Swedish Universities in Transition: From "Mode 1" to what?

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Abstract

This paper aims at analysing the obstacles to in-depth cooperation between Swedish universities and other parts of society. Social capital is used as a comprehensive concept for the norms, values and relations that exist in the university sector and between this sector and the surrounding society. A working hypothesis is that universities' social capital is adapted by tradition to the "Mode 1" production of knowledge, and that a transition to "Mode 2" therefore requires a comprehensive change in the universities' social capital.
After an introduction, section 2 gives a background in its description of the development of the Swedish university policy, mainly from a national perspective. In section 3 an analysis is made of the reasons why Swedish universities still mainly are dominated by Mode 1 production of knowledge and in section 4, a number of areas that deserve further illumination are given prominence. In both these sections, norms, values and networks are central concepts in the analysis. Together these phenomena form the social capital of the universities and between the universities and other parts of society. The conclusion is that this constitutes an important obstacle to the development of a Mode 2 production of knowledge in Sweden.

Keywords: Social capital, Mode 2, University-Industry collaboration, Research policy

1. Introduction

The discussion on the knowledge society has revolved to a great extent around changes in the production of knowledge as such. Perhaps the most influential contribution, Gibbons et al. (1994), developed the thesis of a process of transition from a "Mode 1" production of knowledge to a "Mode 2", in which Mode 1 constituted the traditional, intra-scientific, intra-disciplinary production of knowledge, while Mode 2 characterized the socialisation of the production of knowledge. According to the latter approach, the production of knowledge is being pursued to a growing extent in a form of cooperation not only between disciplines but also with parties outside the academic world – users of research that also participate in and determine the relevance of knowledge, and contribute to quality control. The role of the universities in the Mode 2 production of knowledge is not so evident. Rutten and Boekema (2004) have even claimed that, if the universities cannot adapt to the changes in demand for knowledge made by society's other sectors, they will be marginalized and society's resources for the production on knowledge will be allocated to other parties.

Gibbons et al. (1994), and work on similar theses by Ziman (2000), Etzkowitz & Leydesdorff (1996) and Nowotny et al. (2001), have made the contribution that education and research policies in a number of countries have not only focused on levels and distribution, but also on the need for cooperation between universities and other stakeholders in society, on utility and areas of use of research, and on the influence of the general public and politics. One example of this is Sweden which legislated in 1997 that, in addition to education and research, the universities also have a third equally important task, viz. to cooperate with other parts of society.

This paper aims at analysing the obstacles to in-depth cooperation between universities and other parts of society according to Mode 2. The analysis has been made with the aid of the concept of social capital.

After Putnam (1993, 2000), social capital has mainly been used as a designation of norms and values as well as relations and networks in the *civil society*. However, as pointed out by Westlund (2006) norms and values, and the social networks they are being distributed in are not restricted to the civil society, but exist in all parts of society. In this paper social capital is used as a comprehensive concept for the norms, values and relations that exist *in the university sector and between this sector and the surrounding society*. A working hypothesis is that universities' social capital is adapted by tradition to Mode 1 production of knowledge, and that a transition to Mode 2 therefore requires a comprehensive change in the universities' social capital.

Section 2 gives a background in its description of the development of the Swedish university policy, mainly from a national perspective. In section 3 an analysis is made of the reasons why Swedish universities still mainly are dominated by Mode 1 production of knowledge and in section 4, a number of areas that deserve further illumination are given prominence. In both these sections norms, values and networks are central concepts in the analysis. Together these phenomena form the social capital of the universities and between the universities and other parts of society and this constitutes an important obstacle to the development of a Mode 2 production of knowledge in Sweden.

2. The emergence of the Swedish university policy

As in other countries, up to the beginning of the 20th century the old Swedish universities in Uppsala and Lund were mainly educators of priests and public servants. The ideals that had dominated in Europe since the beginning of the 19th century had been formulated by the founder of Berlin University, Wilhelm von Humboldt. According to these ideals, education should not strive towards short-term material goals and visible results. The shaping of individual personalities should be the overall aim of university education. Another central principle was the freedom and independence of research vis-à-vis different social interests (Sörlin 2003).

Only in exceptional cases were the leaders of the emerging industrial society educated at the traditional universities, but at the technical colleges in Gothenburg (Chalmers' Institute of Technology) and in Stockholm (Royal Institute of Technology, KTH), which were started in the 1800s. However, during the decades around the First World War, the universities started to be transformed "from small, social, homogenous elite and socialisation sanctuaries - into relatively large, diversified, professional education research and organisations mostly for the middle class" (Nybom 1997, p. 21, our translation).

