

Internationalisation of Science

Views of the Scientific Elite in Finland

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It is often recalled that scientists have always been international, long before nations were invented. Universal validity as an inherent norm of science is concretised in encounters with those who do things differently from us. Yet, internationalisation of science is also a very current phenomenon, something specific to our times. As such, it is often seen as a consequence of *globalisation*: the emergence of problems that concern the whole humankind as well as the compression of the world as a result of new forms of communication and cheaper and faster travel. More research-specific factors include expensive instruments and the global reach of many research-intensive companies. (Hicks and Katz, 1996: 42)

However, although there is a clear increase in *transnational* and *multinational* (Ziman, 1994) activity – for example, participation in international conferences, publishing in foreign/international journals, collaborating and co-authoring publications with foreign col-

leagues – it would be misleading to say that internationalisation of science equals globalisation of science. As Leclerc and Gagné (1994) have shown, it would be more apt to speak about continentalisation of science, because interaction increases mainly within zones in which countries have traditionally had strong links to each others, mainly Europe and North America.

Denationalisation of science is an equally controversial trend. Although there is a rise in non-domestic and non-governmental funding of R&D, funding remains mainly national and much of it is still allocated on the basis of national priorities (cf. Crawford *et al.* 1993). Outright ideological and political reasons for collaborating with certain nations (cf. Elzinga and Landström, 1996) may be a thing of the past, but states still have an important role in making possible and encouraging (appropriate forms of) internationality. Today, when states encourage internationality of research – as they increasingly do – it is because in-

ternationality is seen as an important instrument of advancing national science (Sörilin, 1994). This is the case also in Finland, where internationalisation of research and development has become one of the top priorities of Finnish science policy in the end of 1980s. Internationalisation is seen as the key to “international quality”. And as quality of research is commonly indicated by the degree of internationality, the circle is completed. More internationality brings more international quality: who could disagree?

This article sets out to question these self-evident truths concerning internationalisation. This is done through an examination of how Finnish elite researchers – professors nominated to a special research position by the Academy of Finland – from different fields see the meanings and functions of internationality.¹ Following Becher (1989: 3), it is possible to argue that these researchers “delineate and embody the central values of [their] discipline[s]”. This makes their experiences of internationalisation and their responses to the current pressure to internationalise particularly interesting.

Furthermore, an important aspect of mapping the cultures of internationality concerns the notion of international quality and how a small country like Finland may reach it. To make this concept more concrete the professors were asked to define the centre of their field and to locate Finland in relation to it. Further, they were asked how the position of Finnish research (in their field) could be advanced. On this basis – as well as by looking at what they say about their relations to researchers in other countries – it is possible to discern different

“cognitive maps” of the scientific world. As the interviews were conducted during a period when Finland became a member of the EU, the data also provides an interesting opportunity to examine attitudes towards the (government-induced) change in the orientation of Finnish research.

Conceptual Framework

Patterns of Internationality

Empirical evidence for the argument that small countries are more active in international collaboration has been presented by bibliometric studies (see van Raan, 1997: 294; Leclerc and Gagné, 1994: 267). Also more specific studies on the internationalisation of research in small countries have been done: for example, Schott (1992) has analysed the “salient environments” of Swedish science, and Kyvik and Larsen (1997) have studied the international travelling, collaboration and publication patterns of Norwegian scientists. These survey-based studies give a fairly good picture of the international activities Nordic scientists from different fields are engaged in, but they do not cover the qualitative and normative aspects of internationalisation. Some important starting points can, however, be found in the above mentioned articles.

Firstly, it is necessary to note that different disciplines have different patterns of internationality. Kyvik and Larsen (1997: 255-261) explain the differences that they found in their survey between “hard” and “soft” sciences in terms of “internal” and “external” factors. Internal factors include, among others, the paradigmatic status of the discipline

(single vs. multiple paradigms), communication language (codified vs. literary), the audience structure (specialist vs. general) and the nature of the topic (local vs. global). The two external, or social, factors they mention are reward structure and publishing traditions. Thus the greater international activity in hard sciences can be explained, for instance, in terms of the universal nature of their research topics as well as the tradition of publishing almost exclusively in international, English language journals. Although the aim of this article is not to test whether these factors (derived from the theories of e.g. Kuhn and Merton) are valid, they provide the background of the current analysis by giving a preliminary idea of along what lines differences can be expected in the subjective valuations of the academy professors.

Secondly, it is important to note that different fields may have contacts and collaboration in different directions, just as different countries typically have more contacts with certain countries (Luukkonen *et al.* 1992; Schott, 1992). Similarly, it can be expected that academy professors from different fields are oriented to different directions and locate the centre of the scientific world differently. It is also possible that they have altogether different *cognitive maps* of the scientific world. Whether such differences may be explained by the internal and external factors listed by Kyvik and Larsen, or whether the historical, economic and geopolitical reasons mentioned by Schott and Luukkonen *et al.* are more important, is an interesting question but beyond the focus of the interviews. Instead, it will be interesting to see in what ways the cognitive maps of

the academy professors from different disciplines differ from each other.

Role-relations between Centre and Periphery

One way of visualising the scientific world is the centre-periphery model. In the centre, one finds “scientific establishments”, which hold a “monopoly over the means of orientations in science” (Stolte-Heiskanen, 1987: 189). In practice, this means that ideas and publications flow from the centre to the periphery, whereas physical mobility takes place from the periphery to the centre. As Carlson and Martin-Rovet (1995: 227) emphasise, there are no objective criteria for distinguishing the centre and the periphery: the centre is a place towards which scientists from other – thus peripheral or marginal – countries are attracted. Similarly, it must be underlined that, in this article, the centre and the periphery are not interesting *per se*, but as conceptual tools which help in analysing small country research that is located somewhere between.

