



Swedish Higher Education, Research & Innovation Policies: Universities as Engines of Economic Growth

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Swedish Higher Education, Research & Innovation Policies: Universities as Engines of Economic Growth

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Introduction

The Swedish welfare state model has been based on the rights of individuals to a decent life and to equal opportunities for social promotion often achieved through education. Higher education as part of the public sector has been influenced by a powerful nation-state in which regional policy considerations and the social thesis of equality of educational opportunity have played an important role. Higher education has been considered a social good, and as such been free of user charges. But changes in the higher education system have come about, for many reasons. There has been a general understanding that knowledge-intensive production is crucial in bringing about employment and welfare. This has been the focus of the discourse and policies on the important role of higher education and research in recent years. Theories of economic growth and innovation are now intertwined with policies for higher education, research and development, often uncritically. A typical example is the government strategy document *Innovative Sweden*, 2004, developed jointly by the Swedish Ministry of Industry, Employment and Communication and the Ministry of Education, where rather conflicting goals are jumbled together without reference to any internal opposition.

Reform in Swedish higher education

During the past decade and a half there have been several changes in the Swedish higher education system. High levels of unemployment in the early 1990s brought the promotion of economic growth and employment to the top of the political agenda. Expansion of higher education was made a priority, primarily in certain fields considered crucial for future economic growth, such as technology and natural science. Several reforms were introduced by the Conservative/Liberal government during their time in office from September of 1991 through September 1994; the government proposal *Quality and Freedom* from 1992, allowed for more

freedom of action for universities. This government also transferred large sums of money collected in employee owned funds to five newly created independent research foundations: the Swedish Foundation for International Cooperation in Research and Higher Education (STINT, Stiftelsen för internationalisering av högre utbildning och forskning), the Foundation for Strategic Environmental Research (MISTRA, Stiftelsen för miljöstrategisk forskning), the Swedish Foundation for Strategic Research (Stiftelsen för Strategisk Forskning), the Vårdal Foundation for Health Care Sciences and Allergy Research (Vårdalsstiftelsen för vård- och allergiforskning), and the Knowledge Foundation (KK-stiftelsen, Stiftelsen för kunskaps- och kompetensutveckling). When the Social Democrats returned to office in Sept. 1994, the government could not reverse the decision about the foundations, but instead tried to gain control by appointments to boards of these foundations. In this way the government expected the foundations to shoulder some of the financial responsibilities of the government in their respective fields. For this and other reasons competition for research resources via external sources has increased at the same time as the Swedish government (as other EU governments in line with the Lisbon strategy) raised the targets for research training, research and development. Major effort has been expended with reorganized or newly created agencies such as VINNOVA, the Swedish Agency for Innovation Systems, and in coordinating their work with that of Sweden's research councils and the research foundations. Government spending for higher education, however, has not been allowed to rise at the same rate as the student expansion and the new tasks and expectations. Fiscal pressure in one of the highest taxed countries in the world does not allow much increase in government spending, and higher education has to compete with other underfunded and important sectors such as health and the environment.

European policies also have had considerable impact on the development of Swedish as well as other national reform policies in education. This is particularly true for higher education, partly because of its international character and partly because of its perceived importance for economic competitiveness and growth. In line with such reform adjustments some study programmes have been prolonged (nursing) and made more university-like in a process of academic drift and in order to have the diploma recognized for work elsewhere. There is an ongoing process of trying to achieve convergence and transparency in higher education all over Europe, the Bologna process is just one example.

Devolution and decentralization within the system has led to greater autonomy of institutions and the primary functions of ministries are to set the frames and for the National Agency to supervise. In Sweden several buffer agencies were scrapped in the higher education reforms. Ministries and some newly created agencies, like the Agency of Higher Education, had a role in evaluation and accreditation of institutions and disciplines as well as in promoting new learning modes. Resource allocations in block grants are decided in negotiations with the Ministry about education assignments. New public management principles, management by objectives, were developed alongside various accountability measures like monitoring, evaluation and auditing.

However, there has come a new freedom of universities to decide many things themselves, such as the establishment of new programmes, appointment of new professors and the ability to revise admissions procedures. This opened up for some new thinking, but at the same time all the procedures of monitoring, follow up and regular evaluations of departments and disciplines have given rise in higher education institutions to a growing bureaucracy of managers and administrators with professional backgrounds who are without inside experience of academic life in the departments.

Structure of Swedish higher education

In Sweden, the higher education system is unified into one system, all courses are considered of university level, regardless of where they are provided.

There are 16 Swedish state universities, Uppsala (the oldest, founded in 1477), Lund, Gothenburg, Stockholm, Umeå, Linköping, Karlstad, Växjö, Örebro and Mid-Sweden University with campuses in Härnösand, Sundsvall, Östersund and Örnsköldsvik. The state universities also include four specialised universities, The Karolinska Institute of Medicine and the Royal Institute of Technology in Stockholm, The University of Agriculture in three locations, in Umeå, Uppsala and near Lund, and, finally Luleå University of Technology. Four other state institutions have the right to offer postgraduate degrees: Blekinge Institute of Technology, Kalmar University College, Malmö University College and Mälardalen University College.

There are three private or non-state higher education institutions offering post-graduate degrees: the Stockholm School of Economics and two non-governmental foundations: the Chalmers University of Technology and Jönköping University College. In addition, there are twelve state university colleges, seven University Colleges of Art, and some other specialised smaller higher education institutions in the private sector, along with one run by regional authorities.

Degrees offered are diploma (2 years), Bachelor's degree (3 years), university diploma in professional fields (2 to 5.5 years), Masters degree (4 years), licentiate (2 years in addition to the Bachelor), PhD (a minimum of 4 years after the Bachelor's degree). The degree structure is now under revision in the framework of the Bologna process.

The number of students in higher education has increased considerably during the past decade. Since 1991 the number of student has increased by more than 50 percent. Almost 50 per cent of young people in Sweden attend higher education within five years after completing secondary school. First-time enrolment each year is approximately 83,000 (Swedish Institute, September 2004). In the autumn of 2003 there were some 340,000 students enrolled in undergraduate studies and 19,000 in postgraduate studies. The full time equivalent in total for both levels was 319,000.

Financial aid to students is available in the form of loans and grants to help finance their studies. Postgraduate students receive fellowships or more favourable doctoral positions for a maximum of four years. The kind of financial assistance to offer is up to each faculty and the departments.

University Boards are appointed by government (elected and/or appointed through various routes, and are increasingly proactive;) a majority of members must be external representatives. A University Board suggests to the government a candidate for the position as University President after input from various stakeholders. The government subsequently appoints the university president. Unions are represented on the boards but have no power to vote; students are always represented and can vote (students are represented everywhere, in departmental, faculty and university-wide boards and committees). Institute Directors and Department Chairpersons also are elected and/or appointed via various means, and often become long-term leaders at the top of departmental pyramids. There has been a strong trend from more collegial systems to more hierarchical managerial systems. Corporatist formats have been adjusted to allow university administrations more unilateral flexibility.

Entrepreneurialism and innovation in universities

What is an entrepreneurial university? Is it a university that is able to increase funding and income through new sources? Or is it a university that has the flexibility, adaptive capacity and novel thinking to meet present demands and to take advantage of future developments in various ways by offering new lines of study and courses and developing new areas of research, often in a close collaboration with the surrounding society? When we have answers to these questions we have the beginning of a definition of the concept "entrepreneurial university."

How do invention and innovation differ? In a recent study on Sweden's growth policies, Maryann Feldman (2004) defines invention as the "discovery and the creation of something novel that did not previously exist." Innovation, on the other hand, "carries invention further with the commercial realization of the value of the invention." She defines commercialisation as the

process that "turns invention into an innovation and involves defining a concept around who is willing to pay for the new idea."

According to Feldman's definition, we could consider entrepreneurial universities as inventors of new knowledge which could be transferred into innovation. This process could include new products and services to be sold on the market or new courses to be offered to students inside or outside the country or employers etc.