In some cases researchers in the universities' scientific subjects were engaged in industrial projects (Eriksson 1978). Sörlin and Törnqvist (2000) give several examples of this but they also point out that research done by the industry itself played a greater role for its inventions and product development. During the 1910s and onwards, several sector research institutes were founded. This can be seen as a clear sign of the gap between academic university research and the needs of industry.

At the beginning of the last century, the great importance of technical and scientific research for industrial development laid the foundation of a view of higher education and research as a positive driving force in society, "…while the government, which had previously preferably seen that the universities and the academic researchers made as little fuss as possible, now started to hope, and perhaps demand, that science did the impossible" (Nybom 1997, p. 24, our translation). This approach has been in and out of favour and has been expressed in different ways in different periods. While the budgets for the universities decreased as a proportion of GDP between 1925 and 1939, the military orders placed in the USA, chiefly for the atom bomb, clearly marked the immediate socially utility of science. This also had a clear impact in Sweden.

As early as in the 1940s, Swedish research policy was given a peculiar special feature, namely that research should only be pursued at the universities (Nybom, 1997). "After the war the Swedish research policy doctrine was that institutes are evil and that universities are good and all other discussion was superfluous" (Sandén and Sandström 2002, p. 197, our translation). The consequence has been that Swedish institute research has been considerably less extensive than in other countries. This is particularly the case with publicly financed industry research. In EU countries at the beginning of the year 2000, an average of 24% of the public R&D budget was allocated to industrial research. In Sweden the figure was 3% (Sanden and Sandström 2002).

During the first decades after the war the "linear model" dominated the Western world's view of research and higher education. If research was given funds and a free hand, it was expected to deliver new basic knowledge to laboratories at institutes and companies. These laboratories

then developed inventions and new products, which could be commercialised and mass-produced and thereby contribute to growth. Basic research was to constitute a prime engine for social development, but its cooperation with other parties of society consisted only of its supplies. Applied research, innovations, commercialisation and serial production constituted the future links in this chain (se Sörlin & Törnqvist 2000). This model, which was based on observations of the effects of technical scientific research mainly in the USA, was transferred during the period of optimism in the 1960s fairly uncritically to the social sciences and there it was expected to contribute to improving society in a corresponding way (Sandström 2000).

Partly as a consequence of this politically undisputed conception, a considerable process of expansion was started in both higher education and research. The growing need of labour with higher education qualifications as well as reasons of social and regional equality were also strong driving forces behind this expansion. The university colleges in Gothenburg and Stockholm were converted into universities in 1954 and 1960 respectively and were given more resources. The higher technical education programmes and research programmes at the KTH and Chalmers were considerably re-enforced. Two new universities were established in Umeå and Linköping in 1963 and 1970 respectively. Two new technical colleges were established shortly thereafter, in Lund and Luleå.

A certain amount of scientific criticism was directed against the linear model as early as in the 1960s. In society at large, the scientific belief in the future was weakened considerably during the 1970s. The left wing movement and greater awareness of the environment coincided with economic structural crises. Despite the expansion of research and higher education, the economy stagnated. Opposition to nuclear power came to symbolise the new lack of faith in technology and science. However, the expansion of the higher education system and research continued, in principle independently of these events but also in a partly new way. In addition to the expansion of the six existing universities, a large number of regional university colleges were built. This development had started in a small way with a few so-called university annexes in the 1960s. As opposed to the universities, these colleges would not do research but would merely work with higher education in order to meet the needs of the labour market. However, research outside the universities expanded in other forms, mainly through the emergence of a number of so-called sector research organisations under different ministries and government agencies. In principle, these sector research organisations came into being in conflict with the official research policy, i.e. that research should be pursued at the universities, but they were founded and financed by ministries and government agencies outside the controls of the research policy. Even if the simplified view that research directly generates growth had been shaken, there were other reasons for the expansion of research. The public sector had been extended and its different bodies demanded “an efficient, regular and ideologically congenial evaluation and information activity” (Nybom 1997, p. 128, our translation).

