Public Debate on Research Policy in the Nordic Countries

A Comparative Analysis of Actors and Issues (1998 – 2007)

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NIFU

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PREFACE

In 2007 NordForsk initiated and supported a comparative, exploratory study of public debate on research policy issues in the Nordic countries during 2004–2007. The focus of interest was narrowed down to include public debate on research policy aspects of globalisation. The results of the study were published in NordForsk Magazine 1/2007. Based on the experiences gained from the preparatory study, NordForsk decided in 2008 to fund a full-scale comparative study of research policy debate in the Nordic countries during the period 1998–2007. This report presents the results of the comparative study. The study was performed by a consortium of five national teams coordinated by NIFU STEP, Norway (led by senior researcher Egil Kallerud). The other teams were teams were of the Danish Centre for Studies in Research and Research Policy, the University of Aarhus, Denmark (led by Director Karen Siune), SISTER, Sweden (led by senior researcher Lars Geschwind), Rannis, Iceland (led by head of department Thorvald Finnbjørnsson), and University of Helsinki, Finland of (led by Professor of Science and Technology Studies Marja Häyrinen-Alestalo). NordForsk appointed a reference group for the study with these members: Professor Anker Brink Lund, Copenhagen Business School, Denmark; director Carl Jacobsson, Swedish Research Council, Sweden; secretary general Esko-Olavi Seppala, Science and Technology Policy Council, Finland; special adviser Gro Helgesen, The Research Council of Norway, Norway.

The content of the report is the full responsibility of the authors and NIFU.

Oslo, January 2011

Sveinung Skule
Director, NIFU

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EXECUTIVE SUMMARY

Public debate on research policy issues is arguably a neglected domain in studies of research and research policy. This comparative study on this kind of debate is thus a study which may lay claim to some novelty in its choice of topic. It may be seen as an exploration of this aspect of the development of the "knowledge society" and "knowledge economy". These concepts not only suggest that knowledge *in general* is becoming more important, they also emphasize more particularly the increasing importance of formal, advanced, research-based knowledge as immediate sources of economic growth, as a dimension that occupies a larger share of the activities of society as such, and of (an increasing share of) its individual members. The increasing societal and economic role of advanced, research-based knowledge may also be expected to be mirrored in both in the increasing political importance or priority of knowledge policies and may lead to more public debate and media coverage of knowledge-related issues, developments and controversies.

A key part of policy discourse on the knowledge society and economy is the development and active use of a range of indicators and rankings to measure and monitor how individual countries and regions make progress in this process of structural change. From these rankings a map has emerged of "leading" and "lagging" nations and regions. While such rankings often vary as a function of differences between methodologies and aggregation of indicators, they invariably put some or all of the Nordic countries in top positions. This applies in particular to the indicators used by the EU in order to monitor Europe's progress towards the knowledge-based economy. Within these EU rankings the Nordic member countries in general, and Finland and Sweden in particular, are seen to pave the way which the EU as a whole should follow and, specifically, to provide evidence that the target to increase R&D investment to 3 percent of GDP is possible and viable. There is, as such, a "look to the Nordic countries" element in much global and European debate on policies for the "knowledge economy" in general and for R&D (research and development) in particular. Consequently a study of the public debate on research policy issues in the Nordic countries may be an exploration of how and to what extent the allegedly increasing importance of research is reflected in public awareness and in characteristics of public debate on research policy issues. Some of the Nordic countries have strong traditions of extensive civic participation and public engagement in public debates. One could expect that the widening of debates on research policy in these countries may involve broader constituencies than immediate stakeholders in research, industry and policymaking.

As advanced welfare states, the Nordic countries are also committed to values of equality and social security, key references in policy debates about knowledge societies and economies in terms of providing evidence that the "European social model" which combines knowledge-based growth and "social cohesion" is possible and viable. Is there evidence of public awareness that fundamental values may be at stake in the "knowledge society/economy" developments and issues? To what extent and how does awareness about values in particular surface in the public debate on research policy issues?

This study attempts to address such issues through a combined quantitative and qualitative study of articles on research policy published in 3–5 newspapers in each of the Nordic countries during the 10-year period 1998 to 2007. This was a period during which a large number of initiatives were launched and debated in all the Nordic countries as indicated by an overview provided in the report of key policy developments and events

The main findings of the study are as follows.

***Increase in public debate*.** We see an overall pattern where public debate on research policy increased during the ten year period covered. While the extent of research policy debate remained relatively stable during the first half of the period, there was an overall increase in all countries except Iceland during the period 2002–2006. The increase was, however, uneven between years and between countries, and seems to correlate with particular policy initiatives and events.

