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SHAPING STRATEGIC RESEARCH: POWER, RESOURCES, AND INTERESTS IN SWEDISH RESEARCH POLICY

ABSTRACT. ‘Strategic research’ has become a goal of government policy throughout the industrial world. This paper follows the emergence of new approaches to the funding of ‘strategic research’ in Sweden, by examining three research foundations created in the late 1990s, and considers their ambitions, limitations, and achievements.

INTRODUCTION

Contemporary science policy frames academic research in terms of its contribution to economic competitiveness. In Sweden, this represents a marked departure from post-Second World War practice in which the academic community was largely sheltered from external direction. There were, of course, always exceptions to this rule, where government agencies came to support – often in opposition to the academic system – the emergence of new fields. However, these ‘exceptions’ are now becoming the rule. In the 1980s, an ‘entrepreneurial turn’ took place in the USA, followed by the rest of the world, which produced an explosion of commercial interest in academic research. In Sweden, this led to the increasing employment of academics in commercial contexts. A profound change in the Swedish research system has followed. Today, funding bodies are engaged in redefining research practices, with the ultimate aim of recreating the academic system and fostering ‘hybridization’ between academia and the marketplace. The ‘entrepreneurial turn’ is being overtaken by a ‘hybridization turn’.¹

Traditionally, academic research-funding agencies in Europe have tended to act as free agents, combining and re-combining resources, according to the demands of the academic community,

¹ Jason Owen-Smith, ‘From Separate Systems to a Hybrid Order’, *Research Policy*, 32 (6), (2003), 1081–1104.

within the context of overall public accountability.² Networks are their principal clients.³ However, gaining access to these networks may prove difficult.⁴

Increasingly, new funding agencies have been created to facilitate the entry of academic research into global networks, service sectors, and industries. These new agencies are intended to increase visibility (the goal of 'excellence'), and to foster innovation and entrepreneurship (the goal of 'utility').

In recent years, funding agencies of this kind have emerged in many countries, including Canada, The Netherlands, Switzerland, Norway, and Denmark; and they have become a feature of the European Union, with its Framework Programmes for Research and Technological Development. Through them, resources are being devoted to 'strategic' research and development, on the assumption that the knowledge produced will be an impetus to economic growth.⁵ Strategic funding has become particularly popular at the 'periphery' of the research system, where it is hoped to find a niche for smaller countries in the 'globalized learning economy' that today is dominated by the Anglo-American world.⁶

In Sweden, a new system of semi-private foundations came into existence in 1994, designed to stimulate research across disciplinary and institutional boundaries. As such, they challenged traditional structures, and attempted to foster new alliances between academia and industry. They did so by departing, in both form and rhetoric, from the ideals set out by Sweden's traditional research councils, (which support research in medicine, engineering, the natural sciences, and the humanities and social sciences – now merged into the Swedish Research Council), and the mission-oriented agencies that support research in such areas as engineering

² David H. Guston, 'Principal-agent Theory and the Structure of Science Policy', *Science and Public Policy*, 23 (4), (1996), 229–240.

³ Aldo Geuna, Aamon Salter, and Edward Steinmueller (eds.), *Science and Innovation* (Cheltenham: Edward Elgar, 2003).

⁴ Michel Callon, 'Is Science a Public Good?', *Science, Technology, and Human Values*, 19 (4), (1994), 395–425.

⁵ Daniele Archibugi and Bengt-Åke Lundvall (eds.), *The Globalizing Learning Economy* (Oxford: Oxford University Press, 2001).

⁶ Simon Marginson, 'The Anglo-American University at its Global High Tide', *Minerva*, 44 (1), (2006), 65–86; Sally Davenport, 'Panic and Panacea: Brain Drain and Science and Technology Human Capital Policy', *Research Policy*, 33 (4), (2004), 617–630.