In the 1990s, confidence was expressed in the positive effects of research and higher education through, for example, the right wing government’s transformation of the wage earners’ investment funds into research foundations, and the following social democratic government’s initiatives in respect of the regional university colleges and the introduction of the third mission for universities. In the first case, the new research foundations, formally free from political control, constituted a central component in the right wing government’s growth policy. In certain respects the right wing government’s view of research can be compared with the simple linear model of the 1950s and 1960s in which research was to create new growth with the aid of more funds. The Prime Minister, Carl Bildt, emphasised the importance of

being in the front line in the development of information technology, which was expected to have great economic importance (Benner 2001, p. 31). In the latter case the universities were appointed to be driving forces in the service of regional development. The third task of the universities that came into being in 1997, i.e. that the universities, in addition to education and research should also collaborate with surrounding society, is an expression of the increasing importance given to universities in societal development.

3. Incentives and disincentives for a new type of knowledge production.

3.1. Universities' cooperation in practice

Since Sweden has chosen to concentrate its research resources to universities and not to research institutes, it would be reasonable to expect that the Swedish universities perform the tasks that research institutes perform in other countries, i.e. that they also pursue applied research in cooperation with industry and other parties. In an investigation, the Swedish Institute for Studies in Education and Research (SISTER) made a review of cooperation at twelve selected universities and university colleges in June 2003.[1] Some the results of the survey are summarised below:

- The status of cooperation appears to be given high priority on the basis of how it is presented on the websites of the universities/university colleges. With one exception, all had clear links to websites that take up the task of cooperation.
- According to the decision of the Swedish Parliament, each university/university college shall draw up an action programme for its cooperation mission in which it shall report what it is doing to fulfil its assignment. However, an action programme of this type could only be found at five of the twelve universities studied.
- It is more common that the small universities and university colleges explicitly focus on regional aspects in their presentations of cooperation. The larger universities often do not interpret what they mean by "surrounding society". Their formulations revolve in general around "the national" and "the international".
- Evaluations of cooperation projects appear to be very uncommon.
- Among personnel at university colleges with long experience of cooperation projects, there is criticism towards transforming cooperation measures into project form. Experience shows that long-term sustainable financing of cooperation activities is necessary. Government agencies that grant appropriations usually lack responsibility for the long-term perspective and there seem to be few projects that have succeeded in creating their own sources of finance after the end of the project period.

In a large survey by Wahlbin and Wigren (2007), close to 10 000 Swedish teachers and researchers in 30 universities and colleges answered questions about their cooperation activities and opinions on cooperation with the surrounding society for the year 2006. Some of their results are presented below:

[1] The universities and university colleges studied were: Blekinge Technical College, Chalmers Institute of Technology, Dalarna University College, Halmstad University College, Karlstad University, National College of Art and Design, Royal Institute of Technology (KTH), Luleå Technical University, Lund University, Mälardalen University College, Umeå University and Uppsala University.

- One out of three had recruited external guest lecturers and the same share had received salary from other organizations than their home university.
- One out of four arranged for students to solve a problem for a private company or a public organization and nearly the same share participated in commissioned research.
- 2.5 percent of the respondents had started a firm, 1.8 percent applied for a patent and 0.29 percent sold a licence for a patent they owned.
- Most respondents said that cooperation with the surrounding society had positive effects on their academic carriers. Half of the respondents were of the opinion that academic integrity and freedom increased through cooperation projects, whereas the other half was of the opposite opinion. New, regional universities and colleges had higher shares of staff being positive to external cooperation.
- Most respondents considered the support for cooperation from the university to be low and were of the opinion that cooperation took time from other activities.
- New or old university, and the individuals' position and scientific area were the most important factors behind the differences in cooperation activities.

3.2. Increased political demands

The universities and university colleges in Sweden have cooperated with regional and national levels of society in many respects for a long period of time. Concrete cooperative measures, for example research and studies into the problems of the region, science parks and other measures for hiving off activities, existed and increased in scope before 1997. In other words, the universities appear to have been sensitive to the demands of society. Nonetheless, the government does not appear to be satisfied. Political influence over the universities has increased and demands in respect of cooperation have been laid down in legislation.

The foremost explanation of this stronger political pressure is probably the increasingly stronger focus on growth as the goal of the policy. The increasing interest in growth has placed the role of universities in focus. The labour market of the knowledge society is considered to require an increasing number of people to have higher education. To an ever-increasing extent, university research and education have started to be seen as a driving force for new innovations, new companies and new employment (see, for example, Nilsson & Uhlin 2002).

