

Strategies for Stimulating Breakthrough Innovation:

The role of Government, Industry and Science – the Nordic Debate

Modern science as we know it developed during the 17th century with little attention from governments and with a non-existing industry. Around the middle of the 19th century, it became an activity within the universities. Before that, they had been institutions solely for education. The full power of scientific research was fully appreciated by the middle of the 20th century, and scientific research as well as academic education went through a tremendous expansion during the latter half of the century.

In Sweden, government policy since the 1950's has been based on a firm belief that the creation of good conditions for science in general is a guarantee for economic growth, including the development not only of an efficient industry but also of an efficient welfare state. Such a strong confidence in science took a couple more decades to develop in Finland, and it then took a different direction there.

In the late 1960's it was noted in Sweden that general investments in scientific research were not sufficient to stimulate growth. The government played a stronger role in the planning of research, and scientific research was concentrated into so-called "sectorial programs" aimed at solving important problems that were politically defined in the different sectors of society. The results did not fully meet the expectations. This became obvious during the oil crises of the 1970's and, as a result, there was a partial return to academic self-governance of research in the 1980's.

Sweden had decided on a unique research policy already back in the 1950's, specifying that the universities would be the main research-performing bodies in the Swedish research organization. Around 1980, the dissipation of research results and the task of assisting industry and other organizations in their development work was defined, and this because "the third task" of the universities besides education and research. As a result of the focus on sectorial research and the policy of maintaining the universities as the research-performing bodies of the nation, the development of industrial research institutes was neglected, and Sweden still has a uniquely small research institute sector compared to other industrialized countries.

The oil crises of the 1970's also hit Finland. While Sweden chose the easy way of devaluation of its currency, Finland had by that time gained sufficient confidence in the power of science to choose knowledge and technology as a means to attack the problems. A coordinated policy was decided upon, where the different policy areas involved were brought together in close cooperation. The modern idea of viewing industry as a set of clusters of companies was applied, and TEKES, started in 1983, began to fund research and development work in such clusters of companies. In the beginning of the 1990's, Finland was hit by another serious crisis after the breakdown of the Soviet Union which had been an important trading partner. Unemployment rose to about 20%. Again Finland chose to use science and technology as an important means of attacking the problem. The modern concept of "innovation system" was applied and a broad cooperation that involved universities, research institutes, companies (in clusters), consumer organizations, public authorities and others developed such systems. The national Finnish research institute, VTT, was expanded and the universities were urged to develop their international activities. Finland developed a research system that not only produced knowledge of high quality but also had the capability to utilize new knowledge in its industrial development (Långtidsutredningen 2003).

The research policy in Sweden during the 1990's was "more talk than action". The decade was a decade of disagreement and rhetoric. Responsible ministers did not have much faith in the academic leadership. The debate concerned, to a large extent, the question of whether public funding should be channeled through research councils to "free" basic research or through public authorities that commissioned research with specified aims (need-oriented research). A public study, "Forskning 2000", advocated the former way, while the ministers of education and research wanted to put stricter reins on the university scientists. The debate was confused by the redirection of the "löntagarfonder" (funds originally set aside for political purposes) to independent foundations aimed at supporting strategic scientific research. The government took this as an excuse to reduce its spending on research by as much as 20% (Benner). This is clearly reflected in the average yearly growth in spending on research in the two countries during the period 1995 through 2000. This was partly compensated for by the new research foundations.

As a result of the different debates and the different political decisions taken in Finland and Sweden, the situation is different in the two countries. Sweden presently has a not very

sharply focused public research spending. Most of the industrially oriented research (about 80%) is directed towards the university sector, some twenty per cent to the research institute sector and essentially nothing to enterprises (Sörlin). However, the large international Swedish companies have had a considerable research activity within the companies, and this has to some degree compensated for the lack of research institutes in Sweden. The in-company research is now being cut back as these large companies become internationally owned and operated. In contrast, about half the industrially oriented research in Finland is performed in research institutes and the remainder in universities and companies.

In Sweden, the government funding for industrially oriented research is slightly less than that in Finland, a country about half the size of Sweden. While the Finnish research policy has shown a strong record of continuity and a long-term view, the Swedish policy has been under continuous debate and is still rather vague. While the Swedish research community is rather fragmented with very little money and people crossing the border between universities and private companies, the Finnish situation is still characterized by cooperation in clusters and clear innovation systems. Furthermore, when Finland decides to fund a certain research program there is also a planning in parallel for how to use the results that are expected to be obtained.

As a conclusion from this comparison of the Nordic (or rather the Finnish and Swedish) debate over the last decades and its results, one may state that

- when the three parties - industry, government and science - work together, great results will be achieved,
- high quality basic research needs to be complemented by high quality need-oriented R&D and preparations for the result implementation in order to gain the best benefit from the efforts, and
- active and well-composed innovation systems are needed to transform research efforts into prosperity for the welfare state.

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