(Vinnova, the Agency for Innovation Systems) and environmental research (SNV, the Environmental Protection Agency).⁷

These agencies have emerged amidst radical transformations in the governance of research, at points where utility and accountability have come to take precedence over academic independence.⁸ Their emergence has been hailed as precipitating a new ‘social contract’ for research, and may signify a new approach to knowledge production.⁹ However, we know little about these changes, or about their impact upon the academic system. Do they signify the more successful integration of academic values into the commercial marketplace, or have they produced merely re-branded research councils?¹⁰

This essay examines the genesis of these new foundations and discusses their impact. It suggests the need for careful monitoring of their institutional outcomes. Our study derives from an analysis of public and private documents, and from more than fifty interviews with politicians, administrators, and scientists, in a survey conducted between 2002 and 2004.¹¹ Our experience suggests the need to look more closely at the power relations within research policy, an area of study that is surprisingly neglected in the social studies of science.

RECASTING THE GOVERNANCE OF RESEARCH

In Sweden, the global recession of the early 1990s was particularly severe. Knowledge-based entrepreneurship was seen as a key to the

⁷ Mats Benner and Ulf Sandström, ‘Institutionalizing the Triple Helix: Research Funding and Norms in the Academic System’, *Research Policy*, 29 (2), 291–301; Tomas Hellström and Merle Jacob, ‘Taming Unruly Science and Saving National Competitiveness: Discourses on Science by Sweden’s Strategic Research Bodies’, *Science, Technology, and Human Values*, 30 (4), (2005), 443–467.

⁸ Dominique Pestre, ‘Regimes of Knowledge Production in Society: Towards a More Political and Social Reading’, *Minerva*, 41 (3), (2003), 245–261; Aldo Geuna and Ben R. Martin, ‘University Research Evaluation and Funding: An International Comparison’, *Minerva*, 41 (4), (2003), 377–304.

⁹ Helga Nowotny, Peter Scott, and Michael Gibbons, ‘Introduction, “Mode 2” Revisited: The New Production of Knowledge’, *Minerva*, 41 (3), (2003), 179–194.

¹⁰ Gerard Delanty, *Challenging Knowledge* (Buckingham: Open University Press, 2001); Aant Elzinga, ‘Metaphors, Models and Reification in Science and Technology Policy Discourse’, *Science as Culture*, 13 (1), (2004), 105–121.

¹¹ Our research is documented in more detail in Sverker Sörlin (ed.), *I den absoluta frontlinjen: En bok om forskningsstiftelserna, konkurrenskraften och politikens möjligheter* (*At the Very Research Front: A Book on the Research Foundations, Competitiveness, and What Politics Can Do*) (Stockholm: Nya Doxa, 2005).

nation's economic revival. Between 1991 and 1994, a Centre-Right Government, determined to eliminate the country's controversial Wage Earners' Funds, established ten new foundations.¹² The three largest were the Foundation for Strategic Research (SSF), the Foundation for Strategic Environmental Research (MISTRA), and the Bank of Sweden Tercentenary Foundation (RJ). These were set up to support research in, respectively, medicine, engineering, and the natural sciences; the environment; and the humanities and social sciences. They began with capital amounting to around €1 billion – 60% of which went to the SSF, 25% to MISTRA, and 15% to the RJ. These endowments made the three foundations powerful players in the Swedish research system: at their peak, in 2000, they allocated more than 1.4 billion Swedish crowns (about €150 million) to the Swedish universities (see Table 1), well above the level of funding available to the research councils.¹³

Since 2001, government investment in the research councils has surged, and the relative importance of foundation support has diminished. Since their inception, the foundations have represented an innovative challenge to a system that had existed virtually unchanged since the 1940s. The impact of the foundations remains large, as their level of funding indicates, but their relative importance has decreased with the rise of public R&D expenditure.

TABLE 1

Major Funding Organizations in Sweden and their R&D Budgets (Current Prices)

	1995 (€ million)	2000 (€ million)	2005 (€ million)
The Swedish Research Council	110	140	290
Vinnova/SNV	180	110	130
SSF, MISTRA, RJ	110	160	110

Source: Forskning och pengar (*Research and Money*), (Stockholm: SOU, 1996, 25); *Att finansiera forskning och utveckling (Financing Research and Development)*, (Stockholm: Ds., 1999, 68); and *Statsbudget 2005: Utgiftsområde 16* (The Swedish State Budget Act, 2005: Education and Research)

¹² The Wage Earners' Funds were created in 1984 under a Social Democratic Government as an instrument to encourage profit sharing and cooperative management. They were bitterly resented by the Centre-Right parties. Cf. Mats Benner, *The Politics of Growth: Economic Regulation in Sweden, 1930–1994* (Lund: Arkiv, 1997).