The growth perspective has led to new implicit and explicit demands on university research. While the amounts available for the universities to distribute themselves, the so-called faculty appropriations, have remained unchanged at a fixed monetary level since the beginning of the 1990s (Sandström 2003), the increase has taken place in the form of research council funds and sector research funds. In October 2008, a government bill launched a new feature of Swedish research financing: "strategic initiatives" in about twenty areas, selected by the national government. These measures can hardly be interpreted as anything else than a lack of faith in the ability of the universities to distribute the funds or, to put it more positively, as the intention of the donor of the funds, i.e. the government, to direct resources to the areas it wants to give priority to.

In principle the question is whether the state and other research financiers should have the right to direct their funds to the areas they want to give priority to or whether the university itself is more suitable to allocate research resources. No one can deny that there are democratic arguments that political control is reasonable. Parliament and government shall

implement the policies on which they have been elected in different policy areas. In this respect, education and research policy is no exception.

A possible interpretation is therefore that central government, despite an existing increase in the degree of cooperation, gave prominence to cooperation as a mission on the same terms as education and research, since it was not satisfied with the speed of this development, or wanted to clearly indicate that cooperation should be developed into something more than it had been hitherto, mainly formal measures of cooperation. An interpretation of this type is in line with the notion expressed by one of the most radical advocates of Mode 2 in Sweden. According to Brulin (1998), the work of universities should be changed in three decisive ways if the third mission is really taken seriously:

1. Research should cease being based on theory and be based on practice instead.
2. There should be an emphasis on absorption instead of innovation. "The absorption of new ideas and imitation of good solutions often means more for the development for a region or a country than basic research and new discoveries" (Brulin 1998, p 36).
3. The cooperation mission must affect both the basic education programmes and research programmes at universities. The primary task is not longer to educate civil servants but to liberate "a horizontal development dynamism".

To what degree then is this in line with the autonomy that many people in the academic world experience as being threatened by government control, theoretically supported by Mode 2 arguments?

3.3. A questioned autonomy

It would be a misconception to believe that the universities of the 1800s, under the influenced of Humboldt's ideas, were completely screened off from other parts of society. While the forming of individuals' personalities was, according to the ideal, a primary purpose, the universities constituted strong institutions for the preservation of society. They stood above different interests of society but, at the same time, secured the continued existence of the general interests of society and government. The knowledge supplied by the universities of the 1800s was thus, to a great extent, ideologically coloured knowledge. The universities' training of priests and public officials constituted a central component in the formation of the myth of the national state, in Sweden and in other parts of Europe. In this respect there was thus, even in the 1800s, intimate cooperation between universities and society.

The process of transition of the universities from ideological fosterers of public officials to practitioners of science in the modern sense of the term was a long and drawn out process which was expressed in different ways in different countries and in different disciplines. In general it was the natural sciences that started to formalise the scientific methods in the universities by testing hypotheses through experiments that could be repeated. In the humanities, in the core subject of history, the "revolution" was started in Sweden with the breakthrough of Weibull's source criticism, inspired by France, at the start of the 20th century. When, in the 1930s, Karl Popper formulated the requirement it should be possible to test scientific theory empirically - and thus it should be possible to falsify - it was given an importance that can hardly be overestimated.

In many respects, the scientific ideals that have guided post-war universities have had more in common with Popper than with Humboldt. It is by applying these ideals and, at the same time, having a critical approach to the interests of both the government and other stakeholders in society that the universities and research have acquired the confidence and trust they enjoy today. Now that the government has increased its political influence over the universities in some areas and has made stricter requirements in respect of cooperation with other parts of society, it is hardly surprising that this is regarded by universities as constituting a risk that they will be forced to give up their ideals as independent and impartial seekers after truth.[2] At the same time it is, as pointed out above, entirely reasonable from the democratic perspective that political control also includes the education and research policy. They are no *a priori* arguments that higher education and research should enjoy autonomy that other sectors lack. The fact that there may well be good reason to discuss the actual content and effects of the decisions that are taken on increasing political control of the universities and increasing cooperation is another matter.

3.4. A special position needs a special autonomy

If the universities are to function as an effective resource in a new growth and innovation policy which Sweden and other parts of the west world seek, it is necessary that they accept their partly new role. On the other hand, it is necessary that politicians and bureaucrats accept the universities' need of a special type of autonomy that can enable them to pose questions, to be innovative, and to play their expected role in the growth policy. The problem can be expressed in terms of a lack, to a large extent, of social capital adapted to the new function that the government wants the universities to have. This lack of the "right" sort of social capital is not only to be found between universities and other stakeholders and levels in society, but also between university management, which must take both external and internal requirements into consideration, and the universities' teachers and researchers who are primarily striving to preserve their relative independence.