Besides asking directly about the location of certain countries (as was done in the present interviews), there is also a more indirect way of analysing the dynamics of centre-periphery. Following Schott (1992: 22-23), it is possible to distinguish between four *role-relations* between colleagues: influence (through publications or interpersonal communication), collaboration, emulation, and salience of recognition from colleagues. How a scientist perceives his or her relationship to a colleague is a counter-part of how s/he perceives his/her own role and position in the world of science. The logic is the same as in the case of the cen-

tre-periphery polarity: one cannot be defined without the other. Thus Schott's typology is useful for an analysis of relations between – and the definitions of – centre and periphery.

A marginal country is, by definition, the one at the receiving end of influence. If the country is very poor, even its access to journals and books may be limited, not to mention travelling to study in other countries. However, in developing countries this is often done with external funding which can cover more than half of the R&D budget (Leclerc and Gagné, 1994: 267). The objects of influence vary from the choice of research problems, methods and theoretical frameworks to how the research is organised or what kind of values are embraced. The counter-part of influence is often, although not necessarily, emulation: scientists from the marginal country typically accept the science of the centre as a yardstick against which their own efforts can be measured.²

Seeking the recognition of others is a typical role-relationship between the centre and a more advanced science system or more advanced field. Recognition can be received in the form of publications, invitations to conferences or acceptance as a collaboration partner. In order to collaborate with scientists from other countries, a basic competence is necessary. A certain division of labour may allow for considerable differences in competence, but when the aim is to co-author an article, such differences are not easily tolerated. Similarly, to name someone as a competitor usually means that the other is recognised as one's equal. At the same time, a competitive relationship typically means a challenge to a dominating position, and this makes

it a particularly interesting role-relation to be added to Schott's typology.

It is often believed that through becoming international, researchers from marginal countries (regions, universities, etc.) have a possibility of overcoming their marginality, that is, having more equal role-relationships and thus moving towards the centre. If many scientists and fields do this, the marginal status of the country itself may disappear. However, changes can take place in other ways as well. Moving on the map – from margin to centre, from below to top – is not the only alternative. In fact, it has been suggested that the centre-periphery image is no longer valid. The network image suggests that it is no more easy to figure out where the centre is. Or, alternatively, there may be multiple centres. (Kaukonen, 1990; Alestalo, 1991; Sörlin, 1992) In either case, the hierarchy is reduced – although not abolished – and more actors have a chance for more equitable role-relations, and thus a more central position in the networks.

An even more flexible image is presented by Leclerc and Gagné (1994: 262) who speak of a “sovereign scientific market”, which supplants “the general pre-eminence of an omnipotent centre to which states are subjugated”. Kyvik and Larsen (1997: 241-242) present a similar idea: the “global research market”, which is constituted by several market places, most importantly, scientific journals and publishing companies with world-wide/international readership. Individual scientists try to sell their products (papers, articles, books), and if they are successful, the products are “bought” to improve other scientists' research and “paid” by citations and invitations to

conferences. From the perspective of a marginal or small country, the questions are: Do we have enough “cash” to pay for the products we want? How can we access the market with our own products? How can we increase the attractiveness of our own publications and research centres? How can we ensure that the market functions smoothly? Each transaction can be seen as a short-term role-relation, but, on the other hand, collaboration, as well as other forms of internationality, are also instruments of accessing the market and selling better.

Before using these conceptual tools in the analysis of the interviews, the following two sections discuss briefly the developments of the Finnish research system as well as the data of this analysis.

The Finnish Science System and its Internationalisation

The first university in Finland was founded in Turku in 1640. Before this, all Finnish academicians were educated abroad, mostly in France and Germany (Nuorteva, 1997). The Academy of Turku was founded at a time when Finland was still part of Sweden and when institutionalisation and nationalisation of science was starting to take place all over Europe. Because the church never exerted as much power as in Central Europe, Scandinavian universities were under the control of the state right from the beginning. (Crawford *et al.* 1993: 7-11) The Academy of Turku was international since its establishment: for example, the language of the university was Latin. The university may be characterised as provincial because its resources were scarce; however, keeping track with European science in general was always

considered important. (Leikola, 1990) The university was transferred to Helsinki in 1827, and until 1906 it was the only university in Finland.

Since Finland gained independence in 1917, certain disciplines were regarded as of special importance to national development and national identity. After the Second World War, scientific life was still traditional and elitist. Expenditure on research was low: in 1956, it was 0,4 percent of the GNP (Allardt, 1990: 630). In the 1960s, however, the rapid modernisation of the Finnish economy and society was paralleled by fundamental changes in science. Expenditure on research and education was increased significantly and several new universities were founded. The new universities were seen as the key to national and regional development. The end of 1960s marks the beginning of systematic planning of R&D, and international comparisons and the guidelines of the OECD became central in decision making. In the spirit of the Brooks report *Science, Growth and Society* (1971), emphasis was put on the social relevance of science, more specifically, the development of a welfare state. The sciences favoured by the state were mainly soft sciences. (Alestalo, 1993; Kaukonen, 1997)

In the 1980s, emphasis was shifted from soft sciences and societal development to technological development, and also the international orientation of Finnish science changed fundamentally. Whereas science policy documents from the 1970s and early 1980s often emphasise international scientific collaboration as a means of reducing international tension (e.g. Valtion tiedeneuvosto, 1973: 27; 1981: 28) and the frame-

work of collaboration was based on bilateral agreements³, a decade later internationalisation of science was seen exclusively in terms of developing the “national innovation system” (Valtion tiede- ja teknologianeuvosto, 1990: 37). This change was paralleled by a shift towards European collaboration: Finland joined the EUREKA in 1985 and became an associate member of the European Space Agency in 1987. However, until the 1990s Finland retained its cautious policy towards joining international agreements and research organisations, for both economic and political reasons. In 1991, Finland joined the CERN, and in 1995, it became a full member of the ESA as well as an EU-country. This shift will be discussed in more detail in the end of this article, but here it should be mentioned that Finnish participation in EU collaboration has been very active.