There are a number of reasons why knowledge-intensive and innovative endeavours should be facilitated and supported in order to speed up the rate of change, and they are crucial for sustained economic growth. The problem is that knowledge production is hard to protect, which inhibits a willingness to make private investments. If companies (and universities) receive too low a return on their investments they cannot develop, negatively affecting economic growth. Innovations are an important area for public policy measures. Private and intellectual property rights are crucial for positive development. The challenge for policy is twofold, argues Feldman: to stimulate the dissemination of knowledge and at times to protect it.

The images of the university as entrepreneurial, innovative and adaptive are recent. This arises in part because financial pressures have become a typical component of higher education, along with the expansion and diversification of enrolments and participation rates. Another reason is the increased focus on economic growth in society, where higher education and research are expected to play an important role. Finally, institutions of higher education are facing increasing competition nationally and internationally both for students and for external funding.

Driving forces

In Sweden, market forces play a role in the financing of both higher education and research. Higher education institutions get a per capita amount per full time, full year student. This amount follows a set scale which varies between the areas of study. The total sum an institution of higher education receives is divided into two parts of roughly half each, one half based on the number of registered full time students and the other on the study results. This system creates increasing competition for students among the institutions of higher education in Sweden. All upper secondary school leavers get recruitment brochures, CDs or videos from practically all Swedish higher education institutions describing their educational profiles and other competitive advantages.

An increasing number of Swedish students study abroad for shorter or longer periods. Thus, not only do the Swedish institutions of higher education have to compete among themselves, they also have to compete with universities in the UK, USA and elsewhere. Foreign students are attracted primarily via courses or programmes offered in English, increasingly through participation in exchange programmes such as Erasmus and Nordplus. A government commission has been appointed to investigate further the issue of charging fees for students from outside the European Union (there are now no tuition fees charged to students). A report by a previous commission, *Advantage Sweden*, 2003 supported the levying of fees for non-EU students. But according to the student and professional unions, such a decision would open up the levying of fees for other students, perhaps ultimately for all students. At present universities are allowed to offer commissioned or contracted educational programmes via employers or other organizations, but not to charge fees from individuals. In other Nordic countries fees have been introduced. Denmark, for example, has been charging fees for lifelong learning students and recently introduced fees for non-European students.

Funding of research in Swedish higher education has changed over the last ten years. It is still channelled via faculty grants which have been shrinking gradually. Previously each university had some resources for carrying out research and this gave the universities a large degree of autonomy concerning what research to carry out. However, this situation has now changed and

today the allocations to universities for research are mostly used for salaries; little can be used for research expenditure.

At least 50 per cent of all research at universities is financed from external sources, and comes from the research councils, foundations, industry and business, etc. The European Union framework programmes are increasingly becoming an important financial resource for research funding. Researchers in Sweden compete for funding not only with their Swedish colleagues for Swedish research money through the research councils (with less than 10 per cent expected success rate for each round of applications), but also with their European colleagues for grants funded by the European programmes. Research councils and foundations in Sweden increasingly limit their calls for application to pre-defined, targeted programmes and those topic areas which receive the major part of their research funds. This is a development which does not promote diversity or the development of new ideas. Instead, many researchers play it safe and follow the money. This process also means that a lot of time and effort is spent to prepare applications, often in vain.

Higher education and research have been regarded as important political tools for national and regional economic growth. There has been an understanding that knowledge-intensive production is crucial for employment and welfare. Such knowledge-intensive production is dependent on a highly educated work force. Therefore, the creation in Sweden of an adequate supply of well-educated persons for the future has been a key focus, together with attention to immediate demands (Fägerlind and Strömqvist, 2004). The important role of institutions of higher education in this process has been emphasised through collaboration with society at large, called the third mission (in addition to teaching and research), in the revised Higher Education Act. One of the underpinning ideas is that through such collaboration, inventions can become innovations and may be exploited commercially.

Recent policies and strategies

National policies are formulated in a number of government documents such as proposals to the Parliament, memoranda and government agency studies. In addition, non-governmental organisations have addressed these policies in position papers.

Government proposal: Research & development and cooperation within the innovation system (2001)

In this proposal the government outlines the principles for the role of research and development. Research and knowledge production are important for solving practical and theoretical problems, to use the development possibilities and further the development of knowledge in all societal areas. Research produces new knowledge in the form of science and is also important in teaching. Science based teaching can enhance the measurability and quality of higher education and help meet the demands for qualified labour in the labour market. Research is also important for the creation of new ideas and products, which could result in new companies.

The government suggests an increase in the number of universities and university colleges that can start their own holding companies. These **holding companies** can start their own **spin-off companies** which can handle issues like patent applications, sell commissioned education to employers etc. The holding companies all have the same tasks as formulated in the founding documents: they own, sell and manage shares in projects and service companies with the aim of conducting research and development for commercial exploitation. The government also wants to evaluate the **foundations for technology transfer**, *Teknikbrostiftelser*, set up with the objective of creating fruitful conditions for cooperation between researchers and business. These foundations have played an important role for the holding companies owned by the universities.

Sweden's total research and development (R&D) spending as percentage of GDP is **4.3 %**, the highest level among OECD countries (latest 2001 data). Sweden is well ahead of the European

Council's *Barcelona Objective* that EU nations spend 3% of GDP for R&D by 2010. Some three quarters of Sweden's R&D is carried out by private firms. Less than one quarter of spending is in higher education; the remainder is spent in other areas of the public and non-profit sectors.

Innovative Sweden: A strategy for growth through renewal (2004)

In the 2004 strategy document *Innovative Sweden*, the government, by way of the Ministry of Industry, Employment and Communications together with the Ministry of Education, laid out its strategy for growth through renewal. "Neither market forces nor policies alone can create more innovation. A cohesive policy aimed at facilitating renewal requires cooperation and interaction between people, enterprises, the education system and the public sector at national, regional and local levels. ...Our vision is that the Sweden should have the most competitive, dynamic and knowledge-based economy in Europe, thereby being one of the most attractive counties for investment by large and small knowledge-based companies." (page 1). The government stated that it was "devoting intense efforts to growth issues, since growth is the key to preserving and improving welfare." The strategy included long-term growth promotion. The driving force being the emerging knowledge-based economy. The government opinion was that the Swedish competitive edge was to be achieved by such measures as good provision of knowledge, product renewal, efficient production processes and flexible and effective working organisations. Higher education was to occupy an important place within this vision, but no details were offered as to the character of any fundamental changes in the funding or oversight of higher education.

The government strategy included strengthening the knowledge base for innovation. This requires that Swedish education and research be truly world class. The first step in achieving this goal was to create a school which offers everyone a good knowledge base, to promote good knowledge in mathematics (Sweden has fallen from a top position some years ago to a more mediocre one and scored very low in international studies of achievement), to build an interest in science and technology education, and to promote lifelong learning. To ensure that higher education institutions are competitive internationally, they were encouraged to profile and benchmark themselves, and to market their attractions to international researchers and students. The government also wanted to continue its investments in research and research training and also to strengthen industrial research institutes. These institutes, owned by industry and government, are not part of institutions of higher education but are usually located near them.

The government was concerned about strengthening Sweden's innovation systems. The national innovation systems can be described in terms of important actors and components such as universities, colleges, institutes, large and small enterprises, venture capital and the associated regulatory frameworks. It has been considered important to succeed in creating strong environments for research and innovation that are able to interact with the surrounding society and to compete at global levels, and that form effective and competitive **clusters and synergies**.

One important goal for the previous government which is shared by the present one is to improve the commercialisation of research results. To reach this goal, efforts are needed to support the process of transformation of research results and ideas into businesses and enterprises. This includes simplifying the legal environment and supporting entrepreneurial education and various outreach services.

Higher education cooperates (2004)

The National Agency for Higher Education (Högskoleverket) evaluated the cooperation between Swedish institutions of higher education and the surrounding society in a report *Higher Education Cooperates*, 2004. The Agency underlines that the so called third task, or **third mission** cooperation with the surrounding society, is not to be regarded as a new phenomenon. The Agency argues that institutions of higher education cooperate all the time with the surrounding society through research and teaching. They cooperate with the wider public, business, industry, the public sector and various organisations. There are a number of actors who

support these processes such as local government, regional bodies, national government agencies, the EU, foundations, holding companies owned by universities, etc.

