Different Instruments for the Promotion of Technology-Based Firms in Germany (Grants, Risk Capital, Credit Financing) - an Overview

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Since the beginning of the eighties the German Federal Ministry for Research and Technology (BMFT) has been supporting new technology-based firms (NTBF) with two special pilot schemes. The first was the so-called pilot scheme **"Promotion of New Technology-Based firms" (TOU)** (1983-1988) and the second is the pilot scheme **"Venture capital for New Technology-Based Firms" (BJTU)**, which started in 1989 and will end this year.

When the first programme, the pilot scheme TOU, was designed, the conditions in West Germany were not favourable for NTBF:

- the supply of venture capital was very small and not focused on technology firms or new firms at all,
- there were no specialised private or public consultancy firms with experience in providing advice for new firms,
- there was a lack of rapidly growing firms founded by successful entrepreneurs, which could function as models for potential founders,
- there were no incubator or technology centres with a supply of real estate and advice for NTBF.

However, many different institutions were planning to establish venture capital firms, incubator centres or design special consultation services for NTBF at this time.

Due to the unfavourable circumstances, the pilot scheme TOU was designed not only as a programme to promote NTBF, but also to gather more experience and detailed information about the special problems and requirements of NTBF. An important aim of this Federal programme was also to promote the relevant environment for such firms by creating "a demand" for venture capital firms, private and public advice centres, credit institutions, incubator centres and so on.

When the pilot scheme TOU ended in 1988, the situation for NTBF had changed substantially, but there was still the necessity for the state to support such firms. The main instruments of this pilot scheme were grants and additional credit guarantees. As described later, the central insight of this programme was that NTBF primarily requires equity capital to finance R&D and also to finance the marketing of their innovative products. That's the reason why the subsequent promotion programme, the pilot scheme "Venture capital for new technology-based firms", aims to lower the barriers to the supply and demand for venture capital.

Besides the two pilot schemes for NTBF, in 1992 the BMFT started a loan programme for small technology-based firms to stimulate and support the innovation process in such firms.

Before describing these three programmes in detail, I will give a short overview of the advantages and disadvantages of grants, venture capital and short-interest loans from the viewpoint of NTBF (see Tab. 1) and the public sponsor (see Tab. 2). The disadvantages of the different promotion instruments result mainly from the typical design of promotion programmes via grants, venture capital or low-interest loans.

The three programmes "Promotion of New Technology-Based firms" (TOU), "Venture capital for New Technology-Based Firms" (BJTU) and "R&D credit programme for small technology companies" are models for these three promotion instruments. The main features and insights from these programmes are shown in Fig. 1 to 3.

Tab. 1: Pros and cons of promotion instruments from companies' viewpoint

Instrument	Advantages	Disadvantages
Grants:	- Supply of funds without the obligation of repayment - No liquidity burdens in the subsequent years independent of the success of the innovation project	- Only covers part of the projects' costs (usually a max. of 50 %), problems with financing own share - Selective promotion of certain technologies - Usually expensive application procedure, for small companies in particular - Subsidies as extraordinary income increase tax burden
Equity capital	Financial advantages: - Full financing of projects is possible - Strengthens equity capital base and increases the ability of firms to borrow - Financing of company as a whole - Frequently leads to greater scope for supplementary financing Non-financial advantages: - Increased examination of the project from an economic viability standpoint - Usually less expensive application procedure - Less restrictive limits of project-related spending - Possibility of complete control of business course by the investor - possibility for the investor to support management - mostly support in tieing up financial packages - Strong interest of investor in success of company - Equity payments expenditure reduces tax burden	Financial disadvantages (in the case of dormant equity holdings): - Liquidity burden from equity payments - Liquidity burden from repayment of capital Non-financial disadvantages: - Problems with the search for investors - Sales of shares, i.e. investors's right to speak (with shares) - No or little influence on sale of company's shares by the previous shareholders
Low-interest loans with credit guarantee of public sponsor	- Reduction of interest costs - No or only limited provision of collateral - Supply of funds that would otherwise not be possible - Possible coverage of a large part of the innovation expenses	- Liquidity burden from interest and redemption payments - Reduction of equity capital ratio to the extent that danger of indebtedness occurs - Repayment of funds independent of success - Particular disadvantage in the case of no credit guarantee of public sponsor: problem of providing collateral