¹³ Sweden's four research councils – for medicine, engineering, natural sciences, and the humanities and social sciences – were founded in the 1940s, and merged into the newly established Swedish Research Council in 2001.

The foundations' innovative impact on the Swedish research system was reinforced when SSF, MISTRA, and RJ were complemented by a new set of research foundations only one year after they were established. These foundations – seven altogether – were smaller, had a narrow mandate (for instance, allergy and health care research, international exchange, and environmental economics), but did, nonetheless, contribute to a further 'decentring' of research governance in Sweden.

The goal of the first three new foundations was to foster a new spirit of excellence and competitiveness. They were inspired by the recent experience of the USA, where the Ford, Rockefeller, and Howard Hughes foundations, amongst others, had helped orient academic excellence towards commercial outcomes.¹⁴ If the overseas 'foundation model' was appealing, it also nodded to the important role historically played by Sweden's own private foundations, which acted independently, but often in aid of public objectives.

The new foundations were also part of a broader plan to reform the Swedish university system. While Sweden's universities were in many respects similar to their American counterparts, in terms of competitive research funding and commitment to public research and development, many saw them falling behind universities overseas. Critics saw the Swedish system as too rigidly focused on the traditional disciplines, as overly national in its outlook, and as sheltered from international quality assessment. As one political aide to the Government put it, 'We suspected that there was a lot of laziness in Swedish universities. Quality standards were not too high. We needed to change that.'¹⁵ New subject areas had to be implanted, and new relationships had to be established. The universities had to be freed from the grip of state regulation. Evaluation criteria had to be more stringent, and based on international comparisons.

However, the Swedish system lacked the mechanisms needed to stimulate this reform. The *raison d'être* of the new foundations was to create new environments that would be conducive to both basic science and economic growth. New intermediaries were needed to set priorities independent from the state. And by relying on their own capital, with charters that guaranteed their independence, they would become self-regulating, flexible, and path-finding, rather

¹⁴ Robert E. Kohler, *Partners in Science* (Chicago: University of Chicago Press, 1991).

¹⁵ Interview with respondent, December 1996.

than path-dependent organizations, displaying sustained contact with industry.

Moreover, by recruiting personnel from abroad, the foundations would also infuse higher standards into the Swedish system. Such experts would inform strategic research, driven by excellence and utility. To avoid lock-in effects, it was decided that the new foundations would not be permanent, and so would not take on long-term obligations. On the contrary, their very existence was to contribute to a new division of academic labour, in which clusters of talent would become focal points for new science-based industries. Given their encouragement, the Swedish universities were to become more diversified and competitive.

THE FOUNDATIONS IN RETROSPECT

Once announced, the first generation of foundations was created quickly. To ensure their independence, they were established under civil rather than public law. If, politically, they were part of a Centre-Right strategy of privatization, they were also broadly welcomed as symbols of national renewal. As such, they foreshadowed the idea that Swedish institutions could be moved beyond traditional demarcations. This was not a new idea, but it had never before been implemented with such conviction.¹⁶

The three foundations we have studied went about their task in different ways. The largest – the SSF – decided that the creation of graduate schools (some national, some at one or two universities) would be its primary objective. Thematically, the SSF spread its support between basic research in the life sciences, materials science, and chemistry, and applied research in information technology, microelectronics, and production technology. The focus of the former reflected existing academic structures, with programmes in neuroscience, structural biology, nanoscience, and surface chemistry. The latter took industrial interests as their starting point, with programmes dealing with antenna technology, digital media, and combustion technology.