Cooperation takes place through three processes connected to the research and teaching of each institute of higher education, according to the Agency:

- Profiling, recruitment and information,
- cooperation in the knowledge formation and innovation systems to support business and the transfer of knowledge,
- design of education and courses in order to meet the demands from the labour market and to facilitate contacts and cooperation between students and future employers during the studies.

The Agency recommends among other things the following for developing knowledge and growth:

- Institutions of higher education should develop strategies that support the needs of the different elements of the knowledge and innovation processes,
- incentives for the institutions of higher education, and for employees to be more actively a part of the knowledge and innovation systems,
- increased focus on the stimulation of ideas and entrepreneurship,
- greater attention to the exploitation of ideas and research results in existing companies and the public sector,
- education in entrepreneurship should be introduced in all programmes,
- institutions of higher education must be given the full right of profits from their holding company,
- institutions of higher education should develop their networks and contacts through research institutes or similar organisations within universities.

The Agency focuses substantively on the issue of incentives. The present reward system within higher education still emphasises research and publications. The academic career system is built on such academic achievements. Cooperation with business or industry and service to society are activities that are not highly valued in the academic world, sometimes even frowned upon or regarded with suspicion. Also, in Sweden it is not easy to move between the worlds of industry and academia in the same way as for example in the United States. Our former Swedish Universities Chancellor, Professor Stig Hagström, was for many years head of a research unit of Xerox Park in Palo Alto, Silicon Valley, California, later to move back to Stanford University as the dean of the School of Engineering.

Teaching entrepreneurship at all levels of the education system is a recent recommendation of the European Union. No doubt the trend is important, but it also raises a further future consideration – in an increasingly competitive world, those most keen are avidly instituting similar policies. For Sweden not to make competitive effort is not an option. But it must be recognized also that it will not be sufficient merely to do what others are doing.

Measures to make the efforts by higher education in innovation more efficient. (2004)

In a position paper, published in 2004, the Association of Swedish Universities and University Colleges (SUHF) gives the university perspective on how to improve the innovation processes within higher education. First, the organization states that innovation issues are important for higher education since the aim is that results should be usefully exploited. At the same time they underline the necessity of taking the traditional role of higher education into account. There must be rules in order to strike a balance between the demands from society and the autonomy of higher education institutions.

Future changes in the assignment of intellectual property rights?

Today researchers in Sweden hold the exclusive right to their innovations (this is called the "academic exception"), but the universities claim a need to be strengthened and to be allowed to get a share of these rights. Otherwise they will not be motivated to drive development forward and help the researchers in the patenting and initial financing needed for ideas to be commercialised. According to Thomas Östros, former minister of higher education and research, universities have to improve their support mechanisms for commercialisation processes.

The executive director of the Royal Swedish Academy of Engineering, Professor Lena Torell, agrees. She claims that there have to be economic incentives for new companies. Rules, regulations and tax systems need to be changed in this process, and Sweden is far behind many countries in this dimension. Crucial for a positive development is the cross- fertilisation between private and public interests that could be achieved via the formation of so called clusters, agglomerations of research units, universities and enterprises. There are only a few good examples of such clusters or science parks in Sweden: Lund (Ideon), Stockholm (Kista) and Uppsala.

Enterprises, research and public sector activities in Sweden are strongly internationalised through extensive international networks, knowledge exchange and business relations. Sweden holds a unique position due to its high degree of internationalisation, but development still can be strengthened.

Concluding remarks

Investments in enterprises and research are now more mobile between countries and regions due to globalisation. In addition, new knowledge and innovations are increasingly created in close cooperation between research organisations and companies in several countries. In order to profit from the opportunities offered by globalisation, several measures have to be taken. Those publicly recognized include promoting language learning, establishing Swedish enterprises in strategically important markets, becoming a capable collaborator in research and development, attracting foreign direct investments and cutting edge competence, ensuring an internationally competitive corporate tax structure, and developing the image of Sweden as a country of innovation.

In order for Sweden and Swedish regions to be attractive to companies and people the country needs to have a solid knowledge base and profiled research and innovation environments with well developed international networks. This constitutes the basis for the remaining government strategy, namely innovative enterprises, innovative public investments and innovative people.

Working life in Sweden is characterised by large companies in the productive sector which represent a major part of the labour force participation. At the same time it is important that people find it interesting and natural to start their own company, Small and medium enterprises in the knowledge sector are responsible for many major innovations, and they are crucial for creating new jobs. Large companies frequently are customers of the smaller ones, and are dependent on a surrounding structure of innovative partners. Little has yet been done to compensate for Sweden's somewhat peripheral location, and on overcoming the barriers to inward mobility posed by the primacy of the Swedish language; Sweden still has far to go with improving the integration of visiting researchers and immigrants.

An important element of the government innovation strategy is the observation that human resources have to be valued. Innovation presupposes an ability for reorientation by individuals and organisations to cope with efficient change processes. It is necessary to develop work places where the full capacity of both men and women can develop and where the development of new ideas is stimulated; this should lead to better modes of production as well as new products. Studies show that companies, regardless of sector, could better their positioning and improve

growth by developing knowledge management strategies. The government recognizes that we are in a globally competitive environment with high pressures for change, and that some form of action is very important for Sweden.

Knowledge and innovation are key terms both in business and public policy strategies. While approaches stress the systemic importance of knowledge and innovation, consensus has been slow to develop that recognizes a need for constant systemic change. Will leadership be wielded on national, regional, sectoral, societal and cultural levels? Will change typically be driven by the public or the private sector? Is it organized by institutions or actors/entrepreneurs? Innovation is a complex phenomenon, a blend of many things. Innovation is not, however, a passive phenomenon. What might light a fire under those who are not yet dissatisfied?

Innovative Sweden has been a popular policy document, quoted by many, developed at a time of positive economic growth in Sweden. The Nordic countries, Sweden included, have received a good medium term evaluation on the Lisbon strategy. But unemployment rates are still relatively high and recent economic growth has taken place without new jobs. The institutions and personnel involved in higher education struggle on, as does the public, expecting change while at the same time somewhat resentful of it.

The former government's next research proposal was presented in the Spring of 2005. The main feature was an increase in government spending on research. However, there was no evidence of any substantial new funding allocations to accompany the good intentions of the policy makers.

The incoming government has further increased the resources for research in its first budget proposal. Further, this government wants to increase the autonomy of the universities and university colleges and to depoliticise the university boards. The details remain to be presented.

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[Appendices 1 through 5 follow the References]

Swedish Higher Education, Research & Innovation Policies: Universities as Engines of Economic Growth

Appendix 1: EUEREK Survey on Higher Education: Sweden

1. *Legal status of universities and other HEIs. e.g.. to what extent are they legally and financially independent? Are academic staff government employees? Are they employed by their universities?*

All but three higher education institutions (Stockholm School of Economics, private, Chalmers University of Technology and Jönköping University College, nongovernmental foundations) are state institutions. Thus all staff members in those institutions are government employees and employed directly by the university. Previously, before the 1993, the Ministry had the final word on the establishment of new chairs or the announcements of open positions for established chairs. After the reform the whole process of deciding about new academic positions, recruitment of staff and evaluating applications takes place within the framework of the university. Salaries are negotiated locally (local collective agreements) between the elected representatives of the local unions and the employer/university and could vary between fields and between higher education institutions. Market forces also play a role in these negotiations.

2. *Have there been any significant changes in the legal framework in the past 15 years - in particular changes that may have affected their entrepreneurial behaviour?*

The 1993 reform, gave more space for universities to act, to establish new chairs, to start new programs, to decide about curriculum and admissions etc. A market component was introduced in the resource allocations for undergraduate education, the money followed the students (See page 2 and Appendix 2; also, see the question 3 response below).

