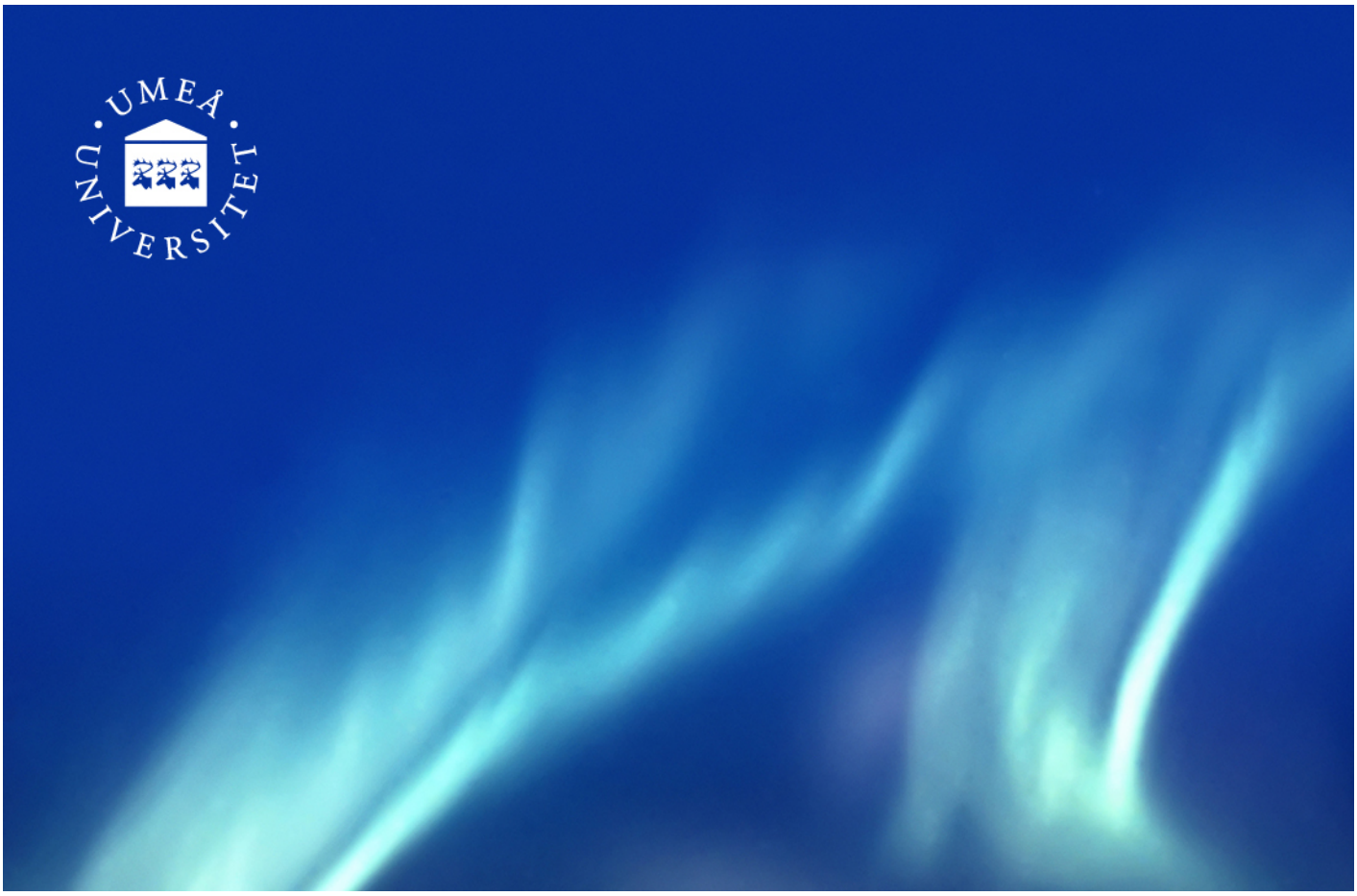

Bridge Building and Knowledge Reconciliation
Working paper prepared for the evaluation of the
KK Foundation's Knowledge Exchange
Programme, November 1999
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Summary

The KK Foundation was founded in 1994. It emerged in response to the economic, social and political uncertainties of the 1990s. One of its three main goals is to support knowledge and competence exchange between business/industry on the one hand, and universities, colleges and research institutes, on the other. In short, The KK-Foundation's Knowledge and Competence Exchange Programme is a bridge-building initiative.