In general, the 1990s has been characterised by emphasis on efficiency through national and international evaluations as well as the establishment of so called “centres of excellence”. According to an official strategy, “[i]nternationalisation...increases the pressure to establish research groups representing international quality in Finland” (Valtion tiede- ja teknologianeuvosto, 1990: 37; see also Academy of Finland, 1997) The centres of excellence were nominated for the first time in 1993. Receiving extra funding, the centres are supposed to represent or to reach the “international top” in the selected fields. Not surprisingly, the selected fields have been mainly hard sciences. Among scientists, the reception of this new system has been varied, as is shown also by the interviews under examination. Naturally, the Academy of Finland is keen on

pointing out Finnish success stories, e.g., low temperature physics and research on information and communication technologies (Academy of Finland, 1995).⁴

Against this background, it is interesting to examine how the academy professors from different fields see the path chosen by Finnish science policy makers and how they experience the pressure to internationalise. Before this, however, it is necessary to take a brief look at the institution of academy professors itself.

How the Research Was Conducted

The institution of academy professors was established in 1970. The professors are nominated by the Academy of Finland for a 5-year period⁵ during which they get extra funding as well as freedom from teaching and administrative duties. A number of professors have been able to renew their nomination, and since the establishment of the system, there have also been four permanent nominations. The selection of academy professors is based on past qualifications as well as the research plan to be completed during the professorship⁶. The aim is to nominate professors who can make a considerable contribution to Finnish science. More recently, this requirement is qualified so that professors to be selected should already represent “international quality”. Thus it is possible to argue that academy professors are the elite of Finnish science by definition and most probably a part of the most international segment of Finnish researchers. (see Alestalo and Kaukonen, 1995; Alestalo, 1994; 1996)

The data consist of semi-structured

interviews with 61 of the 85 academy professors nominated between 1970 and 1995. The interviews were conducted between 1994 and 1996.⁷ Among the interviewees, there were 12 natural scientists (e.g. physicists, mathematicians, biologists), 13 medical scientists, 7 humanists, 15 social scientists (including 3 psychologists), 8 technical scientists, and 6 scientists from environmental sciences, mainly forestry and agriculture. The groups correspond to the nominating research councils of the Academy during the period in question⁸. The fact that nominations are made by the research councils has guaranteed a certain equality among fields although this is not a selection criteria in itself. In contrast, there is a heavy concentration of professorships in terms of gender (there are only five women among the 61 interviewees⁹) and geography (most professors come from various universities in Helsinki and Turku, two large cities in southern Finland). In the present analysis, the main interest is in differences *between* the hard (medicine, technical sciences, natural sciences, environmental sciences) and the soft sciences (social sciences, humanities). However, also differences *within* these two groups are highlighted when necessary.¹⁰

The interviews dealt with several aspects of the professors' own research as well as their views on current science policy issues. The last section included questions on internationalisation, but in most cases, related themes were brought up throughout the interviews by the academy professors themselves. This means that the analysis of the interviews proceeded only partly by examining answers to the preformulated questions, and an equally important part was to

follow the themes that were raised by the professors themselves. Furthermore, it should be noted that in most cases, the professors spoke primarily as representatives of their own discipline, but due to their elite position, many of them have often acted as representatives of Finland. This too is reflected in the interviews.¹¹

The Pressure to Internationalise

The rapid development of the Finnish science system after the Second World War is evident in the interviews. Many of the research professors started their careers during a time when Finnish science was clearly less developed in comparison to today's situation. Many fields either did not exist or lacked equipment and expertise for central research tasks. For example, a natural scientist tells how his Finnish supervisor suggested that he would do his PhD in Britain and bring new techniques to Finland. He did as suggested and went to Cambridge, bringing back know-how and even smuggling some components on his way back. A physicist says that "if I had not been able to do my PhD in Oxford, I wouldn't have become anything."¹² Also many social scientists studied abroad, mainly in the US, and brought back new methods and theories. As typical for a peripheral country, the main role-relation was that of emulation and mobility was totally one-directional. Furthermore, in most cases travelling would have been impossible without foreign funding, especially ASLA and Fulbright scholarships.

Today, internationality seems to be such an integral part of the research by academy professors that they seldom

mention any specific reasons for being international. It is self-evident that internationality is, in many forms, present in their everyday research activities. However, the pressure to become more international has not gone without notice. A medical scientist voices the common response of the academy professors who represent hard sciences: “[s]cience has always been international. And in Finland, science has been international already in the 19th century.” Especially mathematicians seem to be irritated about the pressure to internationalise – for them, mathematics is international in itself:

There can be no mathematics that is not international. Therefore, to suggest that mathematics should become international is to suggest that it should go from zero to positive.

In other words, doing mathematics within nationally defined boundaries is totally unimaginable to them. (see Alestalo and Kaukonen, 1995) Academy professors from other hard fields, however, are more inclined to admit that their fields have not always been international, or they admit that there exist “national sciences” although theirs is not one of them. Many professors of hard sciences believe that their fields will be genuinely international only when scientists from other countries are willing to come and do research in Finland, whereas representatives of soft fields are more prone to believe that internationalisation is only in the beginning. Therefore even its negative byproducts, such as “scientific tourism” to foreign countries are still unavoidable – they just need to be tolerated.

In the hard sciences, the usual moti-

vation for being international, as in the case of mathematics, is that their research could not be anything else as their topic is international. Or, due to specialisation, there are no Finnish colleagues and this takes researchers beyond the national borders. And as a professor from an eastern Finnish university remarks, a couple of years ago he realised that a flight to Stockholm takes no longer than a flight to Helsinki. Another professor says that it is sometimes easier to get funding for international travel than for domestic. On the other hand, funding for research in general is won with national argumentation, says one medical scientist.

Social sciences and humanities are not very different in comparison to the hard sciences. In the case of humanities, this may be explained by the fact only two of the seven scholars chosen by the humanities council study a topic that has a clear relationship to Finnish society. Thus most of the humanists write for a (highly specialised) international audience. However, considering all representatives of soft sciences, the majority has a more or less direct interest in Finnish society, and for these professors, the main audience is naturally domestic. Whenever they want to write for other audiences, they must think anew both the topic and the language. In other words, in contrast to the hard fields where internationality signifies a common space (dominated by the English language) or a certain style of doing things, in the soft fields internationality is understood as cross-cultural dissemination of ideas. In the words of a humanities professor, internationality is just “a bunch of different nationalities”.