3. *What are the main government policies and policy statements of the past 15 years that are concerned with universities' contributions to the knowledge society and/or affect entrepreneurial and/or market behaviour of HEIs?*

The third mission, collaboration with the wider society, was underlined in several steps. Firstly, the third mission was included in the Higher Education Act of 1997 as the third task of universities (beside teaching and research): "Also, universities and colleges are to interact with the surrounding society and inform about their activities" (1st chapter, 2nd paragraph). The budget proposal in 1997 specified further the widened scope of that mission to include not only informing about research and other activities, but also entering into more active collaborations with society at large. These demands were included in a Higher Education Ordinance in 1998. However, supportive mechanisms for such cooperation had been in place in many sectors before, in particular in the agricultural and forestry sectors. Support for the establishment of holding companies was a significant step towards facilitating collaboration and also commercialization. (See page 4 of our report). Later, the government has further developed the demands of tighter collaboration and contributions to the knowledge society in a government proposal from the Ministry of Labor, Industry and Communications about research and development and collaboration in the innovation system (See pages 4, 5 and 6).

4. *How are private universities positioned in the national system? e.g.. Are they officially recognised? How are they staffed? Has the number of private students increased?*

As mentioned, we have few private HEIs in Sweden, but the private/nongovernmental institutions are officially recognized and follow the higher education legislation. They are staffed by the HEIs themselves, but not as government employees. So far the number of private students has not increased very much.

5. *What are the organisational links between teaching and research in the country? E.g is research done mainly inside or outside universities?*

Research is carried out mainly in universities by the teaching and research staff. Sweden does not have the tradition of independent research institutes found in many countries, (See page 4 and Appendix 2) like in France. However, as mentioned a significant share of Swedish research, particularly in technical and medical fields is carried out within private companies. There are several arrangements for how such research is organized and carried out. To mention some examples, companies could employ researchers directly in their research departments or they could establish a joint research institute with an HEI in their proximity or they could sponsor certain research programs or doctoral students so called *industridoktorander*.

6. *How, broadly are core public budgets for HEIs determined? e.g. line-item budgets, student number based formulae, incremental budgets?*

Budgets for HEIs are based on two types of resource allocations from the government a) for undergraduate education and b) for research and research training. As mentioned above (and in pages 3 and 4 of this report), funding for undergraduate education is negotiated between the Ministry and the HEIs in three year task contracts (number of full-time equivalents and number of degrees etc) and follows the students. The HEIs get a certain share of the set student amount, which varies between different programs (it is higher for medicine and lower for humanities); funds are first designated per registered student (about 40%) with the rest assigned when students pass the course examinations and the results are reported (about 60 %). Research and research training is financed via resource allocations to the faculties, including resources for study financing for doctoral students (studentships and doctoral student employments). External resources play an important role in the financing of research and research training.

7. *How important is third mission/task/stream funding?*

8. *In broad terms what proportion of the income of HEIs comes from student fees, research, third mission activities? [these two questions are answered together]*

As mentioned, third stream money is very important for research. Contract education does not bring in a lot of money and there as yet are no student fees. There are no summary national figures for third stream income, but using Stockholm university as an example, keeping in mind that there is no medical or technical faculty, 2003 income for contract education was slightly lower than 50 million SEK of the total turnover of 2.2 billion SEK. Income from commissioned research was about 43.5 million SEK. Income generated by contract education, commissioned research and other sources of external research funding is much higher in medical and technical faculties or specialized institutions. Recent figures about the share of external income for research remain to be processed nationally, but are available locally from each HEI. According to the Swedish Freedom of Information Act, all public institutions are to make all registered information available on request. Spin-offs and holding companies, however, might not be as willing to disclose information.

9. *Are there any HEIs (or parts of HEIs) in the country that are generally recognised as being entrepreneurial? In what way do these differ from mainstream HEIs*

There are some HEIs recognized as being entrepreneurial. Burton Clark's case study of Chalmers University of Technology is well-known, but some of the recently established university colleges could be labelled as entrepreneurial as well. One example is the Jönköping University College, a nongovernmental institution, run as a foundation, organized into several companies. The University of Lund has a well-known science park and, as mentioned, in the medical field, many faculties and institutions such as the famous Karolinska Institute of Medicine display many entrepreneurial traits. The reasons why these institutions differ from other institutions are several: Specialized institutions have by tradition upheld tighter links with business and industry in research and consultancies. Also, they are more in demand for upgrading and retraining education programs through contract education.

Swedish Higher Education, Research & Innovation Policies: Universities as Engines of Economic Growth

Appendix 2: Swedish national-level data

(see individual case studies for additional data)

**Admission to higher education: competition rate for entry to program fields
(national sum of all institutions in Sweden)**

| | | Autumn 2005 | | | Spring 2006 | | |
|--------------------------|---|-----------------------|--------------------------------|---|-----------------------|--------------------------------|---|
| | | Applicants Sökande | Available Places Platser | Competition rate for each place Söktryck | Applicants Sökande | Available Places Platser | Competition rate for each place Söktryck |
| Agronom | Agronomy | 163 | 175 | 0,9 | | | |
| Apotekare | Pharmacy | 468 | 180 | 2,6 | 204 | 90 | 2,3 |
| Arbeterapeut | Occupational therapy | 698 | 237 | 2,9 | 508 | 209 | 2,4 |
| Arkitekt | Architecture | 1561 | 190 | 8,2 | | | |
| Audionom | Audiology | 101 | 50 | 2,0 | | | |
| Basår | Technical preparatory year | 3927 | 2994 | 1,3 | 560 | 580 | 1,0 |
| Biomed.analytiker | Biomedical analysis | 451 | 260 | 1,7 | | | |
| Brandingenjör | Fire safety engineer | 391 | 50 | 7,8 | | | |
| Civilingenjör | Master of Science (undergraduate) | 9390 | 5919 | 1,6 | 69 | 50 | 1,4 |
| Dietist | Dietician | 783 | 40 | 19,6 | 715 | 46 | 15,5 |
| Djursjukvårdare | Animal care | 399 | 40 | 10,0 | | | |
| Ekonom | Economics | 10676 | 4621 | 2,3 | 1801 | 785 | 2,3 |
| Högskoleingenjör | Bachelor of Science | 4235 | 4883 | 0,9 | 327 | 287 | 1,1 |
| Jurist | Law | 4807 | 757 | 6,4 | 1170 | 130 | 9,0 |
| Jägmästare | Forestry officer | 172 | 80 | 2,2 | | | |
| Kandidat | Bachelor of Arts | 12007 | 5115 | 2,3 | 886 | 260 | 3,4 |
| Konst o design | Art & design | 111 | 30 | 3,7 | | | |
| Landskapsarkitekt | Landscape architecture | 210 | 90 | 2,3 | | | |
| Landskapsingenjör | Landscape engineering | 96 | 45 | 2,1 | | | |
| Lantmästare | Farm foreman | 104 | 80 | 1,3 | | | |
| Logoped | Speech therapy | 748 | 110 | 6,8 | 230 | 30 | 7,7 |
| Läkare | Medicine | 4396 | 507 | 8,7 | 2583 | 504 | 5,1 |
| Lärare | Teaching | 15774 | 7834 | 2,0 | 4011 | 1242 | 3,2 |
| Magister | Master's studies | 13252 | 7048 | 1,9 | 1511 | 760 | 2,0 |
| Optiker | Optician | 241 | 80 | 3,0 | | | |
| Ortopedingenjör | Orthopedic engineer | 56 | 20 | 2,8 | | | |
| Psykolog | Psychology | 2487 | 211 | 11,8 | 1552 | 154 | 10,1 |
| Receptarie | Pharmacy worker | 459 | 236 | 1,9 | 60 | 70 | 0,9 |
| Röntgensjuksköterska | Xray technician | 251 | 129 | 1,9 | | | |
| Sjukgymnast | Physiotherapy | 2950 | 313 | 9,4 | 1602 | 276 | 5,8 |
| Sjukhusfysiker | Hospital physicist | 66 | 20 | 3,3 | | | |
| Sjuksköterska | Nursing | 7560 | 2224 | 3,4 | 6063 | 2321 | 2,6 |
| Sjöing- Maskintekniker | Marine & mechanical engineering | 200 | 115 | 1,7 | | | |
| Sjökapten o styrman | Maritime studies | 482 | 100 | 4,8 | | | |
| Skogsmästare | Forestry | 84 | 45 | 1,9 | | | |
| Social omsorg | Social care | 1481 | 350 | 4,2 | 377 | 80 | 4,7 |
| Socionom | Social work | 5630 | 745 | 7,6 | 3188 | 725 | 4,4 |
| Specialpedagog | Special education | 101 | 60 | 1,7 | | | |
| Studie- o yrkesvägledare | Study & vocational guidance counsellor | 711 | 210 | 3,4 | | | |
| Systemvetare | Computer & systems analysis | 2096 | 2296 | 0,9 | 54 | 180 | 0,3 |
| Tandhygienist | Dental hygienist | 865 | 173 | 5,0 | | | |
| Tandläkare | Dentistry | 974 | 130 | 7,5 | 437 | 75 | 5,8 |
| Tandtekniker | Dental technology | 320 | 72 | 4,4 | | | |
| Teolog | Theology | 324 | 225 | 1,4 | 121 | 135 | 0,9 |
| Trädgårdsingenjör | Gardening & landscape engineering | | | | 191 | 60 | 3,2 |
| Veterinär | Veterinary medicine | 939 | 82 | 11,5 | | | |
| Yrkehögskoleexamen | Vocational university degree | 2488 | 1131 | 2,2 | 228 | 130 | 1,8 |
| Övriga program | Other programs | 4099 | 1072 | 3,8 | 1214 | 60 | 20,2 |