The Foundation also has a budget for the evaluation of its initiatives. Following the submission of a pre-study in 1998, the Umeå University Centre for Evaluation Research and the Swedish Center for Business and Policy Studies (SNS) were commissioned to conduct an evaluation of the KK exchange programme.

In the spring of 1999, members of the evaluation team interviewed senior members of the business/industry community in Sweden. This working paper is based on those interviews. It addresses the question 'If a knowledge exchange programme is the solution, what is the problem?'. It concludes that the problem in Sweden, as in many other countries, is tension surrounding the reconciliation of different forms of knowledge. There is no agreement over which knowledge - from pure knowledge to marketable knowledge - is most relevant to the organisation of research and development and, in turn, to the enhancement of Sweden's international competitiveness, economic position and domestic wealth.

Accordingly, a key task for the evaluation is to focus its attention on the knowledge reconciliation problem as it is addressed in the bridge building research schools supported by the KK Foundation.

Background

Research policy and practice have become the object of national concern in Sweden. In 1990, for instance, the Swedish Council for Research and Planning (FRN) conducted a three-year investigation that produced a seminal text, *The New Production of Knowledge: The dynamics of science and research in contemporary societies*[1]. Such national concern has gradually focused on the triangular relationship between the national state, business/industry and the academy.

The early 1990s were a wake-up call for Sweden.

The 1990s, then, have been a decade of review, experimentation and evaluation. Agencies (e.g. Government Departments), fund-holders (e.g. Foundations) and stakeholders (e.g. SNS) have fostered a national reconstruction exercise. In particular, the KK Foundation has focused on the exchange of knowledge and competence between business/industry and the academy. Its guiding assumption is that such an exchange will lead to synergy effects, heightened competitiveness and, as a result, increased economic growth. Further, the KK Foundation has also released funds to investigate and report on the processes, problems and outcomes of its own initiatives.

Evaluation of the KK-Foundation's Knowledge Exchange Programme

The Umeå Centre for Evaluation Research and the Swedish Center for Business and Policy studies (SNS) were commissioned to conduct the formal evaluation of the knowledge and competence exchange programme, following a 1998 pre-study[2] prepared in by UCER and SNS. From 1st January 1999, Clas-Uno Frykholm and David Hamilton were each seconded to work ¼-time on the evaluation – as director and scientific director respectively. The first phase of the evaluation embraced three tasks: (1) launching and staffing the evaluation; (2) maintaining contact with the development of the knowledge exchange programme; and (3) investigating current ideas about research and development (R & D) that circulate within the business/industry community.

To investigate current thinking about research and development, interviews were sought with the fourteen business/industry members of a reference group established by SNS. One member declined to participate, on the grounds of insufficient experience; and one member submitted a written response to the pre-circulated interview schedule (see appendices 1 & 2). The remaining twelve interviews were conducted jointly by Clas-Uno Frykholm and David Hamilton. They lasted from 60 to 90 minutes, were conducted in English, and were tape-recorded but not transcribed. Illustrative quotations from the interviews are printed in the margin of this paper.

The SNS reference group is a non-random sample of representatives from Swedish business/industry. Small and medium-sized enterprises (SMEs) are under-represented. Nevertheless, the interviews yielded a perspective on the economic landscape in Sweden. They furnished an answer to the question 'If a knowledge exchange programme is the solution, what is the problem?' and, in the process, suggested a framework for the second phase of the evaluation.

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[1] M. Gibbons et al. *The New Production of Knowledge: The dynamics of science and research in contemporary societies*. London: Sage, 1994.

[2] *Förstudie inför utvärdering av KK-Stiftelsens program för kunskapsutbyte* (1998), available from UCER and SNS. Also in English on www.ucer.umu.se and www.sns.se.

The Problem

Make market horizons more visible.

The creation and utilisation of knowledge has always been a problem in business/industry. All of the interviewees felt, however, that the problem has taken new forms in recent years. In addition, they fully recognised that this problem also has implications for the national economic profile of Sweden, notably in the areas of education, training and welfare. Further, it was accepted that new contexts of knowledge creation and utilisation (e.g. reduced time from idea to market) could jeopardise earlier symbiotic relationships that existed between industry/business and the academy.