In contrast, MISTRA concentrated on large programmes, where the starting point was a defined environmental problem (for instance, the production of cost-efficient fuel cells, sustainable pulp

¹⁶ Stuart S. Blume, *Science Policy Research: The State of the Art and Implications for Policy* (Stockholm: Forskningsrådsnämnden, 1981).

factories, marine and coastal management systems, and regional climate models). A third strategy was developed by the RJ, which concentrated on a few relatively large groups, and on PhD training in the humanities and social sciences. Academic content was to be determined by academics, but the governing idea was to create larger structures and a stronger international focus, with programmes in such fields as the global society, welfare and religion, integrated landscape history, and value theory. These programmes became substantially larger than Sweden's typical projects in the humanities and social sciences, but they retained a strong academic character.

As new actors on the stage, the foundations were watched closely by the Swedish academic community. The SSF visited most of Sweden's universities, and made several adjustments in its strategies. In response to medical researchers who opposed the concentration of resources in just a few centres, it established a network-based funding model. The SSF recruited its staff from the research councils, and also from the universities themselves. Its first managing director was a former Dean of Physics and Mathematics at the Chalmers Institute of Technology in Gothenburg, and its first two chiefs of staff were formerly Assistant Under-Secretaries of State in the Ministry of Education.

For its part, MISTRA travelled up and down the country, advertising its arrival, and making the point that it wanted to break with academic demarcations. MISTRA was determined to set up separate structures, and so recruited its staff not from the research councils, but from mission-oriented agencies and the public service. The RJ preferred to work closely with existing structures.¹⁷ Overall, the three foundations came to represent two distinct types of organizational innovation: one of smooth adjustment (the SSF and the RJ), and one of path-breaking (MISTRA).

THE FOUNDATIONS IN CRISIS

Almost as soon as they were established, the new foundations faced a severe crisis. In the autumn of 1994, the Centre-Right Government was superseded by a Social Democratic Government bent on public savings. Savings from research were set at roughly

¹⁷ Bengt Stenlund, *Hinc robor et securitas? (From This, Strength and Security?)* (Stockholm: Bank of Sweden Tercentenary Foundation, 2005).

€60 million, slightly less than the three foundations' total budget at the time. The research councils together lost 8% of their funding (€20 million), while the mission-oriented agencies in engineering and environmental research had their R&D budgets cut by €50 million. The next few years were stressful. When the new Government asked the foundations to compensate for these losses, the foundations resisted. In response, the Government attempted to re-socialize them; and when this failed, made substantial cuts in disciplines close to theirs. Eventually, Parliament changed their legal status, and imposed an order whereby the State was given the right to appoint their board members. This right was used to intervene in decisions by MISTRA and the SSF. In consequence, the foundations and their boards (which included directors and chairs of research councils and mission-oriented agencies) acquired some of the obligations of the other funding organizations.

Overall, the crisis of 1994–1998 threatened to hollow out the idea of institutional independence. However, following national elections in 1998, relations between the foundations and the State improved, and the re-elected Social Democratic Government – enjoying a gradually expanding economy – eased pressure on their resources. Indeed, what had become a restricted space in 1997 suddenly grew in scope. Budgets were restored to pre-crisis levels, and the foundations' capital grew with the stock market boom of the late 1990s.

THE FOUNDATIONS FLOURISH

From 1998 onwards, the three foundations focused on three sites: graduate schools, problem-oriented centres, and centres of excellence. New graduate schools were encouraged in personal computing and environmentally sustainable construction. The effects were substantial, and several hundred new PhD students were enrolled. At the same time, several new centres were to be created for international research. These were intended to work at the 'absolute cutting edge' (*I den absoluta frontlinjen*), spearheading the development of the Swedish knowledge economy. New leaders were to be identified; new relations with industry, established; and new patterns of entrepreneurship, sponsored. Together, these centres were intended to be magnets for industrial investment. The model was clearly influenced

by American experience. In this respect, Sweden was a European forerunner in the imitation of US models of innovation.¹⁸