Compiled from Sweden's National Agency for Higher Education (Högskoleverket) "NU database"

Competition for University Entry: National totals for Sweden

| | term | Applicants Sökande | Available Places Platser | Competition rate for each place Söktryck |
|--|------------------|-----------------------|-----------------------------|---|
| | | | | national average |
| Entry to all programs (totals) Summan av alla utbildningspgm. | Spring 2006 VT06 | 29662 | 9239 | 3,2 |
| | Autumn 2005 HT05 | 119784 | 51374 | 2,3 |
| | Spring 2005 VT05 | 32253 | 9393 | 3,4 |
| | Autumn 2004 HT04 | 118477 | 54715 | 2,2 |
| | Spring 2004 VT04 | 31826 | 9498 | 3,4 |
| | Autumn 2003 HT03 | 114312 | 54512 | 2,1 |
| | Spring 2003 VT03 | 29355 | 9492 | 3,1 |
| | Autumn 2002 HT02 | 116223 | 55473 | 2,1 |
| | Spring 2002 VT02 | 27127 | 7770 | 3,5 |
| | Autumn 2001 HT01 | 113756 | 52443 | 2,2 |

Compiled from data as reported by the universities to Sweden's National Agency for Higher Education, Högskoleverket

Swedish State Educational Compensation for the 2005 budgetary year

Följande ersättningsbelopp (kronor) skall tillämpas för budgetåret 2005

| Educational field | Utbildningsområde (Swedish designations) | Annual compensation per full-time student | | Annual compensation for successful full-time study | | Total compensation per successful student year |
|--|--|---|---------|--|---------|--|
| | | Ersättning per helårsstudent | | Ersättning per helårsprestation | | |
| | | € | sek | € | sek | € |
| Humanities, Theology, Law, Social Sciences | Humanistiskt, teologiskt, juridiskt, samhällsvetenskapligt | € 1,812 | 17,217 | 1,785 | 16,958 | € 3,597 |
| Natural Sciences, Technology | Naturvetenskapligt, tekniskt | € 4,572 | 43,431 | 3,939 | 37,421 | € 8,511 |
| Pharmacy | Farmaceutiskt | € 4,572 | 43,431 | 3,939 | 37,421 | € 8,511 |
| Health Care | Vård | € 5,078 | 48,241 | 4,398 | 41,783 | € 9,476 |
| Dental Health | Odontologiskt | € 4,199 | 39,893 | 4,892 | 46,471 | € 9,091 |
| Medicine | Medicinskt | € 5,675 | 53,908 | 6,902 | 65,572 | € 12,577 |
| Teaching ¹ | Undervisning ¹ | € 3,315 | 31,490 | 3,904 | 37,086 | € 7,219 |
| Other ² | Övrigt ² | € 3,836 | 36,441 | 3,116 | 29,602 | € 6,952 |
| Design | Design | € 13,535 | 128,583 | 8,247 | 78,342 | € 21,782 |
| Art | Konst | € 19,215 | 182,547 | 8,250 | 78,372 | € 27,465 |
| Music | Musik | € 11,677 | 110,932 | 7,383 | 70,141 | € 19,060 |
| Opera | Opera | € 27,828 | 264,364 | 16,647 | 158,146 | € 44,475 |
| Theatre | Teater | € 26,909 | 255,635 | 13,403 | 127,329 | € 40,312 |
| Media | Media | € 27,460 | 260,874 | 21,997 | 208,971 | € 49,457 |
| Dance | Dans | € 18,925 | 179,788 | 10,457 | 99,343 | € 29,382 |
| Physical Education | Idrott | € 9,862 | 93,688 | 4,564 | 43,356 | € 14,426 |

€1= 9.5 sek (2005-07-01 midyear exchange rate)

1 Utbildning inom det allmänna utbildningsområdet samt övrig verksamhetsförlagd utbildning.

2 Avser journalist- och bibliotekarietutbildningar, praktisk-estetiska kurser inom bl.a. lärarutbildning med inriktning mot tidigare år samt utbildning vid Grafiska institutet/Institutet för högre reklamutbildning vid Stockholms universitet.

Regleringsbrev för budgetåret 2005 avseende Gemensamma bestämmelser för universitet och högskolor m.m. Riksdagen har beslutat om anslagen till universitet och högskolor m.m. för budgetåret 2005 (prop. 2004/05:1, utg.omr. 16, bet. 2004/05:UbU1, rskr. 2004/05:124). Utbildningsdepartementet; Regeringsbeslut 8; 2004-12-16; Ekonomistyrningsverket U2004/5173/DK (delvis) <http://webapp.esv.se/statsliggaren/document.asp?regleringsbrevId=7465&visningTyp=1>

Sweden's Universities: National-level Resources

| | Annual full-time students Antal helårsstudenter (inkl. uppdrag) | Seating capacity of university libraries Antal sittplatser i bibliotek | Students per library place |
|----------------|--|--|-------------------------------|
| 1994/95 | 218,995 | 7,867 | 27.8 |
| 1995/96 | 233,079 | 9,565 | 24.4 |
| 1996 | 239,881 | -- | -- |
| 1997 | 249,750 | 9,757 | 25.6 |
| 1998 | 250,960 | 10,791 | 23.3 |
| 1999 | 255,912 | 10,454 | 24.5 |
| 2000 | 262,209 | 11,745 | 22.3 |
| 2001 | 272,863 | 11,936 | 22.9 |
| 2002 | 293,200 | 21,811 | 13.4 |
| 2003 | 306,065 | 22,127 | 13.8 |
| 2004 | 308,262 | 23,309 | 13.2 |

Compiled from data as reported by the universities to Sweden's National Agency for Higher Education, Högskoleverket

The Swedish Government has designated the following private or independent organizations (23) as having the legal right to examine students & to grant specified academic degrees:

| National total, full time students 2004 | | 302,562 |
|--|---|----------------|
| Chalmers University of Technology | Chalmers tekniska högskola | 8,459 |
| Jönköping University | Högskolan i Jönköping | 7,052 |
| Stockholm School of Economics | Handelshögskolan i Stockholm | 1,321 |
| Beckmans School of Design | Beckmans designhögskola | 119 |
| Nine psychotherapy programs, from: S:t Lukas Institute of Advanced Studies, Göteborgs Psykoterapi Institut, Otterhällans Institut för Psykoanalys Psykoterapi och Utbildning HB, Psykoterapisällskapet i Stockholm AB, Stockholm Academy for Psychotherapy Education, Svenska Föreningen för Klinisk och Experimentell Hypnos, Svenska Institutet för Kognitiv Psykoterapi, Swedish Psychoanalytic Society, Swedish Psychoanalytical Association | Övr. enskilda anordn. psykoterapeututb. | 196 |
| The Erica Foundation | Ericastiftelsen | 33 |
| Ersta Sköndal University College (Ersta Association for Diaconal Work & Stora Sköndal Foundation) | Ersta Sköndal högskola | 774 |
| Johannelunds Theological University College | Johannelunds Teologiska högskola | 74 |
| Örebro Theological Seminary | Örebro teologiska högskola | 154 |
| H.M Queen Sophia University College of Nursing | Sophiahemmet högskola | 316 |
| Swedish Red Cross University College of Nursing | Röda Korsets högskola | 420 |
| University College of Music Education | Stockholms Musikpedagogiska Institut | 69 |
| Gammelkroppa School of Forestry | Gammelkroppa Skogsskola | 19 |
| Stockholm School of Theology | Teologiska Högskolan, Stockholm | 217 |
| above full-time students at non-public schools (government definition), total | | 19,223 |
| above private higher education students as % of all students | | 6.4% |
| thus public sector higher education (in the narrowest sense) | | 93.6% |
| full-time students at non-public / non-govt. owned schools (excludes also Chalmers & Jönköping, which are converted organizations still owned by the Swedish state) total | | 3,712 |
| above privately educated (though still receiving state subsidies) as % of all students | | 1.2% |