The universities have built up their strong position by maintaining a special position in respect of objectivity and scholarship. While the government that, in the 1800s held its own vis-à-vis different social interests, governs today taking into consideration the interests of different groups, science and its institutions have succeeded relatively well in maintaining their position as objective seekers after truth. For generations they have fostered researchers in the scientific ideals and built up a strong international intra-academic social capital with common norms and strong internal links. One of these norms has been integrity and the reluctance to accept external influences. The universities themselves have selected their research problems and have designed their teaching themselves. Those people who were doing the research in each sector accepted the emergence of sector research funds, since they meant more resources and did not require changes to methods and/or other external considerations.

On the other hand, the production of knowledge according to Mode 2 involves a break with the role that the university has successfully built up. It means that universities are forced to

[2] For one of many examples see Rotstein (2000, p. 65). "For research nothing is more important than autonomy. Without this it is not possible to pursue either critical or useful research. The free searching for new knowledge is of central importance, without it research and higher education are reduced to a soulless form of evaluation that repeats already established conceptions and legitimises the established power's hegemony over our thinking. Neither cultural life and democracy nor trade and industry are served by controlled research. The academics, including the management of my own university, that have actively participated in undermining the autonomy of research, may therefore bear their disgrace."

take external factors into consideration in respect of posing questions and methods; that research focuses on both theory and application; and that its quality and utility is also the subject of external assessment. Put briefly: the universities would be forced to abandon their position of being "above" the interests of society and to become a stakeholder, certainly a stakeholder with special skills, but nonetheless a normal participant among other participants in the public sector and trade and industry.

It is hardly surprising that there is opposition in universities to developments of this type. Most people working in universities do so since they want to work with research and teaching. Most people with action-oriented interests most likely choose other occupations, but those who are to be found in universities probably often apply for posts where they have a great number of contacts with other sections of society. It is probable that the requirements in respect of cooperation meet greater understanding among those who are already involved in cooperation of this type in formal and informal networks and bodies. On the other hand, the fact that a university officially supports the idea of cooperation and takes measures for cooperation cannot necessarily be seen as an expression that its personnel do so.

3.5. A problem of incentives

The predominant method used by the universities to deal with the requirement for primarily regional cooperation has been to establish special bodies, such as cooperation offices, holding companies, technical foundations and science parks, with special personnel. This can be seen in itself as an expression of the difficulties in integrating the cooperation mission into the ordinary activities of the university institutions. Individual researchers usually lack the incentive to add a further task to their research and teaching. "Cooperation" does not give any academic qualifications. One alternative would naturally be to make financial incentives possible for cooperation. The potentially simplest type of cooperation for teachers/researchers – and for which there are financial incentives –namely private consulting work, is however usually in conflict with university rules for sideline occupations. Therefore, in principle, there are only negative incentives, for example a lack of research funds, which can make cooperation an urgent necessity. A basic change in the incentives structure is therefore probably absolutely necessary if cooperation is to be developed into an integral part of university activities.

3.6. What actions is government taking?

There is also reason to examine the foremost stakeholder that is the driving force behind cooperation, namely central government, and what it has done, and not done, to achieve its ambitions. A critical examination of the actions of central government could be interpreted in such a way that even if it wanted universities to be driving forces for national and regional growth, it does not know how this should be done.

While faith in the linear model has failed and the policy for higher education and research at the national level has been characterised by superficially conflicting features in respect of cooperation by universities with other parts of society, politics at the *regional* level have, at least superficially, been clear cut: higher education and research has increasingly come to be seen as the foremost driving force for regional growth and development. The reason why the

linear model has been able to stay alive and even been strengthened in its regional variant is associated above all with the successful examples of Umeå and Linköping.

Umeå University, which was founded in 1965, has come to represent the driving force for development that a university can give to a peripheral small town. Through local political mobilisation, strategic initiatives and persistent lobbying of the government offices, Umeå won the struggle to be the home of the university of the province of Norrland (Olsson 2003). For several decades, Umeå has been one of the most rapidly growing municipalities in Sweden and, since 1992 it is the largest municipality in Norrland. Linköping in southern Sweden, whose university was founded in 1970, has also experienced very strong population growth.

