

STRATEGY FOR SCIENCE IN THE MODERN UNIVERSITY

by

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Strategy for Science in the Modern University

A Comment by Werner Meissner

The President's seal of one of the finest academic institutions in this country bears the motto: "Die Luft der Freiheit weht". Stanford has taken these words from Ulrich von Hutten, sixteenth century German poet and fighter for freedom. Two hundred years later it was the idea of "akademische Freiheit" (academic freedom) which for Wilhelm von Humboldt formed the basis for the foundation of the University of Berlin (1809) and for the reform of the German university system: The unity of research, teaching and learning ^(for the purposes of technical and social evolution) Today universities almost everywhere hold to the view that teaching and research belong inseparably together. This view is in danger, however.

Changing Enrolments in the 1960s and 1970s: Problems and Answers

During the 1960s and early 1970s there was a big expansion in higher education in most countries. Overall, between 1960 and 1975, total enrolment in higher education was up by about 2.5 to 3.5 times in individual countries. Governments took steps to deal with this increase in demand for higher education by opening up new universities and by reorganising and expanding existing ones. Since the mid-1970s this expansion policy in the higher education sector has ended. In some countries this is due to a change in the demographic situation. In all countries a period of stagflation has created the need to curb public spending for higher education. Both measures, expansion and consolidation/contraction, influenced university research.

Because the principal expenditures of universities are associated with salaries, student numbers are a major determinant of financing universities. Income based on, or derived from, student enrolments is an important element in the finance of universities. The 1960s and early 1970s were a period of expansion not only in student numbers but in financial resources also. It was this expansion which started

a process which sometimes led to the operational and institutional separation of teaching and research in universities. Sweden is a case in point. The university budget was divided into two parts: One for undergraduate education, the other for postgraduate education and research. The rationale was to break the direct influence of varying student enrolments on university research and give research a stable and independent existence. At the same time, however, there was the creation of two career paths within the university. One for teaching, one for research. The "university lecturer" was a full-time, tenured undergraduate teacher. He was expected to follow developments in his field but was not required to carry out research himself. This development has been criticized by outstanding Swedish scientists from the beginning and, as a result, Sweden is now trying to restore a close connection between teaching and research.

The stagnation period had its problems, too. In the late 1970s there was concern in a number of countries that governments' policy of reorienting funds towards "relevant" and "applied" areas and the end of the university boom were together leading to a decline in the propensity of funding basic research at the universities. A recent OECD report (1984) found that by the late 1970s the percentage of Gross Domestic Expenditure on Research and Development performed in the higher education sector was declining in most member countries. In general, support ^{for university research} has shifted to research project grants with a lower share of research being financed via general university budgets. This is not without problems for university research.

Funding and Direction of University Research: Autonomy and the Demand for "Relevance"

In a system of research involving a deliberately pluralistic organization, government-sponsored research systems may and must determine the content of activities only to a limited extent. In industry, research and development are foremost within the responsibilities of enterprises. As far as basic research is concerned - and the main performer of basic research remains the university - the selection of subjects and methods of research is a function to be carried out independently by scientific institutions.

The autonomy in the selection of problems and methods is not unlimited. It has to be seen in relation of changing pattern of funding. University research is funded through a variety of sources: Funds from the university budget, from research councils, from private foundations, from government ministries and from private industry.

With growing proportion of outside funding universities are much more open to science policy priorities. To paraphrase: More open to external influence upon the kind of research performed.

Obviously, when funds are derived from mission-oriented government departments and agencies (e.g. defense or energy) considerations of relevance for some practical objective are a major criterion of assessment. But things have changed with research councils as well. During the days of plenty a policy was adopted according to which government would support practically every research project submitted by qualified researchers of the recommendation of recognized scientists in the field (Ben-David, 1977). Now the criteria on which government funds are allocated by research councils have been changing. In place of the traditional responsive mode of operation, research councils have become more interventionist (OECD, 1981).

Of course, universities should pay attention to the question of what contributions they make to social welfare. This contribution is not easy to define. It could be stated as ^{German} (Ministry for Research and Technology, 1980):

1. extending and deepening the level of scientific knowledge;
2. maintaining and increasing the efficiency and competitiveness of the economy;
3. conserving the resources and preserving the natural requirements of life;
4. improving man's working conditions and the well-being of civilization;
5. recognizing the implications and correlations of technological developments, discussing and balancing their opportunities against risks, and substantiating decisions of the utilization of technologies.

Universities have always made contributions to these ends directly and indirectly, through the beneficial effects of the spread of scientific knowledge. It is another matter, however, if university research is orientated to specific research topics, identified as of national economic or social importance. One has to strike a balance. I want to give an example for such an effort: The funding mode of the Deutsche Forschungsgemeinschaft (German Research Foundation).