Intra-scientifically motivated research in universities should be protected. [Yet] Government should facilitate an infra-structure of venture capital, communi-cation and brokering, making it possible for knowledge to find its way into companies.

All interviewees reported on their participation as members of the national research policy community (e.g. as members of the SNS reference group). And some of the interviewees were also able, from first-hand experience in business and the academy, to comment on the knowledge reconciliation problem. The differences of opinion expressed by the interviewees suggest that a culture of uncertainty surrounds R & D in Sweden. Some respondents argued for a whole-sale reform of the academy, while others spoke in favour of its protection.

Overall, there was a recognition that systemic change entails a re-examination of the triangular relationship between the state, business/industry and the academy. Such scrutiny, for instance, might focus on academy/industry relationships (e.g. intellectual property rights), on academy/state relationships (e.g. higher education policy) and on state/industry relationships (e.g. regional economic policy). The remainder of this paper addresses the academy-industry relationship.

The Academy and Industry

The key axis between the academy and industry is *research and development*. According to the collective judgement of the interviewees, this formulation has two missing terms, *knowledge* and *market*. For them, research is about creating knowledge that, ultimately, energises the market place. Further, the interviews suggested that knowledge creation may pass through different hands and, sometimes, different ownership. Typically, research involves the production of *knowledge* which is assembled into *knowledge platforms* – launching pads for products that can be sold in different sectors of the market. Chemical knowledge, for instance, may shape a fibre or fabric (e.g. lycra, goretex) that becomes a manufacturing platform for all kinds of garments that meet and create consumers' needs.

Platforms bring problems closer to solutions.

Such knowledge transfer operates downstream from knowledge production – in this case, from chemical structures, through material properties, to manufactured garments. But production may also work upstream, from practical problems pre-sented by customers, through the investigation of relevant knowledge, to the identification of specific gaps in the map of knowledge. Accordingly, business/ industry can take up a variety of positions in respect of the organisation of R & D. Some companies may regard universities as knowledge providers and, therefore, see collaboration with the academy as an 'investment' rather than a 'cost'. They place the academy at the centre of knowledge creation - an institution whose research mission should be further strengthened, along the lines discussed in the

government report *Research2000* (1999)[3]. Other companies, however, work further away from the primary producers of knowledge. They work upstream from the market, exploiting knowledge platforms that are already in existence. In short, they may be more interested in knowledge brokers than knowledge producers. As they are more distant from the knowledge-producing role of the academy, such companies, therefore, may regard the universities with 'scepticism' or, as another respondent put it, with 'disrespect'.

Many research programmes relating to the views of individual professors have limited commercial value.

This last viewpoint regards the academy as inward-looking and increasingly peripheral to economic growth. From this last perspective, too, the academy should be reformed. Insofar as it has abandoned its role as a knowledge-producing institution it might become, for instance, a teaching rather than a research institution. Instead of the free pursuit of knowledge, it would merely deliver the skills and knowledge profiles demanded by industry (e.g. through masters' programmes).

New and Old Universities

Higher education in Sweden has developed a broad social and regional base since the 1940s. Institutions of higher education are in close contact with social and economic communities. They are valued as a regional as well as a national resource. It is tacitly assumed that small and medium sized university colleges (SMUs) have an affinity with small and medium-sized enterprises (SMEs).

The synergy of regional and national economies, however, was not always positively valued by the interviewees. For instance, regionalisation of research was regarded as a process of dilution as well as decentralisation. This scepticism, however, may not be representative of Swedish business/industry. All but one of the respondents had an international perspective on Swedish business/industry. Their attention focused on Sweden's place in the global economy, rather than on the value of SMUs to the local economy.

From their international standpoint, the respondents raised further questions about the place of SMUs in the Swedish business/industry landscape. Should SMUs replicate the subject range, depth and form of the 'older' universities? Should they, instead, be linked with *national* research institutes in specific areas of knowledge? Or should they be seen as *regional* centres of training - feeding into the national economy through the skill and knowledge profiles of local business/industry?

Universities don't know how to plan, how to take risks.

