Chapter 3
All Cosmopolitans Now?

The Changing International Contacts of University Researchers

Jens-Christian Smeby and Åse Gornitzka

3.1 Introduction

As key social institutions, universities are intricately linked to nation- and state-building. Yet, international contacts at the level of the individual university researcher have been a core prerequisite for development of the knowledge base of small countries. Personal contacts between researchers remain the core of international research cooperation in academia: university researchers have their identity anchored in disciplinary networks and communities, and international contacts are structured by the nature and orientation of such communities. 'Locals' and 'cosmopolitans' are the terms used to denote two types of scholarly orientations of scientists. Locals have a predominantly domestic audience, whereas cosmopolitans have the international, scholarly community as their frame of reference (Gouldner 1957). Given the overall rise in international research collaboration, also documented in Chapter 2, there is reason to assume that the forms, content and direction of international contact have also changed, possibly even to the extent that the distinction between locals and cosmopolitans among academic staff is no longer valid. This is what we set out to investigate in the current chapter. Second, we ask if the possible long-term research cooperation across borders has loosened local ties in research. Third, we analyse changes in geographical orientation in international professional journeys. Changes in research contacts are discussed in light of a distinction between global *de*bordering versus internationalisation as *re*bordering. We ask whether overall trends of globalisation can explain changes in the international contacts of university researchers, or whether such changes are better understood as a consequence of organised political efforts within the area of higher education and research policy that have evolved in the past ten year as part of the European integration efforts. According to a rebordering hypothesis, the cross border contact of Norwegian researchers in academia would increasingly follow the European path

J.-C. Smeby
Centre for the Study of Professions (SPS), Oslo University College, Pb 4 St. Olavs plass, 0130 Oslo, Norway
e-mail: Jens-Christian.Smeby@hio.no

Å. Gornitzka, L. Langfeldt (eds.), *Borderless Knowledge*,

to the detriment of contact from research communities outside the geographical area covered by the European research cooperation.

At the individual level, one precondition for coming into contact with other researchers is the motivation to seek such contacts. Moreover, the scientist has to be attractive to other researchers (Olsen and Svåsand 1971; Kyvik and Larsen 1994). Another precondition that should be added is resources. Resources are needed to conduct research and to undertake travel. Material conditions like access to good research equipment may also constitute a basis of researchers' attractiveness. A key question in our examination of the changing international contacts of university researchers is how these mechanisms for international contacts relate to global debordering as well as international rebordering.

This chapter analyses the changes in contact patterns of Norwegian university researchers over a period of 20 years. Using survey data from 1981, 1991 and 2000 for five types of international contact, changes in conference attendance abroad, study periods abroad, guest lecturing and evaluation work, and research collaboration with foreign scientists, are documented. Based on this unique data set, we capture changes over time in cross-border contact that uphold transnational academic communities beyond the formal, written communication of academic communities analysed in publishing and citation data (cf. Chapter 2). In particular, we are able to disentangle changes in cross-border contact at the level of the individual university researcher to see whether the proliferation of international contacts is not merely a question of increase in 'light' forms of internationalisation, but also in activities that require more motivation and commitment.

3.2 Changing International Contacts: Two Hypotheses

3.2.1 Locals and Cosmopolitans and the Global Debordering Hypothesis

The concept of globalisation is often taken to refer to the increasing global connectedness and interdependence of economic systems, and the decreasing significance of geographic distance (Held et al. 1999; Fligstein and Merand 2002). In this chapter, we focus in particular on the latter aspect of globalisation. Development of information technology contributes to globalisation as the scope, speed and complexity of information increasingly affects our daily lives – we encounter the network society (Castells 2000). As universities are already internationally opened by the transnational character of disciplinary communities, we can assume that the advent of a network society would be particularly relevant for academic staff. The traditional perception of stratification in academia has been that scholars from a small, peripheral countries would be at a disadvantage. Moreover, researchers with low academic status would be 'locals' who are not visible or attractive, and thereby confined to their local institution and local academic practices, unable to have their work published outside the territorial borders and with no international visibility.