Against this background, it is under-

standable that representatives of soft fields are cautious about using internationality as an indicator of quality. There is a danger that the “international” criteria are merely a reflection of the hegemony of some research system or based on a fashion that will soon pass. One social scientist thinks that studies abroad may often lead to excessive specialisation and unhealthy competition because a specialised area of research gets a too dominating position. However, regardless these concerns, the professors do not think that the national and the international exclude each other. On the contrary, a good “national” research problem has its analogies in other countries, and this makes international contacts indispensable. Thus, although Finnish legal science has traditionally been nationally oriented, a legal scientist believes that

there can be no conflict between nationality and internationality even in legal science, although there may be such between nationality and supranationality.

There are also other fields, such as agriculture and forestry, in which research is directed to the domestic audience. According to one professor, “some [of our research problems] interest the international audience, some do not.” All professors from these fields voice their suspicions of using internationalisation as an unquestioned standard for all disciplines. They emphasise the fact that if one wants an international career one must concentrate on a narrow field and that this is not necessarily a good thing. In Finland a broad career is valued more, and this means that an individual scientist may face a choice between recogni-

tion abroad and recognition within Finland – where most money comes from. This is also to say that foreign recognition does not necessarily translate into domestic recognition.

One professor from such an applied field argues that sometimes involvement in international collaboration means that “one’s own work remains undone”. He also adds that if too much funding goes to the kind of “top research” sought by the centres of excellence policy, a situation may emerge where Finland is unable to fulfil its international scientific obligations in applied fields. Another professor agrees: “we just cannot ignore certain fields of research because they are not top research areas”. In comparison to social sciences and humanities, in these applied fields there seems to be much clearer (national) priorities regarding the choice of research topics.

Reaching for the International Top

As the previous section shows, there are interesting differences among different fields in regard to how they perceive internationality. In the following sections, the focus is shifted to the cognitive maps of different fields. In the first two subsections, professors are asked to locate the centre of their field as well as the place of Finland in relation to it. In the remaining sub-sections, the focus is on the role-relations between the centre and Finnish research, and, in particular, the prospects for change.

Locating the Centre

When the academy professors were asked to name the central countries in their discipline, professors from medi-

cal, natural and technical sciences were very much alike in naming the US as the centre of the scientific world. According to one professor, “the US comes first, second and third”. Another says that there are two centres: the west coast and the east coast of the US. However, it is equally common to mention the US together with some European countries: Britain, Germany, France, sometimes the Netherlands and Sweden. Also the list of social scientists looks very similar (with the exception of legal scientists). This is hardly surprising as many social scientists have been trained in the US.

The only groups that differ more are humanities and fields like agriculture, forestry and biology. Almost all humanists disapproved the question itself: they say they cannot name countries, only individuals and institutions. The countries from which the top researchers and institutions come differ much less: the US is mentioned four times, whereas Germany and Britain are both mentioned three times. Scientists representing law and the above mentioned biosciences were alone in mentioning other countries as top countries before the US (e.g. Germany, Britain, the Netherlands, Finland).

Countries outside Northern America and Europe are mentioned seldom, whether as good or bad examples. Natural scientists make an exception: 10 out of 13 mention also other countries (Japan, Australia, India and Russia) and try to evaluate their research. Also some humanists mention Russia. In the hard fields, several professors mention Japan as a rising country but most think that collaboration with the Japanese is difficult because of cultural differences or simply the geographical distance. These

remarks are interesting considering the hopes attached to the new information and communication technologies (e.g. OECD, 1998). Nothing decisive can be said on the basis of this data, but it seems that face-to-face contacts are still considered indispensable. Some say this explicitly.

Of all professors, medical scientists are most convinced about the quality of US science. In contrast, especially social scientists are eager to point out that the US has the first place because of its volume, not necessarily because of the quality of its research. Some professors from hard fields agree with this: one biologist says that US is the top because of its volume but research in Britain is the most creative. On the other hand, a medical scientist argues that the US has more groups, but the percentage of top researchers is no higher than in Finland.

Locating Finnish Research

Many professors from the hard fields seem to agree with the natural scientist who argues that “Finland used to be part of the periphery because of the lack of equipment – now that we have the equipment we are on the top as any other country.” Especially medical scientists seem to be proud of Finnish achievements: roughly half of the 12 medical scientists think Finland is on the top (although never alone), whereas two say Finland is a semi-peripheral country.

Still others think that Finns can never be quite on the top due to factors such as the decentralisation of the university system as well as the volume of Finnish research. Others believe that things have changed and they can be changed. Ac-

According to many medical scientists, the place of Finland has clearly changed: earlier Finns went abroad, now foreigners come here. It seems that for many professors, attracting foreign scholars to Finland is the most important challenge at the moment. The ultimate proof of overcoming marginality is attracting American scholars – at least in some fields there are already more than enough students coming from European countries.

Another important channel for influencing foreign scholars is international publications. In the hard fields, publishing internationally is part of everyday research activities, and as one professor emphasises, publishing itself is secondary to the aim of producing results that are meaningful also after 10 years. However, it is not always easy to get one's results published, especially in American journals which tend to favour American scientists. The adoption of certain strategies may help getting results published but this may happen at the expense of quality, for example, if the journal in question favours "fashionable research problems" or publishes only short articles. In other words, there is a paradoxical situation where Finnish researchers can approach the centre's definition of quality by sacrificing their own definition of quality.

In addition to the role-relations of collaboration and the (sometimes unhealthy) competition for publishing opportunities, some professors also mention competition in a very positive sense. For example, a psychologist says that his group has competed with a US group now for 20 years, and although relations have been less friendly at times, the competition has had an important role

in stimulating research. In general, when competition with US researchers is mentioned, it is often done with a certain pride in tone – competition is a role-relation between equals and it means Finnish research can actually challenge US research.