Tab. 2: Evaluation of promotion instruments from the public sponsor's viewpoint

Instrument	Advantages	Disadvantages
Grants	Direct influence on which company is sponsored under which conditions Targeted promotion without distribution losses	High administrative expenses Danger of political influence on promotion decisions
Equity capital and low-interest loans	Promotion without own administrative costs Indirect large share of promotion of project's costs without conflict with the EU regulations on financial assistance Stimulation of the market forces to finance small and new technology companies Utilization of evaluation apparatus of professional investors	Distribution losses by delegating financial decisions to third parties Attainment of promotion goals dependent on financing behaviour of the venture capital firms and credit institutions

Fig. 1: Pilot scheme "Promotion of New Technology-Based Firms" (TOU) (1983 to end of 1988)

What was promoted?

- Subsidies towards funding business plans of technical or market experts (up to DM 54 thousand)
- Subsidies towards development work for an innovative product, process or a technical service (up to DM 900 thousand)
- Guarantees for bank loans to finance the production preparation and market introduction (up to DM 1.6 million)

What were the unusual features of this promotion scheme?

- The first promotion programme specially designed for NTBF
- Only little experience of the public sponsors with the specific requirements and problems of such new businesses before its launch
- Not all new businesses were promoted, promotion depended on their location, the technology involved, or the participation of a venture capital firm
- Not just financial promotion, but also consultation and advice offered for all technical and non-technical questions
- Very high promotion quotas (in the case of grants: up to 75 percent, in the case of credit guarantees: up to 80 percent)

What insights did the pilot scheme TOU give?

- A subsidy programme that takes into account the high capital requirement of NTBF is very expensive for the public sponsor (about DM 325 million for 333 firms);
- NTBF have hardly any technical problems as their founders are very experienced;
- most of the founders are from industry (about 2/3), only a good fifth from university or other research institutions;
- NTBF need equity capital more than anything, not only for the R&D stage, but also for market introduction and diffusion;
- apart from capital, they mostly need support in setting up the company and opening up the market;
- the advice requirements of NTBF are too specialised, an independent commercial advice centre would not be viable;
- venture capital firms avoid seed financing to a great extent as the high risks involved are not linked with corresponding prospects

Fig. 2: Pilot scheme "Venture Capital for New Technology-Based Firms" (BJTU) (Duration: Mid-1989 - End 1994)

What is promoted?

- Investments in NTBF to develop innovative products, processes and services as well as production preparation and market introduction
- The instruments are safeguarding against risks and/or refunding of investments for investors

What are the unusual features of this promotion scheme?

- Investors and not the NTBF are direct beneficiaries with very reasonable conditions
- no regional restrictions, no limitation of the promoted technologies
- no complex application procedure, programme handled by two public banks
- broad circle of possible investors: venture capital firms, companies, private investors, credit institutions
- provision of capital via direct and dormant investments as well as loans with profit (and risk) participation
- varying intensity of management support by investor depending on type (private or public venture capital firm, company, credit institution)

What insights has the pilot scheme BJTU given?

- Relatively high acceptance among NTBF and investors, 304 commitments to investments by about 40 per cent of the German venture capital firms up to the end of August
- significant regional differences, depending on the activity of regionally restricted investors;
- investment capital is a suitable instrument for the promotion of NTBF
- large leverage effect of investment capital for attracting other funds
- promotion effect is high; at the same time, the expense is clearly lower for the public sponsor than is the case with a promotion via subsidies
- investors invest significantly less in NTBF without state promotion, i.e. state promotion is still needed for seed financing
- most NTBF require less than DM 1 million investment capital, a few need a lot more, so fixing an upper limit, which is too low, should be avoided.