The development and enhancement of global networks could blur the distinction between centre and periphery as the geographical location of researcher becomes irrelevant. We would then expect to see a dispersion of cross-border contact irrespective of cultural and linguistic barriers and national borders – globalisation would foster cosmopolitanism in domestic research. According to a globalisation hypothesis, we would expect territorial patterns of cooperation and geographical proximity to be less important, and the geographical distribution of such contacts to disperse over time. Nevertheless, assuming that the 'Matthew-effect' in academia also comes into force in the patterns of international connectivity, it may also be hypothesised that the cross-border activities mainly involve a small attractive elite. The 'Matthew effect' refers to the mechanism by which well-reputed individuals, groups and institutions that have a record of accessing important positions and resources will be rewarded with future attention and in the allocation of resources (Merton 1968), or in the words of St. Matthew (Matthew 13:12) 'Whoever has will be given more, and he will have an abundance. Whoever does not have, even that what he has will be taken from him'.

Irrespective of whether resources or attractiveness are the most important mechanism, we could expect two different versions of cosmopolitanism to be on the increase. On the one hand, opportunities that global connectedness offers could lead to a de-stratification of research. The costs of cross-border activities are lowered by technological advances and cheap airline tickets, which in turn would have an equalising effect. Cross-border professional journeys would be mainstreamed, and also among the less motivated and less attractive researchers, and with academic disciplines that traditionally have been nationally embedded. On the other hand, if internationalisation is primarily to be seen as driven by intensifying international competition and attractiveness, we would expect the most demanding cross-border activities to remain an exclusive practice reserved for smaller elite segments among the domestic academic communities.

3.2.2 Internationalisation by Design: The Rebordering Hypothesis

While globalisation is often considered as comprising processes which, through its market-driven or network-based character, are out of the realm of political or organised control, there are several political initiatives that directly address the need to steer the intensity and direction of cross-border contact and cooperation in research within a given territorial space. This is what we identified in Chapter 1 as a debordering/rebordering process by deliberate design. Such initiatives are fashioned as a buffer against the unpredictable and uncontrollable forces of globalisation and cutthroat global competition in a knowledge market, and as a way of enabling domestic actors to cope and participate better in the global market place. Global challenges spur regional cooperation (Wallace 2000). Nowhere is this more evident than in Europe. This would then produce a different pattern of cross-border contact than one could expect from an internationalisation that does not encounter the deliberate efforts of re-bordering in Europe. The driver of Europeanisation of research – or

the increase in cross-border activities within Europe as knowledge space – would be located in the deliberately, controlled cross-border activities, developed at the supranational governance level.

Since 2000, the process towards establishing a European Research Area (ERA) has been a core instrument in the EU pursuit of the Lisbon Strategy. The ERA initiative aims directly at removing what is seen as obsolete national borders to create a common market for research in Europe faced with the challenge of transition to the global, knowledge-based economy. The work towards increasing the level of R&D funding in Europe (the 'Barcelona target'), the explicit ambition to coordinate national research policies through the Open Method of Coordination, and to link and open up national research programmes in Europe (ERA-NET), are measures that affect the parameters of European research. The potential effects of these intensified efforts towards establishing an internal research market within Europe cannot be measured in our data. The ERA concept, however, builds on the already-existing architecture and infrastructure for EU R&D policy-making. In addition to the intergovernmental institutionalisation of R&D cooperation (esp. COST and EUREKA) since 1984, the European R&D Framework Programme has been the pinnacle of efforts to deliberately increase cross-border contact within Europe. The EU Framework Programme makes explicit the prerequisites that European research collaboration has to involve research groups from three or more different EU or EEA countries in order to be eligible for funding. The 6th Framework Programme instrument – Networks of Excellence – also directly promotes and funds travel and cross-border activities of European researchers. In total, this constitutes an explicit territorial channelling of cross-border contact in Europe. Norway has well-established traditions for cooperating with the EU in research matters. With its full participation in the Framework Programme from 1994, this can be expected to have made an imprint in the contact and cross-border activities of researchers in Norwegian universities. Through the Framework Programmes, about 3000 Norwegian researchers have participated in some 600 European research projects. We would expect this to make a considerable impact on the level and types of international contact patterns among Norwegian academic staff, i.e. contacts and research collaboration with European researchers would increase in the 1990s. We note, however, that data used here cover the period up to 2000, and consequently do not capture the potential effects of more recent innovations in the EU research policy instruments.

