

Technology Transfer From Research Institutes To Small and Medium-Sized Enterprises.

TEFT - A Technology Transfer Program for SMEs in Norway
in cooperation with
IRC Norway - A EC Transnational Technology Transfer Project working in Norway

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Abstract

Efforts to increase R&D activity in small and medium sized enterprises - SME - are difficult. The Norwegian Research Council wanted to encourage the SME to change innovation practises, and put more R&D into their innovations. The TEFT program in Norway has taken a proactive approach through hiring scientists acting as technology brokers. TEFT I visited more than 1900 SME, and started 840 projects from 1994 - 1998. There was no application and little bureaucracy as far as SME are concerned. The projects encouraged long term relations between scientists and SME. The program has been a success. 30% of the SME returned instantly to the research institutes buying R&D projects. The innovation practise has changed.

TEFT 2 was launched January 1999. IRC Norway and TEFT works very close. Technology brokers in TEFT work also as Counsellors in IRC Norway. TEFT will be replaced by KOMPMEG in 2004. IRC Norway and KOMPMEG will continue the integrated operational cooperation.

1. Introduction

Small and medium-sized industrial enterprises (SME) play an important role in the industrial sector of all industrial countries. SME are making a substantial contribution to the creation of new jobs. Norway has 11.000 industrial enterprises. The SME in Norway with less than 10 employees (about 7.000) constitutes 70% of all industrial enterprises. SME with less than 100 employees constitute 95% of all enterprises and 50% of all employment in industry. But very few make use of research and development (R&D) as a part of their innovation activities.

The Research Council of Norway spends about 100 M Euro every year. Only 800 industrial companies have participated in the R&D work funded by the council.

The TEFT1 program started in 1994 with the intention of increasing the level of participation of SME in research activities. TEFT2 was launched in 1999 for another 5 years period. TEFT 2 will be replaced by KOMPMEG in 2004.

2. The research activity in SME in Norway

About 800 of the 4.000 industrial enterprises with 10 or more employees have been in contact with the Norwegian Research Council recent years. In 1993 approx. 350 SME had been engaged in research activities. This indicates that some of the enterprises are not in contact with the Research Council every year.

A large number of enterprises had not been in contact with the Norwegian Research Council or had done research by themselves. The authorities wanted to change the innovation practices in SME.

3. What does the theory describe as far as innovation is concerned

Nelson and Winter (1) have shown that technological change is a path-dependent and localised process based on the experimental learning and search activities conducted within SME. Changes in the innovative practices are not only embodied in machines and devices, but also in organisational routines of the SME. This is the tacit part of the knowledge base in the enterprise as far as innovation is concerned. The past history and the culture of the enterprise are dominating factors in determine what kind of network and outside resources an enterprise will use in their innovation. Research institutes have not been an important part of the innovation network to SME.

SME innovation practice is:

1. Innovation when necessary. Cost is rising or sale is down
2. Contacts main technology supplier and ask for help
3. If not, SME tries to mobilise other resources through networking

To change innovation practises, you have to change SME by intervening more deeply into the organisation culture, and the way SME does their innovation. A proactive approach by agents and a possibility to engage in a short-term research project with a researcher, that could be an instrument to change the innovation practises in SME.

4. The proactive approach – the theory

When meeting SME, they have expressed some thoughts about research and research institutes:

- *“Research is high tech and we are not involved in that”*
- *“I don’t know any researcher”*
- *“SME should not involve in R&D, it is too costly and risky”*

- *“Scientists are only writing papers for themselves”*
- *“Scientists are difficult to understand”*

From the start we knew that TEFT had to be proactive in the communication with SME. By proactive we mean “get into the car, visit SME, talk to the managers, make confidence, drink a lot of black coffee, convince them, and start a project”.