Compiled from Swedish Government reports, incl.: <http://webapp.esv.se/statsliggaren/document.asp?regleringsbrevId=8038&visningTyp=1>

Swedish Higher Education: Key nationwide data for comparison

| | % of teachers with doctorate -- PE: Andel disputerade lärare (%) | | | | | | | |
|--|---|-------|------|------|------|------|----|----|
| | % income from govt budget -- EK: Andel (statliga) anslag (%) | | | | | | | |
| | % financing from Research Councils -- EK: Finansiering från forskningsråd (%) | | | | | | | |
| | Ratio of external financing -- EK: Andel extern finansiering totalt (%) | | | | | | | |
| all | Full time students per teacher -- PE: Helårsstudenter per lärare | | | | | | | |
| 2004 | Successful results ratio -- GU: Prestationsgrad (%) | | | | | | | |
| | # of Fulltime students -- GU: Antal helårsstudenter (HST) | | | | | | | |
| National totals / Riket | 302562 | 83 | 12.6 | 35.2 | 16.1 | 64,8 | 51 | |
| Beckmans designhögskola | 119 | 100 | 12.3 | | | | - | |
| Blekinge internationella hälsohögskola | | | | | | | 31 | |
| Blekinge tekniska högskola | 3120 | 75 | 16.3 | 32.0 | 2.9 | 68,0 | | |
| Chalmers tekniska högskola | 8459 | 87 | 9.6 | 51.3 | 14.7 | 48,7 | 62 | |
| Danshögskolan | 139 | 87 | 6 | 14.2 | 54.6 | 85,8 | 7 | |
| Dramatiska institutet | 151 | 99 | 6.3 | 10.0 | 96.5 | 90,0 | 2 | |
| Övr. enskilda anordn. psykoterapeutb. | 196 | 100 | 9.5 | | | | 16 | |
| Ericastiftelsen | 33 | 100 | 5.4 | | | | 14 | |
| Ersta Sköndal högskola | 774 | 89 | 10.9 | | | | 32 | |
| Gymnastik- och idrottshögskolan | 515 | 88 | 8.8 | 30.1 | | 69,9 | 36 | |
| Gammelkroppa Skogsskola | 19 | 100 | 3.2 | | | | - | |
| Göteborgs universitet | 26066 | 82 | 11.8 | 33.4 | 18.3 | 66,6 | 58 | |
| Högskolan i Borås | 5329 | 89 | 17.2 | 16.0 | 2.7 | 84,0 | 26 | |
| Högskolan Dalarna | 5218 | 84 | 15.4 | 16.9 | 1.3 | 83,1 | 33 | |
| Högskolan på Gotland | 1973 | 67 | 22 | 32.0 | 12.6 | 68,0 | 29 | |
| Högskolan i Halmstad | 5394 | 85 | 22.9 | 16.6 | | 83,4 | 39 | |
| Hälsohögskolan i Jönköping | | | | | | | | |
| Handelshögskolan i Stockholm | 1321 | 91 | 15 | 77.2 | 5.5 | 22,8 | 76 | |
| Högskolan i Gävle | 6311 | 80 | 15.5 | 15.7 | 2.7 | 84,3 | 35 | |
| Högskolan i Jönköping | *** | 7052 | 85 | 21.4 | 28.1 | 2.1 | 29 | 30 |
| Högskolan i Kalmar | 6394 | 86 | 17.5 | 25.4 | 11.2 | 74,6 | 29 | |
| Högskolan Kristianstad | 5622 | 85 | 17.5 | 11.6 | 27.2 | 88,4 | 29 | |
| Högskolan i Skövde | 4307 | 80 | 22.9 | 11.7 | 3.3 | 88,3 | 27 | |
| Högskolan i Trollhättan/Uddevalla | 4442 | 84 | 17.5 | 17.1 | | 82,9 | 29 | |
| Hälsohögskolan Väst i Vänersborg | | | | | | | | |
| Ingesunds Musikhögskola | | | | | | | | |
| Johannelunds Teologiska högskola | 74 | 96 | 8 | | | | 48 | |
| Karlstads universitet | 8863 | 81 | 14.7 | 22.0 | 7.3 | 78,0 | 32 | |
| Konstfack | 623 | 90 | 8.8 | 7.8 | 89.7 | 92,2 | 3 | |
| Karolinska institutet | 5850 | 90 | 4.2 | 51.0 | 14.5 | 49,0 | 65 | |
| Kungl. Konsthögskolan | 216 | 100 | 7.6 | 7.9 | 71.3 | 92,1 | 4 | |
| Kungl. Musikhögskolan i Stockholm | 556 | 101 | 6.3 | 11.9 | | 88,1 | 6 | |
| Kungl. Tekniska högskolan | *** | 12367 | 82 | 10.7 | 44.6 | 15.5 | 42 | 57 |
| Lärarhögskolan i Stockholm | 6601 | 90 | 20.1 | 24.9 | 24.7 | 75,1 | 24 | |
| Linköpings universitet | 18227 | 83 | 13.7 | 31.8 | 16.7 | 68,2 | 58 | |
| Luleå tekniska universitet | 8479 | 84 | 13.7 | 32.3 | 4.6 | 67,7 | 42 | |
| Lunds universitet | *** | 27970 | 82 | 11.2 | 38.3 | 20.6 | 35 | 64 |
| Malmö högskola | 10733 | 87 | 18.5 | 20.4 | 20.7 | 79,6 | 37 | |
| Mälardalens högskola | 8861 | 83 | 17.8 | 17.7 | 5.4 | 82,3 | 33 | |
| Mittuniversitetet | 8124 | 78 | 17.2 | 24.8 | 1.3 | 75,2 | 35 | |
| Operahögskolan i Stockholm | 74 | 100 | 6.2 | 11.8 | | 88,2 | - | |
| Röda Korsets högskola | 420 | 102 | 13.7 | | | | 28 | |
| Södertörns Högskola | 7056 | 76 | 24.7 | 42.4 | 5.6 | 57,6 | 56 | |
| Sophiahemmet högskola | 316 | 101 | 10.6 | | | | 29 | |
| Sveriges lantbruksuniversitet | 3340 | 92 | 2.9 | 45.6 | 4.0 | 54,4 | 64 | |
| Stockholms Musikpedagogiska Institut | 69 | 96 | 7.3 | | | | 8 | |
| Stockholms universitet | 24204 | 75 | 14.3 | 33.1 | 27.0 | 66,9 | 59 | |
| Hälsohögskolan Väst, Skövde | | | | | | | | |
| Teaterhögskolan i Stockholm | 69 | 100 | 3.9 | 1.7 | | 98,3 | 0 | |
| Teologiska Högskolan, Stockholm | 217 | 81 | 16.4 | | | | 71 | |
| Umeå universitet | *** | 16744 | 84 | 9.6 | 31.9 | 17.8 | 42 | 48 |
| Uppsala universitet | 21337 | 81 | 10.3 | 38.5 | 23.3 | 61,5 | 64 | |
| Vårdhögskolan Boden | | | | | | | | |
| Vårdhögskolan Falun | | | | | | | | |
| Vårdhögskolan Gävle | | | | | | | | |
| Vårdhögskolan i Borås | | | | | | | | |
| Vårdhögskolan i Växjö | | | | | | | | |
| Växjö universitet | 8336 | 82 | 19.7 | 22.8 | 13.4 | 77,2 | 35 | |
| Örebro teologiska högskola | 154 | 73 | 13.7 | | | | 40 | |
| Örebro universitet | 9731 | 84 | 19.3 | 18.1 | 13.8 | 81,9 | 42 | |

*** four Swedish EUERЕК cases

Note: Reported totals do not match: subtotals add to 302,565; 302,562 reported.