Many professors, however, remind that a small country like Finland should not have too high expectations. Reflecting the variation within disciplinary groups, also the most pessimistic view is voiced by a medical scientist: "I doubt anything noteworthy will ever be achieved here." A more moderate opinion, however, is more common:

It is by chance, for historical reasons and for a host of other reasons that some field is strong in some country. I think at least a small country should learn that we cannot be strong – as we are so small – but in a few fields. We should aspire to be the top in a couple of fields.

According to one medical scientist, Finns cannot afford following international fashions, e.g. gene research, because it has no special strengths there. Some professors in the hard fields criticise others for adopting things from the big countries too uncritically. Thus the relative unanimity in defining the US as the centre of the scientific world has also its critics. As one professor notes:

Well, it is true that the US is the number one country here in Finland. Finland is in a curious way, one-sidedly, directed towards the US... This is not the case in Sweden. Not even in Norway... All Finns always want to go to US.

In other words, the emulation of US science is considered as an indicator of backwardness of Finnish researchers. A more advanced country would have

more self-confidence.

Whereas many professors from the hard sciences think that the best way of improving the overall quality of Finnish science is to concentrate on certain fields, several professors from soft fields emphasise that a small country must have basic know-how in all fields; there is no point of sacrificing certain fields for the sake of “international quality” in a few fields.

Social scientists and humanists also find different kinds of strengths in Finnish research. Because their image of the scientific community is more flexible, they also think that there is more than one way of producing good quality. For example, in contrast to many professors from hard fields who generally disapprove any Finnish publications, especially some humanists are proud of their Finnish publication series which frequently publish research also from outside Finland. On the other hand, they believe that a small research community can be more flexible itself. A legal scientist, for example, suggests that Finns can anticipate the emergence of new centres of scientific activity. Another one remarks that as a Finn, he is not attached to any ready-made schools of thought and thus has more freedom for action. In Kyvik and Larsen’s vocabulary, he is in a position from which it is easier to utilise all the options offered in the “scientific market”.

However, the multi-paradigmatic nature of social sciences and humanities means also that not all researchers are engaged in the same debates. This may have negative consequences from the perspective of “small players”: as a sociologist remarks, sometimes researchers from the centre countries bring their in-

ternal debates to the international fora with no regard to the interests of researchers from other countries and research traditions.

Gaining Recognition, Increasing Visibility

Recognition by foreign scientists is one way of measuring the quality of Finnish research – a more and more popular way, considering the international evaluations administered by the Academy of Finland, as well as foreign experts used in selection of applicants for research positions. But as mentioned above, getting recognition is dependent also on other factors than quality.

When the academy professors were asked whether being a Finn poses any obstacles for getting recognition in the international context, more than half of the medical and technical scientists thought that being a Finn is an obstacle, whereas natural scientists (e.g. mathematicians and biologists) were more prone to find good sides about being a Finn. Most social scientists, in turn, believed that nationality is irrelevant. Of the seven humanists, two believed it is an obstacle, two thought it is an advantage. To explain the differences between disciplinary groups is not possible on the basis of this data – although they are probably related to the level of competitiveness – and, in fact, it is more interesting to ask *why* nationality matters, either positively or negatively.

Especially some medical scientists argue that because Finland is not considered a high tech country, Finnish inventions do not get international attention. In this, several professors mention Sweden as an example that Finland has

been unable to follow. The experiences of a professor in a technological field in the end of 1980s are not uncommon either in the 1990s:

[foreign researchers whom I met in conferences] said that it cannot be true that this kind of material technology problems, long known and explored by companies with big money, are being solved in some little place like Finland. There must be something suspicious in your work.

Many professors from the hard fields agree that, in order to get international recognition, a Finn has to work more and achieve better quality because the general visibility of Finland is poor. An exception can also be found: one medical scientist thinks he gets more recognition in the US – in Finland people are just envious. Many add, however, that once one has been able to “access the market” there will be no more problems in getting one’s results published¹³. However, even good results are often not cited by Americans who rather make reference to an American secondary source.

On the other hand, one medical scientist believes that in the international scientific community, it is easy to be a Finn: “The work is valued more because others know that it has been produced with lesser resources.” A more ambiguous situation is brought up by a natural scientist who says that being a Finn makes things easier because Finns are not regarded as competitors as their funding comes from elsewhere. Finns may also be popular as research partners. As one professor tells, “the French dislike Americans so much that even Finns can do!”¹⁴

As mentioned before, representatives of humanities point to different kinds of

benefits: as a Finn it is easier to stay apart from restricting schools of thought and to retain one’s flexibility. And if s/he is conscious of these strengths, others will recognise them too.

By being active and sometimes even pushy, it is possible to make people understand that Finland is definitely not a place that just begs for money... In fact, the opposite is true. With the resources we have, a lot can be done.

In other words, a Finn can expect international recognition if s/he goes abroad with the right mind-setting. In contrast, none of the social scientists thinks being a Finn could be a benefit, with the (perhaps not so flattering) exception when a Finn is needed as a representative of his/her country or Scandinavia in general. On the whole, in humanities and social sciences much depends on whether one chooses to publish in English or Finnish, or in some other language.

The “national character” of Finnish people gets also a lot of attention from the professors, especially those representing hard sciences. The problems mentioned correspond to the stereotype of Finns who are more than often seen as excessively modest and shy, and lacking oral skills. One medical scientist traces this characteristic to the absence of a competitive culture. The situation won’t change, he argues further, as long as the “social security cushion” remains intact. The only solution at the present is, according to him, “a brain wash” through spending time in a US research group.

Many other professors agree that Finnish researchers need to learn to market their results – as one professor puts it, in the US those who “shout

louder” win the game – but they think this can happen through a systematic training of oral skills, even if this takes time from the actual research. Other suggestions vary from working in international organisations or arranging conferences in Finland to travelling more. However, all these activities take time, and across all disciplines there are also professors who think their influence will be minimal. What most professors agree on is that networking and personal relationships are indispensable. But also here excess is possible. As one professor reminds:

networks and contacts [are often] slow and bad cooperation. They take money and time...and require compromises. [As a result], people forget how research and thoughts emerge: they require peace and tranquillity.