The proactive approach is based on the theory of marketing high level competence in an industry market. Market strategies for consultants are very much similar to marketing R&D. You can not market R&D like soap. The barricades of acceptance are high. Marketing strategies must be very personal, and based on a long-term relation. One must remember:

- The R&D market is very personal
- The R&D market is not rational
- The need of the customer is some times very unclear
- Both SME (buyers) and institutes (sellers) are very active in the preliminary inquire
- Good personal communication is vital

You must convince SME that R&D is better and more profitable then the old way of doing innovation. SME are cautious because they hesitate to leave old and proven ways of innovations.

5. The proactive approach - in TEFT

The TEFT-program hire a staff of 12, geographically based, technology brokers (called technology attaches in Norway) who are former scientists. The technology brokers are responsible for running the program in their regions. Knowing the R&D market very well, the technology brokers select SME they that fit into the target group for TEFT after defined criteria. The progress is as following:

1. The technology brokers are scanning public and private databases, newspapers, and other information sources to find SME in the target group.
2. The SME are contacted by telephone, and some preliminary information about the TEFT is given.
3. A visit to the SME are agreed upon (less then 1% refused any visit)
4. The technology broker manages to visit 2-4 SME a day during travelling by car.
5. During the visit the technology broker collects information about the SME, and discusses the needs and the possibilities for new and improved products or processes. Most SME have several technology subjects were external expertise could be helpful. The SME and technology broker makes a preferential list of potential projects. Approximately 40% of visited SME proceed with a project.

6. Back in the office the technology broker writes a short analysis of the company based on collected facts, personal impression and information from different databases (company audit). Based on this analysis a preliminary decision is made about TEFT funding.
7. The technology broker will look for a research institute and a scientist matching the needs of SME.
8. When the researcher matches the needs. TEFT is funding average 8.000 Euro. That is 75% of the project cost. SME is funding 25%. All intellectual property rights belong to the SME, and publishing is not allowed without SME consensus.

See figure 1 next page.

6. TEFT is making it easy for SME to deal with the research community

The research community is approaching SME, and there is **no application, and paperwork is absent as far as SME is concerned**. There is no bureaucracy, and the decision to fund a project is very quick. In some cases only 14 days, but average time is more. In retrospect, the absence of red tape is appreciated very much by the SME.

TEFT is not pushing any specific technology, comparing with what other research programmes do. TEFT is “a la carte” instead of a fixed menu.

7. Is a proactive approach changing the innovation practice among the SME?

During a 10-year program the Government has funded 200 MNOK (25 MEuro). The SME have paid 70 MNOK (8,5 MEuro) as their share of the program.

- **3600 SMEs** have been visited (43% of the target group)
- **1550 R&D** projects has been initiated
- 70% of the projects has been product related
- 30% of the projects has been process related

38% of the SME have changed their innovations practices indicated by the fact that they have ordered new projects in co-operation with R&D-institutes. (The aim was 25%). Average size of the R&D projects is 80.000 Euro

The research network of the SME is also changed by the fact that **68 % of the scientists** are still keeping contact with the SME after a TEFT-project. 48% of the scientists say that SME are in progress of initiating new projects.

The long-term contact between scientist and SME during the TEFT-project has initiated a positive interaction between scientists and SME. 85 % of SME report that communication with scientist was easy. This is in sharp contrast with the common belief that it is difficult to communicate with scientist.

8. Concluding remarks

TEFT 2 was launched January 1999 for another 5-years period. The program is initiating along the same lines as TEFT 1. The project financial limit was somewhat raised, and personal and industrial service enterprises are added to the target group. Due to the fact that many business development programmes are adopting the proactive approach, co-operation and co-ordination with other programmes was given higher priority. TEFT 2 will be replaced by KOMPMEG in 2004.

8. Additional remarks

IRC Norway and TEFT have been working close since 1995. Personnel from TEFT have been recruited to IRC Norway. From 1999, 11 of 12 TEFT brokers also worked as Counsellors in IRC Norway. The combination has given synergies, and the combination of a national TT program with IRC has been a "show case" for both Norway and for EC DG Enterprise.

One of the new objectives in TEFT 2 was to search for European competence to be used in TEFT projects. IRC Norway assists TEFT in finding EU RTD competence together with IRC Network - to be implemented in TEFT-projects.

References

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