Despite all this activity, however, the foundations' work showed limited results. From the beginning, foundation resources added only marginally to university research incomes, and did not greatly alter the structure or content of university research programmes. Even at their peak, in 2000, the foundations accounted for less than a tenth of Swedish research funding. Fairness standards were also a factor. Traditionally, Swedish funding was distributed in relatively small project- and group-based grants, and foundations were expected to distribute their funds in a similarly even-handed manner. As one researcher put it, 'It is impossible to concentrate resources to just one centre in our area: we are many strong research leaders who all want the money for ourselves....'¹⁹ The emphasis on equitable distribution was greatest in the SSF and the RJ, where the tradition of single investigator grants was strong. MISTRA, on the other hand, pursued a more aggressive policy, turning down almost all the 140 applications that it received in the first round, on the grounds that they reflected a lack of disciplinary integration. As a result, MISTRA witnessed an unresolved tug-of-war between researchers – defending discipline-based research – and its own staff, determined to foster interdisciplinary, problem-oriented groups.

MISTRA was the only foundation of the three that attempted to pursue the original vision of new intellectual combinations. To increase its impact, MISTRA looked to very large programmes, with budgets of up to €15 million. MISTRA was also the only foundation that developed an elaborate model of programme evaluation (*ex ante* and *ex post*), involving long negotiations, in which means and ends were scrutinized and changed. MISTRA also devised a model of 'pathfinder' reports (based upon EU programmes), including quarterly reports on progress. The other foundations followed a much less arduous path, in which evaluations were conducted *ex ante*, and in which process and result evaluations were more sporadic.

MISTRA's ambition was to transform the process of knowledge creation, both by creating new fields, and by integrating fundamental research and problem-solving. In this respect, it emerged as

¹⁸ Philippe Laredo and Philippe Mustar (eds.), *Research and Innovation Policies in the New Global Economy* (Cheltenham: Elgar 2001).

¹⁹ Quoted in Mats Benner, 'Starkare forskningsmiljöer?' ('Stronger Research Environments?') in Sverker Sörlin (ed.), *I den absoluta frontlinjen (At the Very Research Front)*, (Nora: Nya Doxa 2005), 274.

an organization well adapted to the ‘Triple Helix’ model and to the ‘Mode 2’ pattern of knowledge management.²⁰ Without external pressure, MISTRA followed its own plan and kept to it steadfastly, despite criticism from certain sectors of the academic community.

The story of SSF was different. The SSF concentrated its efforts on graduate schools, which broadened the scope of PhD training – traditionally confined to narrowly defined fields – and introduced a more structured process of research training, which included enlisting prospective employers in the design of courses. One programme director in a graduate school devoted to information technology welcomed the change:

Academic research is often utopian and solitary – you dig a deep hole and you do it on your own. I worked in isolation with my own PhD studies. In this programme, we base our projects on real problems and teach our students to work collaboratively, to generate a better and more comprehensive picture of how a technological system operates.²¹

The primary function of these new graduate schools was to train researchers for employment in industry. This objective gave the foundation legitimacy. However, beginning in the late 1990s, the SSF began to move from post-graduate training to the encouragement of centres, which were supposed to become hothouses for Nobel Prize winners and research managers. Some €4–6 million were earmarked for researchers with global reputations and for post-docs working with them. The objective was to foster ‘strategic relevance for present and future industry’. ‘Positive spin-off effects are expected’, the SSF claimed, together with ‘an increased integration of basic and applied research’.²² However, the SSF’s relationship with the centres was noticeably weaker than with the graduate schools, in which industry more or less dictated the content.

The third foundation – the RJ – proceeded from the belief that Swedish research in the humanities and social sciences had

²⁰ Michael Gibbons, Camille Limoges, Helga Nowotny, Simon Schwartzman, Peter Scott, and Martin Trow, *The New Production of Knowledge: The Dynamics of Science and Research in Contemporary Societies* (London: Sage Publications, 1994); Henry Etzkowitz and Loet Leydesdorff, *Universities and the Global Knowledge Economy: A Triple Helix of University–Industry–Government Relations* (London: Pinter, 1997).

²¹ Quoted in Benner, *op.cit.* note 19, 276.

