performing SMEs from the manufacturing sector, the non-profit external industrial research institutions and the R&D service providers. In comparison to West German competitors, innovation oriented SMEs in East Germany have fewer returns on innovation activities and, thus, disadvantages in self-financing R&D. They need noticeable stimuli to secure and extend their R&D and innovation activities. A proven approach of technology neutral promotion is the support of R&D projects through grants. Technology neutral R&D support should continue including an emphasis on cooperation.

In the meantime, R&D and innovation promotion measures for SMEs in East Germany expanded nationwide. In the Central Innovation Programme SME (“ZIM”) of the Federal Ministry of Economics and Technology also larger sized small businesses with 250 to 1,000 employees received support in 2009 and 2010. This extension should be maintained for East Germany subject to the results of the ongoing ZIM evaluation.

Non-profit external industrial research institutions prove to be important partners for manufacturing companies. Without public support, they are not viable, though. The Federal government improved the financial framework of these institutions by the promotion of their pre-competitive research projects and investment grants for their R&D facilities in the model programme called “Investitionszuschuss technische Infrastruktur” (“INNO-KOM-Ost”). However, these programmes are temporary and these research institutions are only able to operate in the medium term, if they receive reliable public support. Continuation of support to non-profit external industrial research institutions is therefore highly recommended. The decision making process over grants should be bound to the evaluations of the research institutions, which are conducted regularly by the Federal Ministry of Economics and Technology.

The positive development of East German industrial production and productivity is also driven by the “import” of knowledge and technology from West Germany and abroad. The investment support measures were playing here a key role, which, in the future, will most likely be scaled back. Therefore, it is imperative to develop existing highly productive locations via clustering of R&D and other high-quality business operations as well as to support green-field investments with substantial own R&D. There are some examples in East Germany for successful public promotion of developing integrated production and R&D locations, mainly in the field of new technologies, such as in the case of semiconductors and/or nanotechnology, as well as photovoltaic. In such cases, the Federal and Länder governments provided long-term support with a broad spectrum of measures for the settlement and further development of production locations for producers, suppliers and their interaction with local research and educational infrastructure.

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