As mentioned earlier, sometimes success is dependent on factors that cannot be influenced by Finns. For example, in an applied field like forestry, it may happen that new standardisation raises interest in research which was earlier considered irrelevant. This happened when the environmental laws were tightened in the US and Canada: the value of Nordic forestry was recognised immediately. A legal scientist argues that in the long term, theoretical questions will become central again and then Finland will have a good chance. Others suggest that Finns should not rush to those places where others are going but to be more farsighted and take advantage of long-term changes in the international environment. But such forecasting is difficult: “it often depends on chance what idea pays off.”

Raising the Next Generation

The mobility of young researchers is an issue that is brought up by several representatives of hard sciences. Considering that young scientists are the key to a culture of internationality (or, an international research culture), it is an issue worth a side-track.

The criticism voiced most often is – perhaps surprisingly – that too young people are being sent abroad. As one natural scientist puts it, “soon they [the Ministry of Education] will send abroad even children from the kindergarten.”¹⁵ Many professors think that basic education, including PhD training, should take place in Finland, because

when Finnish science reaches a certain level, it is no more right to send people abroad to write their dissertation there; they should go abroad only after the doctorate.

In other words, they believe that, at this point, sending people abroad to learn rather than to collaborate on an equal basis would tell the wrong message about Finland. A physicist adds a more practical reason for opposing mobility at too young an age: doctoral students often need to be part of longer projects than most of the international projects can offer. A biologist believes that those who go abroad before finishing their doctorate may be put into technical work that does not benefit them optimally.

The willingness of students to go abroad is an equally critical issue. According to a professor from a technical field, nowadays many young Finnish scientists do not want to go abroad for longer periods although there are plenty of opportunities. The reason is, he ar-

gues, the harder competition faced by them: they must concentrate on one thing whereas international activities would require extra time they just cannot afford.

Another problem is that it is not always easy to return from abroad. Professors from all fields agree that there are not enough post-doctoral positions. Thus going abroad is risky – sometimes it can be an advantage, sometimes it means losing opportunities. Here one can find an interesting parallel to Carlson and Martin-Rovet's (1995: 215) research on the mobility of young French and American scientists: for example, they found out that French women researchers travelled because it would give them the competitive edge they need in France whereas American women researchers felt they would lose the competition in the US if they left the US to work abroad.

Finally, it is important to note that although family reasons have always been part of researchers' willingness for going abroad, they may be even more important today when an increasing number of researchers are women. As one medical scientist points out, women may not be willing to go abroad because their husbands do not want to sacrifice their own careers – as wives of male researchers at least used to do. Of course, in more applied fields people may not be so eager to go abroad at all because they have good employment opportunities in Finland. Whatever the reasons, if international contacts are dealt with solely by the older members of the department there is a danger that socialisation into an culture of internationality is not taking place. On the whole, however, mobility of students has

not decreased, as reflected in the above criticisms towards mobility at wrong age.

European Collaboration

Finnish Membership in CERN

As mentioned earlier, cautiousness about international involvements was, for a long time, an important part of Finnish science policy. This was partly because of political reasons, and partly because of the costs of such involvements. Especially the decision to join the European Laboratory for Particle Physics (CERN) in 1991 was debated widely.

Some academy professors think that the cautious attitude should be retained and that the decision to join the CERN was wrong. The typical argument is that the CERN costs too much in comparison to the benefits: as a biochemist points out, one should not only look at the membership fee itself but the costs it causes at the home front. Finland simply does not have enough good scientists unless extra money is allocated to those fields that may benefit from the CERN. One argument is that Finns should not waste money abroad because then no researchers will come to Finland. Credit from big projects goes to the director of the project, and s/he is usually from a big country.

Not surprisingly, there are also professors – mainly from technical fields and natural sciences – who think that the decision to join the CERN was necessary. A professor representing the technical fields summarises the main arguments:

We need to be involved in many things. The idea that we could only pick the raisins from the bun does not work ... We have to be involved so that Finland

is visible and known to others. This is a basic requirement ... If we say that we cannot afford joining the CERN or cannot afford joining the ESA, in the eyes of the international community we classify Finland as a second class country. And this must not be done.

Reflecting the fears expressed by the biochemist cited above, those in favour of CERN membership emphasise that the decision to join means that Finland must now start doing better in order to benefit from its membership. This may be seen as a justification for more funding from national bodies but it also indicates more pressure on the scientists in terms of the quality of their work. As a mathematician puts it, "bad conscience will increase": Finnish scientists will face difficulties in utilising all the possibilities offered by the membership in the CERN (and the ESA) while retaining a broad competence. Little is being said about what Finnish researchers can contribute to the CERN. The explanation is probably that it is too early to evaluate this. Or, as one professor remarks, "if we had realised [earlier] that we could actually contribute to international projects, today our participation in them would be of a different kind."

A special case of European research collaboration is the framework programmes of the European Union. Finnish membership in the EU in 1995 is also the most significant commitment in the field of R&D this far. (However, it should also be noted that Finns were able to participate in the framework programmes also before the year 1995.) Although the interviewees' participation in EU projects is limited, their elite position means that they are well informed about what EU collaboration is. Thus their opinions about how EU research will in-

fluence their field and Finnish science in general are interesting.

EU Research Collaboration: Hard Sciences

The most prevalent opinion among all professors in hard sciences, including those in applied fields, is negative – "Finns should not be forced to become European" – and their list of complaints about EU research is long. For example, half of the medical scientists – who in general seem to be the most pessimistic group in regard to EU collaboration – say they cannot find suitable partners for useful collaboration in EU. Also others think that the EU requires partner combinations that are not natural in their fields. Other common criticisms concern the excessive bureaucracy, the system of evaluating applications as well as the emphasis on applied research. Especially medical scientists highlight these problems by a comparison to the European Molecular Biology Organisation (EMBO), of which they have very positive experiences. A mathematician emphasises that "euro-mathematics simply does not exist. Mathematics is mathematics. And it comprises the whole world." He fears that EU collaboration means that non-EU countries are ignored. Some others say that new things come from the US, and Finland should be careful not to rely too much on EU research.