The interviewees' scepticism was not, however, restricted to SMUs. The older universities also came in for their share of criticism. One respondent, for instance, felt that they were a relic of the 'Age of Industry' in Sweden - the era of wood, iron ore and steel. Others pointed to the restrictive culture of possessive individualism echoed in intellectual property rights that still accrue to Swedish professors. And finally, at least two of the interviewees felt that *Research2000* was more a model for the retrenchment rather than the modernisation of the academy. One respondent suggested that its proposals were 'going backwards';

3. SOU 1998:128 Forskningspolitik (Report of the Swedish committee for the review of research policy, often described as *Research2000*.)

and another suggested that it might be retitled *Research1950*. It might strengthen Sweden's position in the league tables of academic productivity yet, at the same time, jeopardise Sweden's position in economic league tables.

Doctoral programmes require 'a reduced time-scale', a 'different mind set', a 'philosophy more related to market issues'.

As the respondents differed in their views on *Research2000*, they also differed in their perceptions of higher education. They saw it, variously, as a cultural institution a research institution, or a training institution. As a cultural institution, higher education is the upper branches of a learning tree that reaches down into the pre-school years. Its main task is to foster the production of capable, active citizens. As a research institution, the task of the academy is to produce knowledge that can be utilised by industry. And as a training institution, the task of the university is to service segments of the local and national labour markets.

Knowledge Networks

The government should 'steer' R & D towards 'platforms' that 'foster market leadership for Swedish companies'.

The place of the academy in knowledge production can also be seen in another light; namely, that universities and colleges are only one element in a network devoted to knowledge production and exchange. The interviewees felt that knowledge production is not the sole responsibility of higher education, nor that all new knowledge necessarily comes from the academy. Collectively, they suggested that knowledge creation has become a different activity. It is a complex, iterative, non-linear process. It combines intellectual, technical and social activities that run in parallel. It values risk-willingness and teamwork. It profits from the identification of productive synergies. It requires the creation and stabilisation of intermediate platforms. It is facilitated by active brokering – in the areas, for instance, of outsourcing, market intelligence and intellectual property rights. And, not least, it operates through short, mid-range and distant horizons, each with its own sunset (or exit) clause.

What, then, is the role of the academy in this process? Is it a key player? Is it the ultimate source of all knowledge? Or does it have to coexist with other knowledge producers in Sweden and elsewhere? Is knowledge production a one-way or a co-operative process? If the latter, how does the academy engage with other partners in the knowledge industry?

Systemic Solutions

Universities need to produce a body of 'skilled doers'

This last question not only relates to the distribution of knowledge but also to the wider contribution that higher education can make to the knowledge industry. How, for instance, should universities combine knowledge creation, capability training, and practical experience? Should graduate schools have a different focus from undergraduate programmes? Should their core business be the fostering of knowledge creation and exchange, leaving the core business of undergraduate programmes to be a liberal education fostering capable citizenship? What roles should diplomas and masters' degrees take in the knowledge industry? And, not least, how should business/industry perspectives be represented in the organisation of the academy?

While the interviews with business/industry representatives did not focus on the local and national state, they did focus on 'bringing knowledge to the market' and, therefore, on the political context of knowledge production. The general feeling was that the triangular relationship embracing state, business/industry and the academy should be synergetic, not dysfunctional. Further, it was assumed that the complex relationship should always be open to re-engineering through initiatives of the kind promoted by the KK-Foundation.

Without exception, the interviewees welcomed the work of the KK- and other foundations operating in the field of knowledge production and brokering. They accepted that such initiatives are a risky investment that, nevertheless, should be allowed to flourish in the short term. In the longer term, however, those responsible for the initiatives should also be required to account further for their processes and results.

Concluding remarks

Throughout the world, national (state) agencies are actively repositioning industry, society and themselves. They are trying to respond flexibly to different horizons in time and space, different labour markets that over-lap and interact, different possibilities within social systems (the graduate society), knowledge systems (the learning society), and technology systems (the digital society).

This working paper has focused on R & D in Sweden. It is based on information from 13 senior members of the business/industry community. Different forms of knowledge – from pure knowledge, through practical knowledge, to marketable knowledge are central to the current work of universities, government and business/industry. In turn, these institutions have never ceased to grapple with the social and economic implications of these different knowledges. A key development of the last decade, symbolised in the creation of the KK and other foundations, has been multilateral and co-ordinated pressure to reposition higher education and government in respect of these different knowledges. If there is a continuum from pure knowledge to market knowledge, where should higher education be placed? What positions should be cleared for postgraduate students and postgraduate studies? And where, against the background of decentralisation and the knowledge reconciliation problem, should central and local government position itself?