Compiled from data as reported by the universities to Sweden's National Agency for Higher Education, Högskoleverket

Swedish Higher Education, Research & Innovation Policies: Universities as Engines of Economic Growth

Appendix 3: Interview questions used in EUEREK case studies
(English & Swedish; format of questions posed by each of the seven EUEREK teams)

EUEREK questions / EUEREK frågor

6. Mission and strategy

6. Mål och strategi:

To what extent is the university's mission and strategy influenced by state policies or by its systematic positioning and to what extent is it self determined or adopted for the purpose of fulfilling particular institutional objectives?

I vilken utsträckning är universitetets mål och strategiska plan påverkad av statliga policies eller av universitetets egen systematiska profilering / positionering och i vilken utsträckning är den till för att uppfylla/ genomföra de institutionella målen ?

Has this changed over the last decade?

Hur har detta förändrats under det senaste årtiondet ?

If so, can you identify the factors which have influenced the change: state policy, market forces, internal dynamics, or external economic or social factors?

I så fall, kan Du säga vilka faktorer som har påverkat denna förändring: statlig politik, marknadskrafter, intern dynamik eller externa ekonomiska eller andra samhälleliga förhållanden ?

7. Governance and organisational structures

7. Styrning och organisation:

What changes in governance, organisational structures and decision-making have taken place over the last decade?

Vilka förändringar vad gäller styrning, organisatorisk struktur och beslutsfattande har ägt rum under de senaste tio åren?

Are these changes a cause or a consequence of the development of entrepreneurial behaviour at the university or have they been initiated by the state?

Är dessa förändringar orsakade av eller en följd av ett framväxande entreprenöriellt beteende inom universitetet eller har de initierats av staten ?

Could it be said that there is an entrepreneurial organisational culture at your university, or in particular parts of it (units, departments) (in that case which ones) or is it your opinion that such a culture does not exist?

Kan man säga att det finns en entreprenöriell organisationskultur på Ert universitet generellt eller på vissa enheter eller institutioner (i så fall vilka) eller anser Du att en sådan kultur inte finns ?

8. The funding base

8. Ekonomiska resurser:

What are the sources of non-core/non-state budgeted funding and how have they developed?

Vilka typer av icke-budgeterade (statliga) resurser förekommer vid universitetet ?

What impact have these resources had on the university's academic and organisational structure?

Vilken betydelse har dessa resurskällor haft för universitetets akademiska eller förvaltningsmässiga organisationsstruktur ?

What academic or financial risks, if any, were involved in particular ventures?

Kan man säga att det funnits akademiska eller ekonomiska risker knutna till vissa nya åtaganden ? I så fall vilka?

Have any ventures failed? If so, for what reason?

Har några sådana åtaganden / projekt misslyckats ? Varför i så fall?

Is external funding (non-core funding) for particular activities used to cross-subsidise other academic activities or is it planned to do so?

Används externa resurser särskilt för att understödja/subventionera andra akademiska aktiviteter eller planerar man att göra det ?

9. The development of new knowledge from entrepreneurial activities

9. Utveckling av ny kunskap genom entreprenöriella aktiviteter :

Have you got any illustrative examples of how new knowledge has been developed from entrepreneurial activities?

Har Du några illustrativa exempel på hur ny kunskap skapats genom sådana aktiviteter?

Have these activities been generated by bottom-up or top-down initiative (or both)?

Har den utvecklats via initiativ nerifrån verksamheten eller på initiativ av ledningen?

Was the driver primarily academic or primarily financial (or both)?

Var drivkraften huvudsakligen akademisk (nyfikenhet, sökande efter ny kunskap) eller ekonomisk eller både och?

How have they been financed?

Hur har dessa aktiviteter finansierats ?

If funding was made available, where did it come from and was it competitive?

Om vissa medel tillskjutits, varifrån har de kommit och har man konkurrerat om dem ?

10. The dissemination of knowledge

10. Kunskapsförmedling och spridning :

Apart from regular teaching, what steps does the university take to organise the dissemination of knowledge (through teaching, short courses aimed at external audiences or otherwise) in accordance with the demands of employees and others outside the academic world?

Vid sidan av det gängse undervisningsuppdraget, vilka åtgärder har universitetet genomfört för att organisera förmedling av kunskap (genom undervisning, kortare kurser med externa målgrupper eller en bredare publik) i linje med efterfrågan från arbetsgivare och andra utanför den akademiska världen ?

11. Mechanisms for exploitation of knowledge/knowledge transfer

11. Mekanismer för exploatering av kunskap/överföring av kunskap :

What mechanisms have been created for the exploitation of knowledge/knowledge transfer?

Vilka mekanismer har tillskapats för att exploatera kunskap (knowledge transfer) ?

How successful have they been?

Hur framgångsrika har de varit ?

Has the external climate, e.g. the political, legal and administrative situation encouraged the exploitation/ transfer of knowledge?

Har det externa klimatet – politiskt, rättsligt eller den administrativa situationen uppmuntrat exploatering/överföring av kunskap ?

12. Competition

12. Konkurrens :

In what fields or ranges of activities does the university compete with other universities and/or enterprises and for what?

Inom vilka verksamhetsområden konkurrerar universitetet med andra universitet och/eller företag och om vad i så fall?

Is there any evidence that competition encourages or discourages new developments?

Finns det några bevis för att denna konkurrens uppmuntrar eller hämmar utvecklingen på något sätt ?

13. Human resource management

13. Personalpolitik (human resource management) :

What changes, if any, to reward systems have taken place and how have they affected staff behaviour?

Vilka förändringar, om några, har införts vad gäller belöningsystemen (löner etc.) och hur har dessa förändringar påverkat de anställdas beteenden i så fall?

Have these changes enhanced or hindered an entrepreneurial approach to academic/financial activities (the search for or creation of new economic resources)?

Har dessa förändringar positivt påverkat eller förhindrat framväxten av ett entreprenöriellt förhållningssätt till akademiska/ finansiella aktiviteter (sökande efter, eller skapandet av nya ekonomiska resurser) ?

14. Inhibitors to entrepreneurial behaviour

14. Hinder för företagsamhet/entreprenörsbeteende :

What factors could be said to inhibit entrepreneurial activity at the institutional or the individual staff member level - state regulation, history and tradition, (or culture) organisational, budgetary or any other?

Vilka faktorer kan betraktas som hinder för entreprenöriell aktivitet på institutionell nivå eller på individnivå för akademiker och andra anställda, som t ex statliga regleringar, historia och tradition, eller kultur, organisatoriska, budgetmässiga eller andra hinder ?

Are there rigidities whose removal would encourage greater entrepreneurialism at institutional or individual level?

Finns det några nuvarande regleringar av sådan art att man om de försvann så skulle man uppmuntra företagsamhet och entreprenörskap på institutionell eller individuell nivå och denna skulle därigenom öka ?

Additional comments

Övrigt

- x - x - x - x - x - x -

Swedish Higher Education, Research & Innovation Policies: Universities as Engines of Economic Growth

Appendix 4: Summary Presentation of Higher Education in Sweden (OHP)

Swedish Higher Education, Research & Innovation Policies: Universities as Engines of Economic Growth

for EUEREK Turku Workshop
11 & 12 February 2005

EUEREK Sweden Team:
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"A fundamental condition for Sweden to be able to continue to compete successfully in the knowledge-based economy is that Swedish research and education are of world class. To maintain the strong international position of Swedish research, continued efforts need to be made in research and postgraduate education."