Taken together, it is clear that there is wide concern that EU collaboration is not efficient and it does not produce quality. As one professor puts it, the problem with the EU is that people go round just for its own sake and don't have a clue about where it is taking them.

No publications result from such activity. He also mentions the danger that Finns become some kind of assistants to foreign scholars. Another professor's comment on EU projects is equally condemnatory:

95 per cent of them are pseudo-teams or pseudo-networks put together in order to get money but which get together once a year, for the obligatory meeting. But [all partners] do what they please.

Regardless of his pronounced disapproval of such artificial collaborative arrangements, the same professor has participated in EU collaboration himself and will continue to do so. He explains: "I applied for EU money because Finland pays [the EU] so much. I did it quite reluctantly."

Indeed, in most interviews with professors from the hard fields the concern about getting the money back is expressed side by side with criticisms towards the quality of EU collaboration. For example, five of the 12 medical scientists say, all in almost the same words, that "Finns have to get their money back". Whether or not scientists like it, EU collaboration has become a part of their reality:

in an ideal system no particular continent would fund the co-operation, it would be world-wide. But naturally, [because of the] realities, we are now looking at this from the viewpoint of European competitiveness.

On the other hand, many professors doubt that Finns could get back the money that Finland pays to the EU. Reflecting the views of many others who criticise the EU for being "political", one professor states: "the whole ideology is designed so that small countries get the

benefit. Finland may be among those and it may not be." What is more, the requirement of equality between countries and regions means that it will take a very long time to achieve results comparable to those of the US.

On the other hand, some positive attitudes towards the EU can also be found. Several professors admit that on an "ideological" level it is necessary for Finland to belong to the EU. Whatever the quality of EU collaboration, (also) from the perspective of research, Finland could not take the risk of not joining the EU. One view is that EU collaboration may be beneficial in the long term – even if it now seems useless or even counter-productive – because it helps to overcome the supremacy of the US.

Some professors point out that EU research opens possibilities for co-operation and for the mobility of young scientists. This, in turn, will have the effect that the US will start to perceive Europe as interesting. One professor adds that this benefit, however, will go mostly to Britain, France and Germany – countries that Americans are willing to visit. On the other hand, the EU is at least a partial solution to the image problem faced by Finland. Thanks to EU, Finland may now be a better known country at least to Europeans.

EU Research Collaboration: Soft Sciences

For academy professors from the soft sciences, Europe is a natural context of contacts and collaboration. Many have positive experiences from the European Science Foundation (ESF). However, a similar attitude of "facing realities" can be found among them. When asked

about the changes effected by the EU, one professor answers: “Well, good or bad, but it has to be so. I would say that [the EU] is a new agent of power, and we are dependent on those who are important.”

However, the possibilities offered by the EU for social scientists and humanities are limited. Some interviewees – although not many – think that the EU has nothing to offer to their fields. For example, one social scientist notes that EU has little to do with his field, except for one applied sub-field, and comments: “This is actually good, we are not dependent. Or it is good as long as it does not threaten our position.”

A humanities professor, however, is more positive about the possibilities EU could provide for humanists. He says that Finland must work for the establishment of a humanist – as well as a “human” – research agenda in EU. What he worries about is, rather, the attitude with which Finns are going to Europe and the EU. It reminds him of going to European championships thinking “what can we get for ourselves”. A sociologist shares this view: “if we go to Europe we must think of what is good for Europe. This requires a new attitude.” The contrast to the concern of “getting our money back” is obvious.

Not surprisingly, also social scientists and humanists are concerned about the EU’s emphasis on applied science. Furthermore, especially many social scientists point to the problems connected to the emergence of “integration studies”, that is, studies concerning Europe defined as the EU. Related to this, a legal scientist sees a danger that EU research produces not proper research but mere reports. Finnish researchers cannot

compete in this area: for “supra-national research we are too small. We have nothing to give to the bureaucrats in Brussels.” However, the same professor believes that “in the long term, theoretical questions are bound to...resurface.” When this happens, Finns will have their chance because they have a strong theoretical background. Also another important strength of Finnish researchers is brought up in the interviews: the ability to understand the relationship between the East and the West. As one professor remarks, Finns have gained this understanding in the (otherwise less productive) bilateral collaboration, and now its time to reap its benefits and “use the Eastern card in the EU.”

Finally, whereas professors from hard sciences are worried about retaining their relations to US research groups, social scientists and humanists are more concerned about a decrease in Nordic co-operation, which they believe is a fact already. A sociologist mentions also the danger that Finnish research communities become divided into those who do EU research and those who engage in other kind of research. However, he does not reveal what kind of hierarchy this will be. One scenario could be that in the future, those doing research with EU funding have more money, whereas others have more prestige.

As mentioned before, the last interviews were conducted a year after Finland had joined the EU. Since then, there has been a significant increase in Finnish participation in the EU programmes, and a recent study on Finnish participation shows that the experiences of EU collaboration have been mainly positive. (Luukkonen and Niskanen, 1998) Whether and how this is reflected in the

valuations of the Finnish elite researchers is an interesting topic for further research.

Conclusions

One of the main conclusions that emerges from the examination of the academy professors' interviews is that the common belief "the more internationality, the better" should not be taken at face value. In many of the hard fields, it seems that the "saturation point" has already been reached, and more collaboration would actually mean fewer results. In soft sciences, there may be a need to internationalise but as the academy professors from these fields point out, the degree of internationality is not necessarily an indicator of quality. However, this does not mean that there is a conflict between internationality and nationality: a good research problem has relevance also beyond national borders. Reflecting the way in which the national and the international are always defined in relation to each other, some professors from applied science believe that concentrating on national problems is an international responsibility.

For most professors from hard sciences, the notion of "international" seems to be unproblematic, whereas professors from soft fields remind that there is a reason to be critical of what actually counts as international: too often international means American. It could be argued that in hard sciences, international has come to mean a common way of doing research, and even if its origin is in one particular country, it is applicable in and the best for all (advanced) science systems. The dangers of homogenisation are recognised in some

interviews, but in general, it is taken as a fact that cannot be challenged. In contrast, soft sciences hold on to internationality as a cross-cultural dissemination of ideas. That what is local or national is bound to change in encounters with others, but it will never become the same as the other. (cf. Carlson and Martin-Rovet, 1995: 247). For both groups, *global* science community, to use Schott's (1993) term, is hardly a reality.