The conclusions drawn from the interviews discussed in this paper are three-fold:

1. the need for collaborative ‘review, experimentation and evaluation’ of research policies and practices in Sweden is justified.
2. the knowledge industry is an open system; that is, with more questions than answers.
3. the triangular relationship between state, business/industry, and the academy can be reduced to the knowledge reconciliation problem.

The next stage of the evaluation will have two foci. First, the knowledge reconciliation problem - as it is addressed through the research schools and related programmes supported by the KK-Foundation. And secondly, the identification and gathering of base-level measures that make it possible to map the intended and unintended outcomes of these initiatives, particularly with reference to the forms of knowledge, skill and capability that they promote.

The UCER's analysis of the knowledge reconciliation problem, together with a preliminary analysis of the research schools and related programmes, will be completed during 2000.

Umeå, December 15th 1999

David Hamilton

Interviewees (appendix 1)

Jonas Frick, Medevir (Huddinge)

Robert Gabrielsson, Koinor (Umeå)

Håkan Jansson, Novare Kapital (Stockholm)

Göran Karlsson Pernova (Lund)

Cecilia Larsson, Nobel Biocare (Gothenburg)

Carl-Göran Larsson, Telia (Stockholm)

Dan-Anders Lidholm, Astra (Södertälje)

Pär Malmberg SKF (Gothenburg)

Jan Martinsson, ABB (Västerås)

Bengt Modéer, Gambro (Stockholm)

Åke Sander, SSAB (Stockholm)

Patrik Söderlund, Sigma ENPECE (Lund).

Interview Schedule (Appendix 2)

A Background data

1. Could you describe the company that you represent? (products/services, number of employees, turnover, activities in other countries etc.)

2. How long have you been working in this company? / What are your previous experiences? (professional background, previous jobs)

3. What is your present position in the company? / Are you directly involved in R & D activities? (In what way?)

4. Does your company have a research department? / How much money do you invest in R & D activities? (percentages of turnover, number of researchers – with Ph D, with Masters Degree)

5. Do you cooperate with universities (university colleges) or research institutes in R & D matters? (Which universities/institutes, in what way?)

B Problems and possibilities for Swedish industry/business

6. Over a five-year perspective, what would you say are the major problems – or challenges – for Swedish industry/business?

7. How important is R & D? (for Swedish industry/business, for your company?)

8. To strengthen R & D capacity, what measures should be taken? (by the state, by industry/business, by your company?)

9. How do you see universities (university colleges) and research institutes in this context?

C Relevance of the KK programme

The KK foundation invests – together with industry/business – some 1.7 billion Swedish crowns to enhance the exchange of knowledge and competence between universities, research institutes and industry/business.

10. Are you familiar with this programme? (Give more information if necessary) / What are your general views about the programme?

The aims and objectives of this programme include strengthening research in strategic areas, increasing the number of researchers working in industry/business and enhancing the transfer of knowledge and competence to small- and midsize firms.

11. What is your response to these aims and objectives? / How important are they for the development of Swedish industry/business? / How important are they for your company?

A major part of the programme is used to develop industrial research schools (570 million crowns) and consortia for competence development (500 million crowns). Other parts of the programme concern specifically the university colleges (120 million crowns), small- and midsize firms (40 million crowns) and the wood industry (100 million crowns).

12. What do you think about these programme areas? / How, if at all, are they relevant for the specific needs of your company?

D Programme involvement

13. What is your current involvement in the KK programme?

    (If R is involved): How did you get involved? / Why? (any doubts, possible benefits)

    (If R is not involved): Why not? / Are you interested in getting involved in the future? / What changes in the programme would make you more interested?

14. Do you have any worries with the fact that the programme is run by a foundation? (by the KK foundation?)

15. Do you foresee any problems in working together with universities (university colleges) or research institutes?

16. Are you involved in other similar programmes? (which programmes, experiences, comparisons)

E Strategies for the future

17. From your perspective, how would you judge a programme like this? / What criteria would you use? (What would you look for - in the process, in the outcome?)

18. What do you think will come out of the KK programme? / Do you think it is a good investment? Do you think it will have sustainable effects?

19. What modifications or changes in the programme, if any, would you suggest?

20. Is there anything else that you would like to change in R & D activities?