On the other hand, the ways in which the "regional linear model" functions in practice, i.e. how higher education and research should function as driving forces in reality, have remained unclear. Apart from initiatives to strengthen human capital through training programmes, regional centres have also regarded university colleges as a means for consolidating growth. The goal of the municipalities and the university colleges has often been that the colleges should be given university status. For the colleges themselves, the reasons have mostly been associated with growth, more resources and higher status. Other local and regional parties have noted the strong growth of Umeå and Linköping during recent decades and have regarded a university as being of decisive importance for the development of their own municipalities and regions. Even if the regional colleges and other parties in each place have accordingly agreed on the goal of university status, their reasons have differed. The college has had its reasons and the region its reasons. There are few examples of the two participants working out a common strategy for seriously linking the university ambitions of the colleges to their role in their region development.

R&D's share of GDP increased from 2.8% to 3.8% between 1990 and 2000 and has remained around that level since then. The establishment of the research foundations financed by the so called collective wage-earner funds, the reorganisation of the government research councils and the "strategic initiatives" on selected areas have enhanced the possibility of directing research funds to politically desirable areas. Concrete results in the form of spin-off effects, or regional or national growth, as the result of these initiatives have however not occurred yet.

The responsibility for universities, including its third mission, lies with the Ministry of Education (and where the University of Agricultural Sciences is concerned, with the Ministry of Agriculture), despite the fact that the third mission, with the present focus on growth, is to a very high degree an industrial policy issue. With the exception of the establishment of a special committee for regional cooperation on higher education (*Samverkansdelegationen*), with a budget of SEK 50 million per year for the period 2002-2004, the Ministry of Education has largely delegated the responsibility for the interpretation and implementation of the third mission to the universities themselves. On the other hand, in the industrial policy field, the National Agency for Innovation Systems (*VINNOVA*), with its annual appropriation of slightly more than SEK 1 billion, has in practice become the leading figure and financier of the universities' cooperation activities, since a substantial proportion of its resources are allocated to regional innovation systems and triple-helix projects.

At the regional level, the growth agreements/growth programmes, under the management of the county administrative boards or the regional self-government bodies and often with co-

financing from the EU's structural funds, constitute a platform for cooperation between universities and other parts of society.

The central government strategy for the promotion of cooperation between universities and other parts of society consists, in other words, mainly of financing selected projects. A strategy of this type meets at least two problems that must be overcome:

The cooperation mission consists of a number of different measures and activities of which some, without any doubt, should be run in project form while others in all likelihood should have more of a long-term focus. If the "infrastructure" for the projects also consists of associated projects that are limited in time, the continuity of cooperation is put at risk, and there is a risk that links that have been established will be dissolved and that the attitude towards cooperation among the parties concerned will deteriorate when there is a lack of finance for essential infrastructure.

In terms of social capital, the strategy can be described in such a way that, with its financial incentives, it has the aim of changing attitudes towards cooperation and establishing and strengthening links between universities, industry and the public sector. In other words the measures focus on the *external* links of the universities (and other parties involved). The problem with the generally negative incentive structure *in* the universities towards external cooperation and the general social capital in the universities is not tackled with this strategy.

Of these two problems the one-sided project focus is the easiest to rectify. Allocating funds to a structure for cooperation is, in principle, merely a budget allocation issue. On the other hand, the ways in which the universities' internal social capital should be changed in a desirable direction from the cooperation perspective requires an in-depth discussion.

3.7. Gains and losses or win-wins?

The first question that must be posed is whether the advantages of changing the universities' internal social capital really outweigh the disadvantages. What would be lost if the universities took on their social mission in full? The answer from those who currently defend the independence of universities would probably be that they would lose the role that is so important for democracy, i.e. that of independent examiner and critic, and thus democracy would be undermined. There would be a risk that the established scientific approach with its theoretical research would be replaced by one-sided practice-oriented study activities. At worst the universities could lose their reputation as independent bodies that always seek after the truth and be transformed into a consultant among all the other consultants that present the results the financier wants to have. The focus on results that have a commercial application could lead to extensive new priorities that would affect the humanities and social sciences, but also to a situation in which commercial applications were given considerable priority over technological-scientific basic research that is at a stage that is a long way from possible future commercialisation.