Nordic cooperation has traditionally had a strong position as a regionally- based R&D regime. It features with priority in the most recent Norwegian university reform, and also in the national research council's strategy for internationalisation. This type of regional cooperation has manifested itself in established arrangements for research cooperation such as the Nordic Research Academy and mobility programmes such as NORDPLUS. We see this also in the initiatives towards establishing a Nordic Research Area (Björkstrand 2004). Yet, the Nordic organised dimension has to some extent felt the impact of Europe (cf. Chapters 7 and 8).

In addition to these efforts towards the deliberate internationalisation of research at intergovernmental and supranational level, Norwegian policy for higher

education and research has increasingly placed an emphasis on the domestic higher education and research system within its international context (cf. Chapter 8). A primary argument has been that internationalisation of Norwegian research is quality-enhancing – exposure to the international scholarly community serves as a quality check of domestic research. It can be calibrated with international academic standards. Access to the international disciplinary communities means being integrated into transnational epistemic communities, and access to latest development in research disciplines and to collaborative opportunities. Cross-border activities are performance-enhancing. This is also corroborated by studies of the association between international contacts and research productivity (cf. Kyvik and Larsen 1994).

There is also a division of labour argument raised in national policy which says that small size, and limited intellectual and financial resources, can be compensated by being included in international research communication and collaboration. So far, these elements of a domestic research policy are policy orthodoxies. Policy instruments used were primarily linked to incentives for academic mobility and to a strong emphasis on *juste retour* for Norway's contribution in the Framework Programme (Research Council of Norway 2000, 2001; Simmonds et al. 2001).

The last 10–15 years' higher education policy has put much more emphasis on the domestic aspects of internationalisation, and on a much stronger link between internationalisation and other aspects of higher education and research policy by the Norwegian Ministry of Education and Research. Domestically, internationalisation is also used as an *indicator* of academic standing and quality and, having an active international interface, is rewarded both by the institution (cf. Chapter 4) and by national governments (cf. Chapter 8).

3.2.3 Data

Data in this chapter are drawn from three surveys among tenured academic staff at Norwegian universities[1] covering a period of 20 years at three points in time: 1981, 1991, and 2000. The number of respondents in these surveys was 1585 in 1981 (79 per cent response rate), 1815 in 1991 (69 per cent), and 1967 in 2000 (60 per cent). We categorise the faculty members into the following five fields of learning: humanities, social sciences, natural sciences, medicine and technology.[2] In all these surveys, faculty members were asked to report destinations for professional journeys abroad in connection with conferences, guest lectures, study and research periods, peer review/evaluation work, and research collaboration. The latter type of visit was not a separate category in the 1981 survey. Journeys are, however, mainly analysed as a single dichotomised variable. Since research collaboration does not have to

[1] University of Bergen, University of Oslo, University of Trondheim (now the Norwegian University of Science and Technology) and the University of Tromsø. Until 2005, these four were the only universities in Norway.

[2] The 1981 survey does not include technology.

include visits abroad, data on research collaboration with researchers in their own department and in other countries in the previous three-year period are examined. These variables are only available for the two latter surveys.