²² Swedish Foundation for Strategic Research, *Activity Report, 2001* (Stockholm, SSF: 2002), 6.

become isolated from the international mainstream, and needed larger, broader and interdisciplinary research constellations. It gave funds to PhD training, but on a much grander scale: RJ projects were typically around €1 million – two or three times larger than those supported by other funding organizations in the humanities and social sciences. Even so, its impact on academic research was limited, and the RJ and its management became increasingly frustrated by the unresponsive attitude of the universities.²³

Despite its objective of supporting interdisciplinary studies, most of the RJ's funding went to single-discipline projects, and interdisciplinary programmes represented only a quarter of its budget.²⁴ When, in 2004, the RJ was challenged by claims that Swedish researchers in the humanities and social sciences ranked behind those of other Nordic countries, and well behind leading universities in the world, a new funding scheme was launched to concentrate support upon fewer and larger centres, and over longer periods. The hope is that this will lead to 'increasing mobility and improved collaboration across disciplines, faculties and universities'.²⁵ However, the consequences of these changes for quality and collaboration have yet to emerge.²⁶

Overall, and certainly since 1998, the three foundations have shown a tendency to move from small-scale schemes to large centres, capable of winning international recognition. These goals do not differ dramatically from those of other funding organizations. In fact, the foundations today support fewer, larger centres. But this has not yet created seamless webs of academic-industrial collaboration. Instead, there are clear signs of 'academic drift' from the foundations' original objectives.

MODIFYING UNIVERSITIES

From the outset, the three foundations were to engage with Sweden's forty universities and colleges, to break down demarcations,

²³ Stenlund, *op. cit.* note 17.

²⁴ *Ibid.*

²⁵ *Bank of Sweden Tercentenary Foundation: Annual Report, 2001* (Stockholm: Bank of Sweden Tercentenary Foundation, 2002), 8.

²⁶ Sverker Sörlin, 'Do We Need Research-based Research Financing?,' *Bank of Sweden Tercentenary Foundation: Annual Report, 2005* (Stockholm: Bank of Sweden Tercentenary Foundation, 2006), 68–75.

and to create and sustain competition. In effect, the foundations were expected to invent new ways of conducting and organizing university research.

Reform looks to structure and content. Despite the demands placed on them, the foundations showed limited interest in reforming the system itself. Their situation was aggravated by the problem of governance. The foundations began by appointing programme directors – a practice unusual in Sweden – who then recruited researchers, on contracts for longer or shorter periods. But the directors faced a dilemma: they had flexibility, which limited the risks of inertia; but their influence was constrained. Existing academic networks remained in place, and many academics simply integrated foundation support into their existing funding profiles. The intended concentration of resources did not take place. Ultimately, the relationship between the new foundations and the research councils became a distinction without a difference.

Today, the foundations remain hesitant to take on long-term obligations, a task which is seen as the responsibility of the universities. In the words of one foundation director, they prefer to act as ‘unreliable change agents’, rather than as system builders. However, the universities have also been reluctant to act strategically in relation to the foundations. Swedish universities are not accustomed to working with funding organizations that insist upon making reforms and setting priorities.

The foundations have scored one important goal, however, in that they have encouraged a more conspicuous distribution of resources across the university system. In attracting support, some universities have been more successful than others. The clearest case is Linköping University, which has an engineering faculty organized along thematic lines, and which had graduate schools in place well before the foundations were established. Its organization was well suited to the foundations, and in particular, to the SSF. Although one of the smallest of Sweden’s universities, Linköping is also among its most successful. Others have had greater difficulty in adjusting to foundation priorities. These include Stockholm University and Umeå University, which have received limited support, as well as the Karolinska Institutet, the powerhouse of Swedish biomedical research (see Table 2).

TABLE 2

Universities and their Share of Support from the SSF, 2001

Royal Institute of Technology	19%
Chalmers University of Technology	16%
Linköping University	15%
Lund University	14%
Uppsala University	12%
Karolinska Institutet	5%
Stockholm University	1%
Other universities	18%

Source: Swedish Foundation for Strategic Research, *Activity Report, 2001*

In the field of environmental studies, MISTRA support has gone to a disproportionately large extent to the Swedish University of Agricultural Sciences, with a tradition of running mission-oriented programmes. In contrast, several of the older universities, which organize the natural sciences along disciplinary lines, have lagged behind (see Table 3).