However, the question is whether this interpretation of the consequences of the cooperation mission is the only possible interpretation. Can it be the case that both the advocates and the critics are both right in their own way – although they are also wrong? If so, the mistake they make is that their points of departure are their own disciplines and research orientation and they forget the diversity of objectives, research tasks and methods in Swedish universities. A

cooperation mission with a growth focus *can* entail a number of problems for the social sciences and humanities. As mentioned above, it can partly entail cutbacks since the contributions made by these disciplines to economic growth are often difficult to prove. And partly there are, without doubt, very good reasons to maintain that there is a risk that the disciplines that scrutinise and investigate society and those in power (which many subjects in the humanities also do) would end up in a situation of dependence if, at the same time, they pursue active cooperation with these parties and if these parties increase their influence over the universities. Extensive cooperation *can* thus have negative consequences on both education and research resources and academic quality in the social sciences and humanities, and on democracy in society.

At the same time it must be said that these negative consequences are definitely not automatic. Cooperation with other parties should, in general, increase access to education and research resources and information. The risk of a negative situation of dependence on parties in cooperation can be counteracted with discussions and training programmes in research ethics and integrity. Where society is concerned, these parties also have a great need of having research done into specific problems. This has been clearly demonstrated by the growth of sector research.

Active cooperation with external parties is already an established tradition in large parts of technical, scientific and medical research. For these disciplines, cooperation often leads to more resources, better access to various types of information, and better opportunities for empirical observations and experiments. As in the case of the social sciences and humanities, there is naturally always a risk that a situation of dependence may arise, that inconvenient research is not initiated, or that embarrassing results are not are not published in order to protect future financing. It is necessary to have – and there are – resources for independent research.

Also from the perspective of society – government, industry and the third sector – the positive effects of cooperation with technology, medicine and science are obvious where welfare and growth are concerned. The problems from the perspective of society are rather that there is not enough cooperation. Cooperation is mainly with large, well-established parties and their contributions to the creation of new business are weak. Research does not reach far enough and is not sufficiently transformed into commercial innovations.

The above discussion – which shall naturally be seen as a hypothesis rather than proven truths – could end up in the conclusion that, in many respects, there is a win-win situation in increasing cooperation between universities, industry and government. However, the design and scope of cooperation must be able to vary considerably between different disciplines. The demand for cooperation for growth may not be permitted to have a negative effect on the role of universities as upholders of culture and on subjects with weak links to growth. Nor may cooperation naturally come into conflict with the academic ideal of seeking after truth.

3.8. Formal incentives and informal social capital

The large majority of people in the universities probably agree in theory with this formulation of their cooperation activities. However, in practice there is opposition since an increase in cooperation would mean that other personnel than those in the special cooperation bodies would be drawn in. For many this would require changes in both working duties and in internal and external contact networks. For universities as a whole, acceptance in practice of

the cooperation mission would require changes in their formal and informal valuation and incentive structure, and of standards and attitudes on the role of universities in society and their internal work, in brief of their social capital.

The last mentioned change can only be regulated or administered to a small degree from above in all types of organisations. In universities with their strong tradition of individualism and independence, this would probably be particularly difficult. A possible method on the part of central government would naturally be to link an increasing proportion of research resources to research in cooperation with other parties in society. However, there are several problems with a compulsory strategy of this type. It would probably create frustration and ill will towards cooperation in the academic world and the incentive for industry to become engaged in cooperation under such premises would be small.

The misgivings expressed by Rutten and Boekema (2004) - that the universities will be marginalised and lose resources if they are not capable of adapting to new demands for knowledge in society – would appear to be extremely improbable in the foreseeable future in Sweden. Academic research still has high political status. How the academic world will be successful in defending their appropriations in competition with other producers of knowledge and social interests in the future is, however, impossible to say. Nonetheless, it is probable that the experienced utility to society of the universities will be of significance in this competition.

Accordingly, government can use both the whip and the carrot to increase the participation of universities in knowledge production of Mode 2 type. However, a change in the universities' internal social capital can only be achieved by their teachers and researchers and it will only take place if they feel that it would be to their advantage in their profession. Naturally, a change of this type will take time and would be facilitated by a common strategy, formulated in an open discussion. The point of departure should be that there is no distinct conflict between the academic ideals and cooperation with other parties of society and that the problems that arise can be solved.

A possible conclusion is thus that the third mission of the universities can, in the long term, come up to the same level as the other two and thus constitute an important element in the development of Mode 2 knowledge production, but that it requires resources of both a permanent and project nature, fundamental changes to the universities' formal incentive structure, and changes of the universities' internal social capital.