3.3 Crossing the Border – How Motivated and Attractive are Norwegian University Researchers?

One measure of international interface of university researchers is their propensity to undertake professional journeys abroad. In the course of an academic year, a significant majority of Norwegian academic staff at Norwegian universities will have travelled abroad for professional reasons, where conference participation is by far the most prevalent reason for their travels (see Fig. 3.1). In 2000, three-quarters of university academic staff participated in conferences outside Norway. About a half travelled abroad in connection with research collaboration with foreign partners; almost 40 per cent gave guest lectures abroad; and an almost identical share travelled as visiting scholars and for short-term study visits. The least prevalent reason for foreign travel is participation in international peer reviewing and evaluation work.

The most striking change is simply the overall proliferation of travel abroad from the 1980s into the 2000s. From Fig. 3.1, it is clearly seen that the possibility of virtual travel through information technology has not reduced the propensity for leaving the country. The ubiquity of conference participation abroad clearly suggests that there are very few 'pure locals' left among academic staff at Norwegian universities.

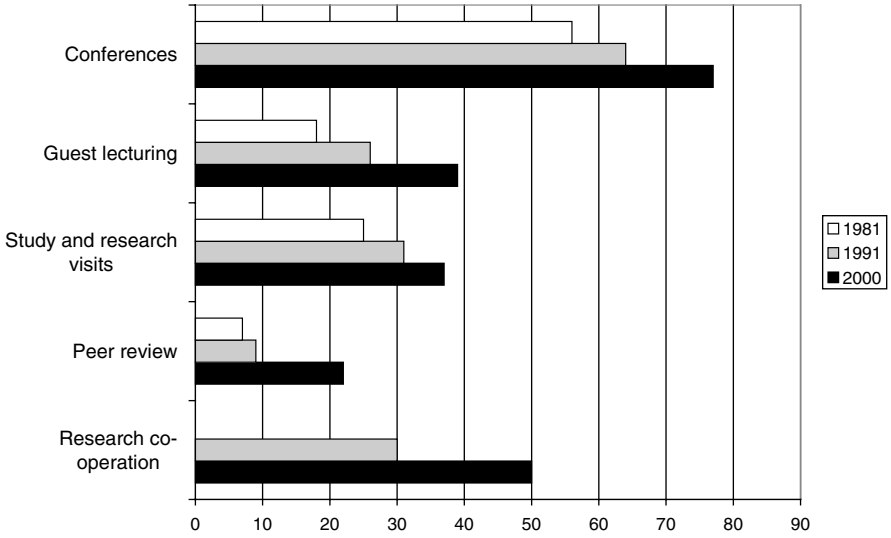

Fig. 3.1 Share of academic staff undertaking at least one journey abroad according to type of activity. 1981, 1991, 2000. Per cent

The integration of researchers into transnational academic communities is dependent on both a researcher's motivation and attractiveness. The researcher needs to have the motivation in order to make the effort to engaging internationally. Attractiveness refers to the extent to which international colleagues perceive a researcher as a relevant and interesting partner. Attractiveness would depend on the researcher's international visibility, active participation in transnational academic discourse, and formal competence. Motivation is a prerequisite for all types of international professional journey, ranging from the least demanding type of international contact and conference participation, to the most demanding forms of cross-border activity. Attractiveness, on the other hand, is a condition for being actively sought out by other colleagues, to give guest lectures, and participate in evaluation work and peer reviews. Even the most common type of foreign contact, conference attendance, is a mixed bag in terms of motivation and attractiveness, as shown by Kyvik and Larsen (1994). They demonstrate how this type of international contact includes the minimally-motivated 'conference tourist' who attends with minimal effort and no paper presentation, the highly motivated that actively participates and interacts in the international academic community by presenting papers, and internationally attractive researchers that are invited to give conference presentations and key notes. Our data show that conference attendance is not primarily an excuse for 'academic tourism': in 2000 over 80 per cent of those attending conferences abroad also presented papers, either at their own initiative, or by special invitation.