Fig. 3: R&D-Credit programme of the BMFT for small technology companies (since 1992)

What is promoted?

- Loans to finance R&D work on innovative products, processes and services
- Interest rate reductions for small technology companies (up to DM 40 million annual turnover) and limited liability for house banks

What are the unusual features of this programme?

- Loans of up to DM 2 million
- Up to 80 per cent coverage of innovation expenses
- Not just investments, but above all operating resources can be financed
- Even if innovation projects fail, the loan have to be paid back

What insights has the R&D-credit programme given?

- Banks' readiness to implement R&D lending schemes varies and tends to be rather small;
- The decisive point is the provision of security for such loans, banks appear very averse to taking risks
- Enquiries of small technology companies remained significantly below that expected
- In economically difficult times, companies shrink from loan-financed innovation projects

The R&D credit programme will probably replaced by another credit programme with different conditions, especially concerning the banks' role and the problem of the provision of security for such loans. This new project started two months ago with an overwhelming demand. But both credit programmes were not designed for NTBF.

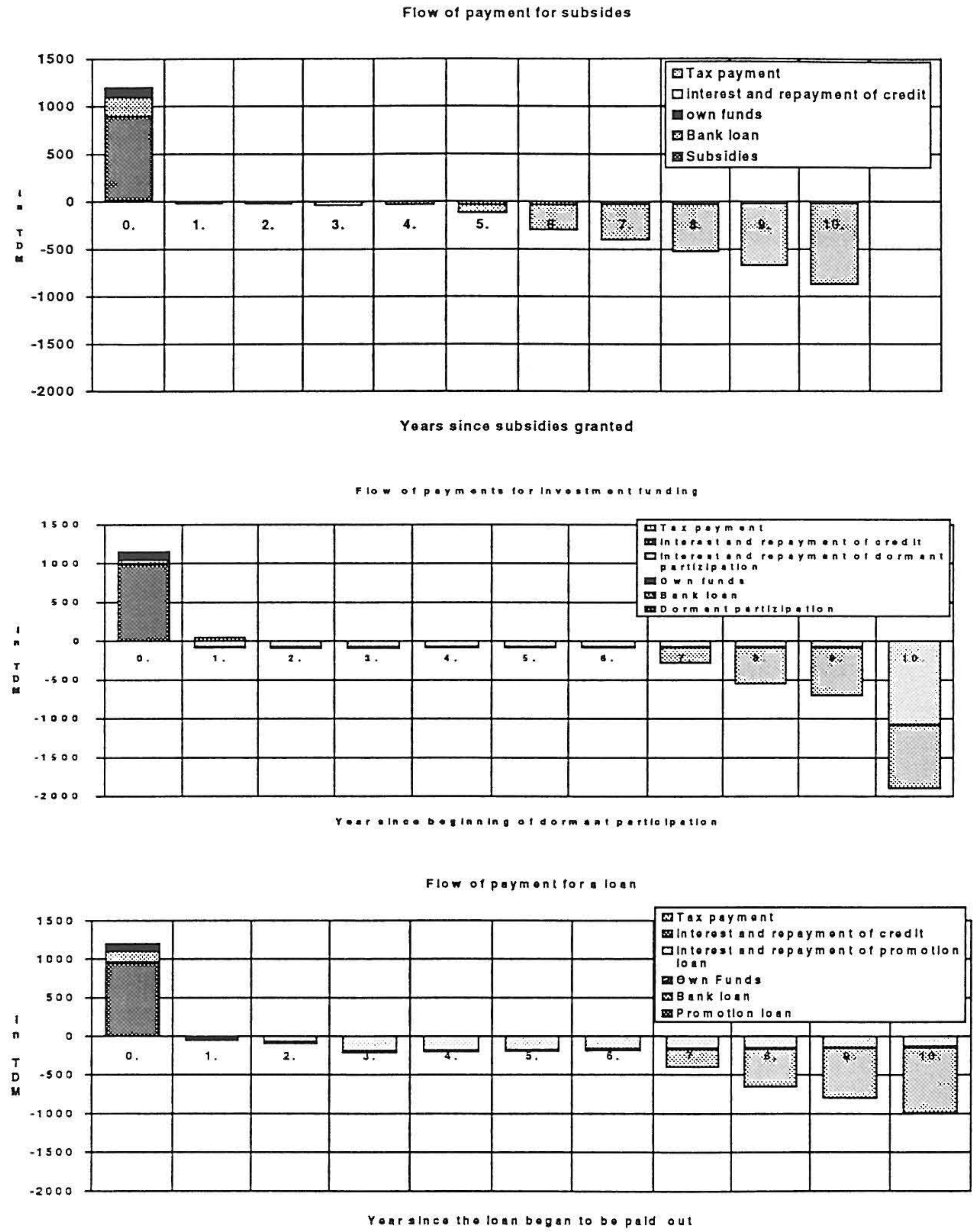
The following short calculations should demonstrate the effects of the different instruments for a NTBF in a ten-year-period. In the first case, promotion by grants, we assume, that the innovation project is mainly financed by grants (900,000 DM) and additionally by a longterm-loan (200,000 DM) and own funds (100,000 DM). The whole innovation project costs one million and two hundred thousand DM. Besides the payments for interest and repayment of the loan, the NTBF has primarily to pay taxes, which increase from the fifth to the tenth year. During the ten years, the firm has to pay in total 3 mio. DM for taxes and for the loan.