The discussion in this section has only been from the universities' perspective – which to a great extent is a reflection of the research that has been pursued and which has been summarised here. However, a comprehensive discussion must naturally also include the regional environment with which the universities are expected to cooperate. However, much less research has been done into the importance of the regions for the ways in which cooperation with universities should develop. Nonetheless, one general conclusion seems to be that the regions' absorption capacity, i.e. their capacity to absorb the knowledge, technology and innovations generated by universities, is of decisive importance for the extent to which the universities will have regional effects (Florida and Cohen 1999).

4. Issues for further research

In this paper the problems of universities' collaboration with the surrounding society have been examined from different perspectives. Of the problem areas taken up here, two deserve to be given particular prominence.

The first problem area concerns the effects of specific measures taken by the universities and other stakeholders to strengthen cooperation between them, or to put it another way, the universities' *external social capital*. This is a matter of the scope, content and timing of the measures. Nilsson (2002) has, for example, emphasised the importance of taking the right initiative before anyone knows it is right, i.e. the importance of not investing in yesterday's winner. This problem area also includes the "absorption capacity" of the regions, i.e. their capacity to assimilate the students, knowledge and research that the universities produce.

The second problem area concerns formal and informal incentive structures, standards and values and the networks they create (and do not create) in universities, i.e. the universities' *internal* social capital.

A reasonable hypothesis is that these two problem areas are interrelated, that in both cases there is a lack of social capital in the form of sufficient links and common values between the universities, trade and industry and the politically governed sector to enable the political goals of knowledge production of Mode 2 type to be achieved. A discussion of research needs in these areas can be held with the aid of Figure 1.

Figure 1. The universities' social capital broken down into different component parts.

<table>
<tr><td>Internal social capital</td><td colspan="3">External social capital</td></tr>
<tr><td rowspan="2">Links/relations charged with attitudes, norms, traditions etc. that are expressed in the form of:
- "Spirit"
- Climate for cooperation
- Methods for renewal and development, conflict solution etc.
- Incentive structures</td><td>Related to education and research</td><td>Related to the environment</td><td>Related to the market</td></tr>
<tr><td>Links/relations to research and education financiers, users of research, external researchers and other cooperation and development partners</td><td>Links/relations to the local/regional environment, to decision-makers in the public sector etc. (Lobbying capacity, etc.)</td><td>Universities as brands and trademarks and other general relations to stakeholders with whom there is no direct contact.</td></tr>
</table>

Source: Application of Westlund (2006).

The conclusion drawn in Section 3 was that changes in internal social capital can only come about if it is to the advantage of teachers and researchers. If cooperation with other parts of society should mean, for example, better salaries, more research funds, and academic qualifications, it is probable that changed attitudes would lead to a greater interest in building links to stakeholders outside the universities. So far, only one a few studies on attitudes and relations in universities and their importance for building external links and relations have been made (Wahlbin & Wigren 2007, Johansson & Westlund 2008). In this respect research on companies is much more advanced than research on universities.

If we go over to the universities' external social capital, it is the education and research related capital that is usually mostly associated with the discussion on cooperation. In this perspective, effectiveness and successes for innovation systems, clusters and triple helix cooperation are linked to the structure and content of the social capital that is related to education and research (see, for example, Garlick (2000), Kim, Ohlsson and Sandström 2001, Ljunggren 2010), but it is quite clear that many fundamental facts have not yet been compiled. There are, for example, no studies of the resources that universities invest in cooperation and – not least important – what their effects are. In this context, studies of the regions' absorption capacity are also important. In these areas also research on companies is considerably more advanced.

The social capital of the universities that is related to their environments (i.e. not that which is directly linked to education and research) includes the participation of the personnel and the students in formal bodies and networks of a less formal nature. It also includes the role of the universities as creators of attractive urban environments with a wide selection of culture and recreation facilities. In none of these areas are there any investigations of how, and to what extent, the universities interact with their environment and the effects of this interaction. The same applies to the market-related social capital of the universities. The universities participate in a market place where they compete for students, personnel and financial resources. In principle, the universities act in these areas like companies and invest in various types of marketing activities. Also in this respect there is a lack of basic knowledge.

The conclusion is that the universities' intentional and unintentional investments in social capital in all probability have a decisive effect on their cooperation with other parts of society and thus the potential for the development of a Mode 2 production of knowledge. Hitherto, however, we know very little on the scope and the effects of these social capital investments.

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