Study and research periods abroad also necessitate varying motivation and attractiveness, not only in terms of duration. Some study periods are primarily connected to academic staff qua teachers, as has been the case for the 300 university and college teachers who have participated annually in the teaching exchange programme, ERASMUS (Vabø and Smeby 2003). In 2000, half of the academic staff at Norwegian universities reported study periods abroad with a duration of one semester or more. Study periods of such length demand a least a high degree of motivation and, in most cases, some prior international visibility and attractiveness in addition.

As observed in Fig. 3.1, there is a striking increase in all forms of international contact from 1981 to 2000. Travelling abroad seems to have intensified more during the 1990s compared to the 1980s. We see the strongest increase in journeys as part of international research cooperation, i.e. the type of contact that is among the most demanding in terms of motivation and attractiveness. Such an increase should not only be seen as the increase in inner motivation, but also as connected to the increasing availability of international funding of collaborative research. This corroborates the general findings presented in Chapter 2, and serves to underscore that the general increase in cosmopolitanism is related to the changing organisation of international research cooperation, and also the resources and incentives for cross-border cooperation that have been offered as part of national and institutional research policy instruments.

Although not as prevalent as research collaboration, there is a significant increase, especially of university staff participating in peer review and evaluation abroad during the 1990s. On the one hand, this could lead us to conclude that this is sign of increasing attractiveness and scholarly reputation of the Norwegian

university research community; on the other, the 'glorious return' of peer reviewing and the strong increase in the use of formal and internationally-based research evaluation would suggest that in general more scholars are needed to perform such activities and, as such, it cannot be reserved for a very small elite of academics travelling 'first class'.

3.4 The International Interface of Research Collaboration

Figure 3.2 shows that 66 per cent of academic staff collaborated in their research with colleagues abroad in the period from 1998 to 2000. Compared to the situation in the period from 1989 to 1991, when 57 per cent of the respondents were involved in international research collaboration, this is a considerable increase. International research collaboration does not necessarily imply cross-border journeys, yet our data show that the propensity for travelling as part of international research collaboration increased far more, from 30 per cent in 1991 to 50 per cent in 2000. Contrary to the claim that virtual travel made possible by communications technology can reduce the need to travel, we see that the explosion in global travelling is no less relevant to academic life than elsewhere. An additional reason for the significant increase in journeys abroad related to research collaboration also rests with the universities that have the financial means available to sustain such a level of travel. It is encouraged as part of the institutional internationalisation strategy (cf. Chapter 4). Similarly, internationally organised research programmes,

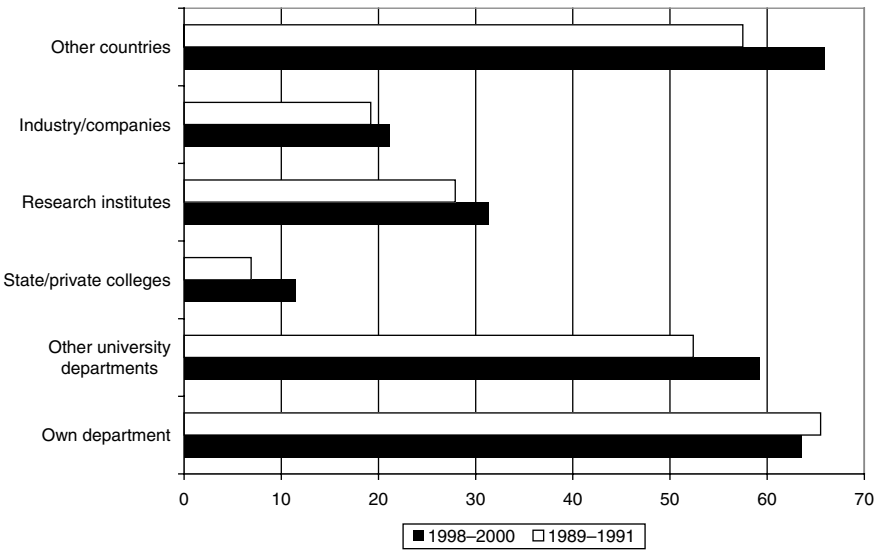

Fig. 3.2 Share of faculty members having research collaboration during the periods 1989–1991 and 1989–2000. Per cent

in particular the EU Framework Programmes, earmark funds for travel for the partners. In the EU networks of excellence, it is the network activities that are funded, not the research in itself, and in particular face-to-face cross-border interaction.