The more path-dependent nature of the RJ has been reflected in the pattern of its funding, which has gone primarily to the older universities (see Table 4).

Still, there is evidence of change in process. If, in the early 1990s, the universities' response to the foundations was weak and uncoordinated, by the late 1990s, they saw the point of climbing the new 'learning curve'.²⁷ As one vice-chancellor told us:

TABLE 3

Universities and their Share of Support from MISTRA, 2003

Swedish University of Agricultural Sciences	41%
Göteborg University	18%
Uppsala University	10%
Chalmers University of Technology	6%
Stockholm University	4%
Royal Institute of Technology	4%
Other universities	17%

Source: MISTRA, *Annual Report, 2003*

²⁷ Ingrid Schild and Sverker Sörlin, *Interdisciplinarity in Sweden: A Report to MISTRA, Swedish Institute for Studies in Education and Research, SISTER Working Paper 18 (Stockholm, 2002).*

TABLE 4

Swedish Universities and their Share of Support from the RJ, 2001

Uppsala University	19%
Lund University	14%
Göteborg University	14%
Stockholm University	13%
Umeå University	8%
Royal Institute of Technology	6%
Linköping University	2%
Other universities	22%

Source: Bank of Sweden Tercentenary Foundation, *Annual Report, 2001*

[O]ur structure is way too fragmented. The future lies in large programmes with a broad structure. Those who do not adhere must go. Hence, we must re-organize to improve our share of the foundations' funding.²⁸

Since 2002, the foundations have encouraged reform. Their early push towards larger programmes can be interpreted as an effort to reconstruct the structures of knowledge production. Paradoxically, however, their intention is now not to rearrange research so as to integrate academic and industrial interests, but rather to increase their leverage. In this sense, the foundations have come to operate more as agents of change *within* the academic system, rather than as brokers between academia and external 'users'.

CREATING KNOWLEDGE NETWORKS

Given a degree of 'displacement' from their original objectives, how far have the three foundations contributed to their ultimate goal – of fostering new engines of innovation and growth in the Swedish economy?

To date, their programmes have retained a broadly academic character, and industry has been left to absorb their relevance and utility. The most important contribution has been in PhD training, in which industry has been actively involved. In some cases, they have succeeded in building networks, but no new major forms of academy-industry collaboration have as yet emerged.

²⁸ Interview with a university vice-chancellor (confidential), March 2002.

Even academic commercialization is very recent.²⁹ This problem has been raised in recent evaluations of MISTRA, and is relevant to the other foundations as well. For more than a decade, Swedish industry has been enrolled, rather than integrated, into the academic system. Similarly, there have been few academic initiatives to stimulate entrepreneurship. The rare exceptions have taken place outside the research framework, in the form of special missions to support entrepreneurs.

The firms involved in the SSF's programmes are among the largest and most important in Sweden. They have included Ericsson, Astra, Pharmacia, and ABB. However, their role has been limited to the membership of governing boards, and has not extended to cooperative funding or to active partnership in research. Again, MISTRA's role has been and remains different, and has involved industry to a greater extent: MISTRA is the only foundation that is encouraged by its charter to support company R&D. Nonetheless, even in MISTRA's case, industry has remained essentially passive.³⁰

The explanation is not far to seek. The foundations were built on conceptual models fashionable in the 1970s, according to which industry guarantees the long-term relevance of research, and the public researcher gives industry a window on future opportunities.³¹ So far, the foundations have reproduced this model, and have not created a new one. But this fate speaks not only to the limitations of the foundations; it speaks also to the resilience, and resistance, of the Swedish academic system. The phantom that the foundations proposed to chase away was far more powerful than anyone had expected.

CONCLUSION

Since the 1990s, Sweden has explored new ways of governing research. Attempts to encourage economic competitiveness are emerging in many countries, but the Swedish experience is of par-

²⁹ One example is the SSF's VINST programme (established in collaboration with the Agency for Innovation Systems), which supports research collaboration between universities and small- and medium-sized enterprises.