As regards to "international quality", it is still defined mainly by the US. Especially for medical scientists, US recognition is the only way to the top. On the other hand, many academy professors think that quality-wise there are no big problems; a bigger problem is that as a small country it is difficult to get the recognition Finnish research deserves. In the hard fields, change for the better is understandable in terms of "choosing the right route" and thus reaching toward the centre. The cognitive map itself is fixed and remains so unless the EU is able to improve its research performance considerably. In contrast, the cognitive map of social sciences and humanities is less rigid, and the majority of professors from soft fields think that the strength of Finnish research lies in anticipating the emerging centres, rather than in seeking the recognition of the established centre(s). In other words, there is not only a multitude of routes (toward the different centres) to be chosen from, but the cognitive map itself is subject to change.

This difference is reflected in opinions regarding EU collaboration. Typically, professors from the hard fields are critical of EU projects because involvement in them is a side-step from the established route towards the centre. At the

same time, many recognise that in the long-term Finland has no choice, and – as some professors say in a patriotic tone, as if they were sacrificing themselves for a higher cause – Finnish scientists are responsible for bringing back the money Finland pays to the EU. What is more, in the long term there is some hope that the EU is a solution to the image problem that they identify as a central obstacle for getting US recognition.

Although many of the professors from the soft fields share the concerns about EU collaboration, they nevertheless see EU research more positively. It is not only a new possibility for sharing data, theories and methods, but a chance to learn a new attitude towards international collaboration. In addition to doing good research, they see EU collaboration as a way of becoming “truly European”, whereas professors from hard fields speak in terms of national interest. In other words, scientists studying “national” topics are not necessarily more “nationalistic” than those studying “universal” or “global” issues – at least not in the case of elite professors. At the same time, it should be noted that just like “international”, “national” has many different meanings in the professors’ speech. In any case, nation still has relevance for the identity of Finnish elite researchers, and it cannot be disregarded in analysing their role-relations to foreign colleagues.

All in all, it is clear that questions regarding internationality must be studied against the background of disciplinary differences. But this does not mean that conclusions can be drawn on the basis of an abstract definition concerning the nature of the hard and soft fields. As this article has attempted to show, the mean-

ings and functions of internationality are dependent on how scientists perceive the scientific world, its flexibility/rigidity and the strengths and weaknesses of their field, as well as on those loyalties that might supersede immediate gains in the quality and efficiency of research.

Notes

- 1 This paper is a part of two larger projects, “The Finnish scientific elite: strategies of internationalisation” headed by Marja Häyrynen-Alestalo (University of Helsinki) and Erkki Kaukonen (University of Tampere) (see Alestalo, 1994; 1996; Alestalo and Kaukonen, 1995), and “University research in transition” headed by Erkki Kaukonen.
- 2 If a country chooses to go its own way and to develop its indigenous knowledge base in isolation, it is absurd to speak of a centre-periphery relationship in the sense I have done.
- 3 The first bilateral agreement was signed with the USSR in 1971, and thereafter with several socialist countries, but also with France, UK and Austria (Immonen, 1995: 286). The most recent agreement was made with Taiwan in September 1997. Of course, there has always been a lot of Nordic collaboration, and in many fields, working in the US was made possible by Fulbright and ASLA stipends.
- 4 A recent evaluation report by the Academy of Finland compares the scientific productivity of Finland to that of other OECD countries by proportioning international publications in environmental, natural and technical sciences to the populations in these countries. In such measurements, the Finnish figures are quite comparable to those of e.g. Britain, USA and Japan. (Academy of Finland, 1998) It can also be noted that in past years, funding from abroad has grown significantly. However, as in the case of many other countries, the actual figures are still small: in 1995, foreign funding comprised 2,9% of all research funding in Finland (Tilastokeskus, 1996: table 2).

- 5 Until the mid-1980s, the professors were nominated for three years.
- 6 Thus there is a clear difference in comparison to the old system of nominating "academicians", which was more of an honorary title for distinguished scholars already in retirement age.
- 7 The interviews were designed by Marja Häyrinen-Alestalo and Erkki Kaukonen. Most of the interviews were conducted by Marja Häyrinen-Alestalo, the rest by Erkki Kaukonen and the present author.
- 8 Since 1994, there are only four research councils: culture and society; natural sciences and engineering; health; environment and natural resources.
- 9 As it might be easy for the Finnish reader to recognise the female professors, they are referred to with the personal pronoun "he". Furthermore, individual disciplines are mentioned only when there are several representatives of the field so that recognising professors is not possible.
- 10 It is clear that this typology of disciplines is not unproblematic. For example, two of the three mathematicians have been nominated by the council of technical sciences and one by the council of natural sciences; psychologists are nominated by the social sciences council, although their research is often very much like that of medical/natural scientists (e.g. brain research). (For a discussion of this problematic, see e.g. Becher, 1989)
- 11 As Allardt (1990: 617-618) points out, Finnish professors have had an exceptionally close relationship to the state: since the independence, many have even held the position of minister and diplomat. In comparison to other countries, professors have always been highly valued by the public.
- 12 A professor of biosciences tells about the establishment of a new, specialised area of research today. The field in question has strong traditions both in the US and in Europe. In the former, it is a basic science whereas in Europe it is mostly applied science. In Finland, the challenge is to combine and utilise the most suitable parts of these two traditions.

- 13 Interestingly, some of the professors themselves use the "market vocabulary" suggested by Kyvik and Larsen.
- 14 It is too early to say whether similar reasons might partly explain the popularity of Finns as partners in EU collaboration, but it is certainly an interesting hypothesis.
- 15 These criticisms are at least partly related to the critique aimed at the graduate school system which was established in Finland by the Ministry of Education in 1995.

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