-- *Innovative Sweden* p. 16

Innovative Sweden Strategy: Four Priority Areas:

- Knowledge base for innovation
- Innovative trade & industry
- Innovative public investment
- Innovative people

Profiling Sweden: Key R&D Data

Sweden's total R&D spending as percentage of GDP is **4.3 %** -- ***highest in the OECD*** (latest 2001 data; Sweden is well ahead of the European Council's *Barcelona Objective* of 3% of GDP for R&D by 2010)

Some three quarters of Sweden's R&D is carried out by private firms. Less than one quarter is in higher education; the remainder is in other areas of the public and non-profit sectors.

Profiling Swedish Higher Education: Key Figures

340 000 undergraduate students enrolled (2003)
19 000 postgraduate students
(319 000 full-time equivalent students)

Central government expenditure for HE sector:

55.3 billion SEK (2003; approx. 6.1 billion euro)

- to central government-owned universities: 73.4%
- for financial aid to students: 19.7%
- to private educational institutions: 5.8%
- to central government agencies: 1.1%

University funds flow in via:

- Remuneration for undergraduate students according to contracts negotiated with the Ministry of Education
- Faculty grants for research & research training

External research grants come from:

- national, regional and county research councils
- sectoral agencies, research foundations and academies
- the business sector
- international programs (EU) & research collaboration

1993 Swedish Higher Education Reform -- universities given new freedom to decide on:

- educational organization
- institutional organization
- what courses & programs to offer
- student admissions
- establishment of new positions
- appointment / elevation of professors
- career paths for teachers
- allocation of resources to undergrad education

Other strategic changes in the 1993 reform:

- a new set of agencies
- a new resource allocation system
- national audits of quality and monitoring
- emphasis on competence and management

Subsequent HE reforms in 1996, 1998, 2001:

- third priority made explicit, stressing collaboration and contacts with business & industry, public sector activities, culture & adult education (in addition to the priorities of education & research)
- new composition of governing boards
- new academic career system

Future Changes Expected:

- tuition levies (applied first to non-EU students)
- intellectual property rights changes (away from researchers; perhaps to be shared also with institutions & departments)
- new networks, alliances, clusters & synergies
- opening-up of national system (increased mobility)
- increased specialization & increased rivalries
- information will have more proprietary importance
- more emphasis on the 'D' of R&D

Simple Assumptions or Future Friction Points?

"The state has special responsibility for financing basic research, where the issues to be studied are decided by researchers. The state also funds research, addressing the knowledge needs of the business sector and society as a whole."

--- *Innovative Sweden* (Oct. 2004, p. 16)
Swedish Ministry of Industry, Employment and Communications & Swedish Ministry of Education

Swedish Higher Education, Research & Innovation Policies: Universities as Engines of Economic Growth

Appendix 5: Explanatory comments on Swedish data
(cautions when making comparisons)

Sweden's universities have gone through numerous changes from 1993 to present, due to various causes. Some of these are solid reasons that data should be interpreted with considerable caution.

Please note the below caveats before attempting to extrapolate from the Swedish data:

Colleges and functions have been absorbed or spun-off in response to external policies

The universities studied have changed domain during the period studied. Since 1994 there have been a number of reorganisations in the Swedish higher education system. Health colleges, for instance, offering education in nursing and other occupations in the medical and health sphere, were previously run under the auspices of the county councils. (The 21 Swedish county councils represent a level between the municipalities and the state government, and are politically elected with the primary task of being responsible for all health care, including hospitals, and public transportation of their respective counties). Within the framework of unification of all Swedish higher education into one system, and as a consequence of trying to uphold the ambition that all higher education should be linked to research ("rest on scientific foundations" according to the Higher Education Act), the health colleges were gradually transferred into the state system, sometimes being incorporated into nearby university colleges or universities.

In Jönköping, the Health College was incorporated into Jönköping University as the School of Health Sciences in 2000, adding another school to the three created earlier.

Another reorganisation was the creation of Malmö University College which entailed that all teacher education located in Malmö that at an earlier stage had been incorporated into Lund University, was now to transfer into Malmö University College. In addition, some engineering programmes provided in Malmö became part of the new college. On the other hand, the education for dentists, previously a separate school in Malmö, became part of the University of Lund and merged with the faculty of medicine there. All such changes have taken place during the period studied, with subsequent effects on the basis from which statistical data is generated. In many cases nationwide, such changes in university domain have arisen in response to Swedish national or regional policy, and not as an effect of an individual university's entrepreneurialism.

Non-core income is systematically underreported

It is important to note that some / much income from commercialisation of various kinds, contract education, consultancy services or research-based products etc. are not visible in the annual reports of the HEIs or in the statistical information provided by Högskoleverket (Sweden's National Agency for Higher Education). This is because the HEIs have created separate external companies to deal with these tasks. Some of these are wholly-owned by university holding companies, some are partly owned, and some are owned by other principals such as professors, but operate in some form of *symbiosis* with the universities. In some cases the university agreed, for example, to a ten-percent ownership of the spin-offs. This is largely due to the fact that Swedish HEIs are administrative units of the state, not legal persons, and as such they cannot enter into legally binding contracts or agreements with other parties (three exceptions include Jönköping University). In addition, as part of the government, HEIs cannot independently bring cases to court, hire staff, take up loans, have command over capital and own real estate without the limitations that apply to all agencies of the state. And as we have reported

elsewhere, university researchers in Sweden retain rights to commercialization and intellectual property ownership of their innovation (this is called the "academic exception"). In many cases it is therefore preferential to run commercial or externally-directed activities in corporate or foundation form. These companies file financial reports according to corporate law, and income from such entrepreneurial activities often is not reported in the university accounts. Yet it can be the package mix of the university and private combination that makes a university department, research team or position attractive (this is cited as a factor that retains researchers in Sweden; see "Getting it together." *New Scientist*, 27 March 2004, p. 50-51). Donations to universities can also be creatively funnelled through mechanisms allowing greater (or lesser) latitude or control. There are many avenues existing that allow workarounds as countermeasures to organizational and legal rigidities. In as much as entrepreneurial mechanisms grow in these ways, the published data may move in the opposite direction.

Data definitions and formats have changed

The data definitions are not exactly the same from year to year. Both the HEIs and Högskoleverket have adjusted the definitions and formats which makes comparisons over time. The Agency rather carefully charts details of these changes, but the annual reports of the universities are not necessarily explicit about their discrepancies. To compare data between universities in one and the same year using Högskoleverket's figures can be done with a high degree of confidence, but more than that becomes rather tricky. The fiscal year in Sweden has also changed: 1995/96, was the last fiscal year reported from July 1st to June 30th; from 1997, the fiscal year became the same as the calendar year. In this transition, data was published for an 18 month period.

Another difficulty is with determining teaching staff data. Some technical staff and many doctoral students teach courses. But we cannot simply count doctoral students as teachers. Though all doctoral students in Sweden must have full funding prior to entry, some are paid as employees while others receive fellowships. In the latter case, due to tax implications, they are not supposed to teach, but often do. Finally, the teaching load at most Swedish universities is quite low in international comparison. Full-time equivalent data is thus deceptive. If course hours offered were the starting point, perhaps data would be more robust; instead, people are counted and determined as full or (to some extent) partial employees.

In Sweden, "private" does not always mean "non-state"

The driving force for becoming a private university as an entity under private law (which was the case with Chalmers and Jönköping) was primarily as follows:

- to build up funds of one's own
- to own land and buildings
- to decide about the organisation
- to develop an employment structure of one's own
- to develop a recruitment procedure of one's own

Another effect of this status is the relative ease of entering into agreements with organisations or individuals having independent legal standing, to control real estate or capital, and with freedom to form new legal standing, merge or split legal status without the need for special permission.

It is not unusual for the government to choose to "hand over" some public administration tasks to be carried out in other forms than through public authorities. Such transfers of authority are legally regulated and cannot be considered simply "private" (or non-state).

Nationwide negotiations determine compensation per student; individual negotiations between the state and each institution (including private institutions) determines maximum number of students for whom compensation will be paid. In practice, the Swedish government's ultimate funding of programs also controls what programs are offered. Universities as a rule may not charge tuition.