In the case of promotion by venture capital, we argue only for dormant participation, the typical form of investments in the pilot scheme BJTU. The innovation project is financed by venture capital (1 mio. DM), a long-term loan (100,000 DM) and own funds (100,000 DM). During the ten-year-period, the NTBF has payments for interest and repayment of the loan, for interests and pay-back of the dormant participation and for taxes. The highest amount of payments will be in the tenth year, due to the pay-back of the dormant participation. But the burden for taxes will be later and lower, as in the case of grants. During the ten years, the firm has to pay in total 3.9 mio. DM for the dormant participation, the loan and for taxes.

In the case of promotion via low-interest loans, the innovation project is financed mainly by this loan (1 mio. DM) and additionally by a bank loan (100,000 DM) and own funds (100,000 DM). Low-interest loans are characterised by annual pay-backs, decreasing interest payments, and tax payments, which are later and lower, as in the case of grants. During the ten years, the firm has to pay in total 4 mio. DM for the loan and for taxes.

These short examples demonstrates, that grants are the most favourable promotion instruments for NTBF, if you only analyse the amount of inflow and payments. But grants don't alter the equity base of such firms and they are also very expensive for a public sponsor.

Fig. 4: Flow of payment in the case of grants, venture capital and low-interest loans



What insights have the two pilot schemes TOU and BJTU given for the promotion of NTBF in the new Länder?

1. The success of promotion via subsidies or investments depends to a great extent on the reaction of the specific environment (above all banks and venture capital firms)
2. As the credit system and the venture capital market still have to be established in the new Länder, promotion is only possible via subsidies. Promotion via investments or loans requires the presence of qualified intermediaries.
3. Due to the small equity capital, very high promotion quotas are necessary to enable R&D work to be carried out.
4. Technical problems only play a small role in the promoted companies in the new Länder as well. Technical goals were frequently achieved.
5. The major problems of promoted NTBF lie in the fact that they have hardly any knowledge of markets or experiences with the market introduction of innovative products. These problems make great demands on the advisors.
6. The goal of the advice given must be a learning process of promoted company founders in order to qualify them to deal with markets and the management of a new company.
7. The insights into the specific problems of NTBF in the new Länder have to be diffused quickly to qualify venture capital firms and credit institutions as well.
8. The failure rate of promoted NTBF may well be significantly above that in the old Länder (although no empirical evidence so far).