³⁰ MISTRA, *The First Ten Years: An Evaluation of the Foundation for Strategic Environmental Research by an International Committee* (Stockholm: MISTRA, 2003).

³¹ Hans Weinberger, *Nätverkstreprenören (Network Entrepreneur)*, (Falun: Scandbook, 1996).

ticular interest to those embarking on ‘strategic research’. It also has implications for the European Union, which is trying valiantly to compete with the USA and Asia for a stake in the global innovation economy.

Within Sweden, the foundations created since 1994 have formed part of a broader attempt to modify systems so as to encourage competition, concentrate resources, produce academic ‘stars’, and reward strategic thinking. In this sense, they have been part of a wider restructuring of the world’s research enterprise in general. Not surprisingly, there have been power struggles over the new funding streams, and ‘institutional wrestling’ over the direction of resources.³² Some may explain this in terms of bounded rationality. Certainly, in the early 1990s, the idea of academic-industrial ‘hybridization’ was relatively new, and was supposed to represent something different. But the essential task of defining terms was left to the new agencies. In the event, organizational inertia constrained innovation, and vested interests resisted change. While ‘Mode 2’ and ‘Triple Helix’ are fashionable buzzwords among policymakers, they do not enjoy wide acceptance among academic elites, at least in Sweden.³³

Because Sweden’s research reformers had only a vague understanding of how economic competitiveness may be linked to research funding, the academic system took control of the new arrangements. The history of the RJ well illustrates this ‘academicization’ of opportunities. The funding the RJ received was not earmarked for specific purposes, its grants were seldom matched by organizational reforms, and its programme was colonized by existing structures. To date, it has failed to produce major innovations in knowledge production or organization. Its academic constituency has managed to expand its financial base without making major adjustments in its orientation. MISTRA has shared a similar fate. Despite its mandate to foster academic-industrial relations and problem-solving, and to encourage crossovers between fields, it has also failed to bring about organizational change. Its ambitions have also been compromised by the resistance of the academic system, and by a lack of engagement with industry.

³² For example, SSF’s plan to concentrate support on a small number of research environments was quickly transformed into a practice of giving more evenly distributed support to many graduate schools.

³³ With the exception of MISTRA, where these concepts have found fertile ground, at the cost of popular support among Swedish academics.

In contrast, the SSF represents a successful juxtaposition of ‘academicization’ (RJ) and ‘goal-displacement’ (MISTRA). The SSF has produced an organizational hybrid that directs researchers to novel ways of doing research – for instance, in larger centres rather than in small project groups, in formalized networks rather than in looser ‘invisible colleges’, and in more intensive dialogue with the ‘users’ of research. To be sure, the academic system has retained its values. Today, these inform the SSF’s priorities. However, the ‘old’ values of quality and excellence now cohabit with the ‘new’ values of ‘accountability’. The SSF has been successful in identifying sectors where ‘managed change’ and ‘networking’ go hand in hand. It has enjoyed a more supportive constituency, and less resistance from the academic community, than has MISTRA. In this way, the SSF’s experience has been similar – although more modest in scale – to that of the Engineering Research Centers in the USA, with their revolving doors between academia and industry.³⁴ Like their American cousins, the SSF-funded academic centres have become beacons of academic-industrial collaboration.

Overall, our study has endorsed the conclusion that research funding and the structures that govern it are highly dependent upon existing political and academic cultures. These cultures cannot avoid playing a decisive role in policy formation. Clearly, there are tendencies, in Sweden as elsewhere, to favour visions of ‘strategic research’. As elsewhere in Europe, however, Sweden has tended to mimic idealized models. In reaching for change, the Swedish foundations have had to struggle with stubborn realities. The outcome of the contest is so far undecided. Reform is clearly one possibility but, as Sweden’s experience has shown, it may not be the only one.

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³⁴ James S. Dietz and Barry Bozeman, ‘Academic Careers, Patents, and Productivity: Industry Experience as Scientific and Technical Human Capital, *Research Policy*, 34 (3), (2005), 349–367.

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