The proportion of faculty members who reported international research collaboration varies significantly between fields. Differences in international research collaboration according to fields of learning are, in general, greater than is the case for other types of cross border contact. International research collaboration shows the strongest increase for academics in the fields of learning that have been most 'local' in orientation. Yet it is still the case that university staff in the natural sciences (77 per cent) and technology (70 per cent) who are the most occupied with taking part in international research collaboration, while faculty members in the humanities collaborate least with researchers in other countries (55 per cent) (Trondal and Smeby 2001). International research collaboration has to some extent been mainstreamed into the more locally-oriented fields of learning. Compared to a decade ago, it is now more common to collaborate with international colleagues than not, also in the humanities and the social sciences. Yet the disciplinary differences in international research orientation still persist.

3.5 The Rise of Global Orientation – The End of Localism?

So far, the trend towards intensification and mainstreaming of international orientation is strong. That in itself does not answer the question of whether international research collaboration is a supplement or an alternative to collaboration within the national research system. The data on research collaboration clearly indicate that international orientation in research does not preclude involvement in national research cooperation. First, both international and national research collaboration has increased from the 1980s to the end of the 1990s. The only type of collaborative effort that has not been on the rise is that involving colleagues at the researcher's own university department. Nonetheless, there are still just as many university researchers who cooperate in their research with their departmental colleagues (64 per cent), as there are researchers engaged in international research collaboration (65 per cent). Second, there is a clear correlation between the different types of research collaboration. The correlation between collaboration with Norwegian university researchers and collaboration with a researcher abroad is 0.21 (Pearson's r). Being involved with research collaboration of one type increases the tendency to be involved in other types of collaboration (Trondal and Smeby 2001).

Does this suggest that the 'Matthew-effect' in academia (Merton 1968) also comes into force in the patterns of international connectivity? Our data indicate that internationalisation of university research also follows such a pattern where established researchers are increasingly involved in international networks and cooperation, while others of lesser academic status fail to connect. Such segmentation and stratification are seen by some as a particularly prevalent in case of researchers from small, and/or poor countries (Altbach 2001; van Vught et al. 2002). Similar claims

have been made applying to the institutional level. Geuna, for instance, argues that internationalisation of research might entail a bi-polarisation of research universities. One elite group of institutions has a global standing with resources and status to successfully participate in international networks. The larger group of domestic institutions will be unable to compete and will be internationally marginalised (Geuna 1998). The data referred to in this chapter are unable to document such effects at the institutional level; the findings at the individual level support the idea that global and local connectedness are mutually compatible and even reinforcing – researchers that tend to be active in collaborating internationally are also fairly active as 'locals', whereas others tend to be less active in both arenas. The Matthew-effect seems stronger than the delocalisation effects of globalisation.

3.6 Changing Destination: Europeans or Cosmopolitans?

While the 'debordering hypothesis' expects that a trend towards increased worldwide contacts and collaboration may be observed, the 'rebordering hypothesis' anticipates two kinds of territorial patterns, i.e. contact within European and Nordic borders. Figure 3.3 shows that there has been a significant increase in international travel to all the geographic regions. Researchers in Norwegian universities are increasingly 'going in all directions'. The relative increase has been the highest for journeys to North America and the rest of the world. The overall increase has been 20 per cent in the period from 1981 to 2000. Still, the regions closest to Norway, the Nordic countries and the rest of Europe, are the most frequently visited by researchers from Norwegian universities. This pattern varies somewhat according