The DFG is an autonomous body of the German scientific community that formulates its own statutes and itself selects the scientific and academic members of its agencies. It has for years made use of three quite different modes of research funding. Firstly, there is the Normal Procedure, a responsive mode of funding. A fully qualified research scientist may apply through the normal procedure for financial support for a research project. The initiative, therefore, rests with the researcher himself and as a matter of principle the DFG does not influence the contents of the project put forward for support. The normal procedure provides an important method for supporting young scientists. It gives the DFG an opportunity to identify at an early stage that the first tentative steps in a new research direction are taking place. These can then be given special attention when arrangements are being made for support and the terms of other funding procedures.

Secondly, there are the Priority Programmes (Schwerpunktprogramme). The promotion of priority programmes is a particularly important instrument of research policy. Research workers from a number of universities combine their efforts for a limited period of time in a focal-point programme concentrating on an agreed aspect while working in their own research establishments. The theme of a priority programme is - in contrast to normal procedure projects - established in advance. Through such support the DFG Senate seeks to further a particular line of research (directed support). The reasons for supporting priority programmes vary. The first programmes were introduced in 1952/53 chiefly for the training of the younger generation and as a determined effort to catch up with developments in, for instance, geochemistry or crystal-

structure research. Since then support for priority programmes has gained greater prominence with German Federal Government resuming participation in major joint international undertakings. Meanwhile, too, the priority programmes support for particular subjects is now principally used as an instrument for initiating work in unexplored scientific fields.

Thirdly, there are the Special Collaborative Programmes (Sonderforschungsbereiche). Here groups of scientists join together with the approval of their university for joint research in which the university recognizes that their research has common ground deserving support for a longer period of time. Not individual researchers apply but the university which must demonstrate their own financial commitment to the field in which it is applying.

It should be stressed that the DFG has not sought to develop these more interventionist modes of research support at the expense of the traditional response mode. The share of the normal funding procedure has remained more or less constant (about 40 per cent) throughout the years. It is the policy to preserve this proportion. The normal funding mechanism is seen by the DFG as having the crucial advantage of flexibility, of permitting rapid response to a new research opportunity.

What remains of the Humboldtian university ideal today?

The success of German research in the 19th century was attributed to the German university: To its principle of unity of research and teaching, but also to its being a general rather than a specialized institution, and to its self-government (Bernal, 1939; Ben-David, 1977). Until about the 1870s German universities were virtually the only institutions in the world in which a student could obtain training in how to do scientific or scholarly research. The effect of this system on the organization of universities in other countries was strong (less so in France). Such was the dominance of the German universities in the 19th century that it would have been difficult to imagine any country neglecting this model.

And today? Gruner's remark that large scale federal research support over the past 30 years in the US finds parallels or origins in the Humboldt model is important. Though important, it is only one aspect. More can be said:

1. The most visible function of the university will be an educational one. It can be argued that it is more important today than ever before to learn how to learn. How could this^{be} achieved better than by participating in research?
2. The aim of the Humboldtian university reform that teaching and research should be for purposes of technical and social evolution can still give guidance for the kind of research which should be carried out. It seems that industry has become increasingly unwilling to invest in R&D directed to the development of fundamentally new technologies (c.f. development in biotechnology). Radical innovations, however, are needed if low productivity growth, unemployment and inflation are to be tackled successfully. There should be substantial investment in strategic research so that the universities could make a significant contribution to the economy. This implies that universities should be a part of a broadly determined national science policy. It will not suffice either to allow universities to devote all their resources to research of immediate industrial, i.e. technical interest.
3. Then, the purpose of social evolution. Research commissioned in furtherance of social policy has too often been constrained by a preoccupation with the quantification of well-recognized problems (OECD, 1978). But in this field there should be strategic research, too. Social science research in the universities is increasingly squeezed between a growing dependence upon government funding for projects of immediate relevance and a traditional disciplinary commitment to pure theory. Research involving several disciplines, however, is essential. Problems of the environment, of occupational health etc. do not correspond with the

approach of a single discipline. This opens up important possibilities for new methods and principles of model building which allow for the integration of different disciplines. The method which is so prominent in the work of Committee II is an excellent example!

4. The principle of unity of teaching and research could not mean today that all university teachers need to be continuously engaged in research. The growing student numbers of the 1960s and early 1970s have fostered tendencies for teaching and research to grow apart. This should not lead to the conclusion that higher education can largely be provided by individuals who have no involvement in research. If the principle of unity of teaching and research cannot be realized in any single teacher it is all the more important that the university should be a place where this principle is valid.

The purpose of technical and social evolution means that a balance between support for independent research of purely scientific interest and for strategic research is needed. To paraphrase: A delicate balance between responsive and interventionist modes of funding university research. In this sense the Humboldtian ideal is still alive today and its relevance for today's universities is obvious.

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