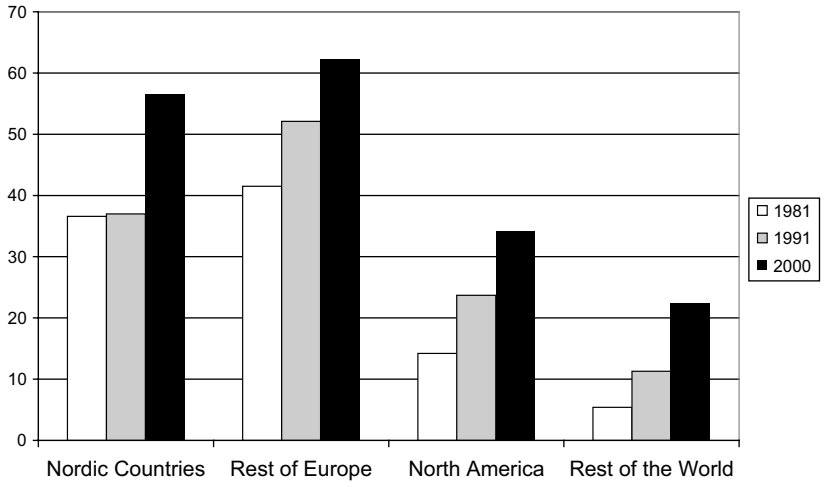

Fig. 3.3 Share of academic staff who undertook at least one professional journey abroad in 1981, 1991 and 2000. According to destination. Per cent

to the different types of international contacts discussed earlier. The Nordic region is a particularly frequent destination for the purpose of participating in evaluation work and peer review. But the Nordic countries are less attractive for study and research visits. The overall change in the travel pattern among university staff is thus consistent with what we identified as part of the globalisation hypothesis. Yet, there is no call for announcing the 'death of geography' on the basis of these data as the Nordic and European destinations are still predominant.

The mainstreaming of international contact patterns across all fields of learning is a general trend that also conceals some striking disciplinary differences with respect to 'geography'. Academic staff in the humanities, social sciences and medicine are just as frequently in contact with colleagues in the Nordic countries as with their peers in the rest of Europe. In the social sciences and humanities, this is in all likelihood related to the significance of language and cultural proximity for the subject matter of research and the social organisation of research in these fields. This we also know from the higher propensity in these fields for publishing in Norwegian or another Nordic language (cf. Chapter 2). The situation in medical science may be attributable to the high standing of Swedish medical research – i.e. the Norwegian colleagues have the research frontier already 'next door'. In the national sciences and technology, Europe is the most frequent destination. North-America is the third most frequent destination for all fields of learning, more important in the natural sciences, medicine and technology, least important in the humanities. University researchers in technology have the most global spanning travel pattern – a pattern that significantly includes destinations outside Europe and North America. This is probably due to the strong position of Asia in this field of learning (Smeby and Trondal 2005).

Regarding research collaboration, the geographical contact patterns during the last 20 years have developed in somewhat different directions compared to the general pattern of international contact (cf. Fig. 3.4). The percentage of Norwegian university researchers collaborating with colleagues in North America has remained virtually the same from the end of the 1980s to the end of the 1990s. This is where our data most clearly indicate a significant turn towards Europe and provide strong evidence of the impact of the world's largest regional research cooperation programme, the EU Framework Programmes. The increasing Nordic research collaboration demonstrated in Fig. 3.4 should not necessarily be interpreted as effect of specific Nordic regional cooperation in research, but is most likely an

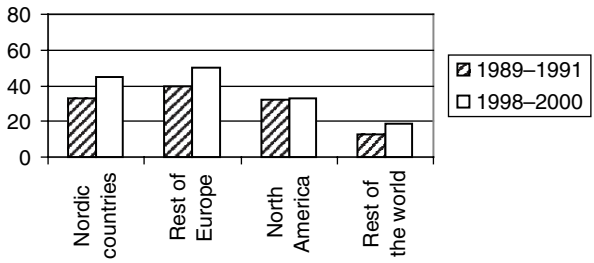

Fig. 3.4 Share of academic staff having research collaboration with foreign scientists during the period 1989–1991 (N=1815) and 1998–2000 (N=1967). Per cent

effect of researchers from other Nordic countries also participating in EU funded projects. This is corroborated by data on Nordic and international co-authorship (cf. Chapter 2).

3.7 Conclusion

In the course of the 20 years covered by our data, the world for Norwegian university researchers has become smaller. We find that international contacts among Norwegian academic staff have changed considerably. From 1981 to 2000, international contacts have proliferated and become mainstreamed among university researchers. There are 'more cosmopolitans and fewer locals'. Yet all types of research collaboration have increased – going global has not been to the detriment of local collaboration. Developments in information technology seem to stimulate and supplement traditional types of international contacts rather than replacing them. Nor has a distinct development towards Europeanisation of contact patterns precluded an increase in worldwide contacts. There has been a significant increase in different types of travel to all parts of the world. Personal contact between researchers worldwide seems to be more widespread than ever. International contacts and collaboration among university faculty members are complex processes affected by individual choice and political initiatives as well as collaborative and competitive characteristics of the international scientific communities.

When controlling for the content of international contacts, a clearer territorial dimension surfaces, and we can see the effects of a European rebordering of university research, notably to the detriment of research collaboration with North America. Funding schemes and programmes on national and supranational levels seem to be successful in terms of stimulating research collaboration within Europe. In general, research collaboration is the most demanding type of contact between researchers since it presupposes attractiveness, international visibility and often involves significant commitment by the researcher. It is also the most important type of contact because it involves the entire research process. Even though researchers in North America still hold a central position as partners, policy initiatives in Europe seem to have changed the research landscape significantly.

Our data nevertheless support the global debordering hypothesis. Contact patterns in general do not indicate that any specific geographic region has become more privileged than others. While markets and politics tend to be treated as conflicting dynamics of change, a study of the world economy and the EU single market suggests an intimate link between politics and market dynamics (Fligstein and Merand 2002). Correspondingly, our study indicates that European initiatives and globalisation processes are closely interrelated and not mutually exclusive processes. A central basis for international research collaboration is local and regional visibility (Kyvik and Larsen 1997). Moreover, less demanding types of international contacts, such as conference participation, may be a first step to more demanding types, for example, being invited as guest lecturer and being regarded as

a prestigious collaborator in research projects. Correspondingly, when individual researchers as well as research groups acquire visibility at a national level, this may be a first step to gaining visibility and recognition at regional and finally at global levels. It is reasonable to assume that programmes and funding to simulate contact and research collaboration on a regional level, such as the EU, strengthen the visibility of researchers involved in these projects. Such policy initiatives are therefore likely to have an impact on the development on research networks worldwide.

The present study is based on data on Norwegian faculty members. As argued in Chapter 1, such data are of significant interest in studies of the internationalisation of research as processes and effects of internationalisation are crystallised in small knowledge systems. Nonetheless, the conclusions we draw on the changed patterns of international contact are also limited by the particular conditions of our case. The tendencies demonstrated in the Norwegian case may be different in larger countries. Furthermore, there are significant differences in the level of international involvement among academics in industrialised countries, which may not reflect country size. Factors like research culture and research facilities also influence faculty members' international collaboration patterns (El-Kawas 2002). The relationship between Europeanisation and globalisation may also be different in EU member states and in non-member states. Future studies could well be focused on comparative analyses of the tensions between globalisation, regionalisation, the stratification of scientific communities, and between locals and cosmopolitans in academia. Moreover, it is reported that research collaboration often has an informal character and takes place because scientists share common interests and have complementary skills which allow them to tackle more complex problems (Thorsteinsdóttir 2000). Our data only shed light on faculty members' motivation, attractiveness and resources for international contacts indirectly. Studies of these mechanisms are needed to further develop our understanding of the dynamics of scientific communication and collaboration.

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