Researchers are the dominant actor group. Researchers and research institutions combined are the dominant group of authors in all countries except Iceland, where the dominant group is journalists. The dominant role of researchers is particularly salient in Sweden. In these countries (excluding Iceland) journalists are the second largest actor group. However, the relative weight of both these two and the other groups varies considerably between the countries. The presence of civil society is relatively marginal in all countries and does not provide support for the assumption of a general shift in the participation in research policy debates from immediate stakeholders to wider social groups. Thus we find no firm indication that groups beyond immediate stakeholders feel affected by, and engage actively in research policy issues.

Politicians' and business roles vary strongly. In Denmark, politicians and representatives of the ministries are more active than in any other country while their relative presence in Finland is very low. This reflects the different characteristics of the political process in the two countries. There is also a large variation in the participation in the debate of actors from business/industry, which in Denmark plays a more prominent role than their counterparts in other Nordic countries. Women were more active in Iceland and Denmark than in the other countries. Sweden and Denmark display a higher degree of policy initiation (through laws, bills, executive orders or appropriations of financial resources) compared to other Nordic countries. The amount of researcher- and journalist-initiated debate is lowest in Iceland and Finland.

Politicians are often referred to in the debate. While the politician/ministry group has a relatively minor role as author, the minister/ministry of research and other ministries taken together are by far the largest referred actor groups (persons referred to in an article) in all countries except Finland. Within this group, other ministers or ministries are more frequently referred to than the research minister/ministry in the debates in Denmark and Finland. In Iceland leaders of research institutions are referred to much more frequently than in the other countries. In Sweden, state initiated committees/inquiries are relatively frequently referred to, compared to the other Nordic countries.

Researchers and politicians disagree. Disagreements among researchers and politicians were by far the most common in all the Nordic countries. Disagreements among researchers occurred most frequently in Finland and Iceland, while this was rarely the case in Denmark.

Limited explicit value awareness. In around half the articles some explicit reference to one of four values (knowledge, economy, welfare, sustainability) could be detected. The knowledge society and economic growth dimensions were by far those which were most often frequently referred to. Economic growth is more dominant than the knowledge economy dimension, particularly in Norway and Sweden, and references to these two dimensions are nearly equally frequent in Finland and Iceland. Denmark differs from the other countries in this respect with considerable more references to the knowledge society than to economic growth.

Different topics prevail in the various countries. The topics of the articles were coded into forty subjects, each assigned to one of six main topic groups: Financial management/resource issues, organisational management, human resources, output-related issues, challenges and conflicts. While economic/resource topics, organisational topics and output-related issues are the dominant topic groups in all countries, the relative prevalence of topics groups differs between the countries. In debates in Denmark, issues of organisation and management were most common, output-related issues were the most frequently debated in Finland, while debates in Iceland, Norway and Sweden were predominantly on financial and resource issues. Our analysis of the topics is to a large extent qualitative, highlighting a number of national specificities.

Much debate about health science in some countries. Unsurprisingly, issues about technical science and technology were common in all countries, particularly in Finland and Denmark, but in Norway, Iceland and Sweden discussions on health science were more common, and in Sweden and Norway issues pertaining to the humanities were also common, and much more so than in any other country.

***Basic research a key concern*.** For all countries except Finland, debates were about basic research in the cases where references to types of research could be detected. In Finland the main reference was to "research and development". This was also common in Norway and Iceland. Only Danish debates referred to any significant extent to "strategic research".

***Extremely strong national bias in research policy debates in all countries*.** A main finding of our study is that in all the Nordic countries the research policy debate had an *almost exclusively* national focus. References to the Nordic countries or other regions were rare. References to non-Nordic EU countries were more frequent in Finnish debate articles than in articles in other Nordic countries. This picture is also sustained by our finding that relatively few articles made any reference to issues of international research cooperation. As a large part of the debate in several countries was concerned with inadequate resource levels, references to the Barcelona target were frequently made as part of the argument. In this way the EU dimension did figure in the national public debate as pressure on national governments to increase (public) funding of research. To a certain extent public debate may be seen to have acted as an "ally" to the European Union wanting to exert pressure on national policymakers to increase research funding.

* * *

Sammendrag

Innen feltet studier av forskning og forskningspolitikk er det gjort få undersøkelser av den rolle som offentlig debatt om forskningspolitiske spørsmål spiller. Herværende komparative studie av slik debatt kan altså til en viss grad gjøre krav på å være nyskapende i valg av tema. Den kan leses som en utforskning av denne spesielle siden ved utviklingen av "kunnskapssamfunnet" og "kunnskapsøkonomien". Disse begrepene indikerer ikke bare at kunnskap generelt er i ferd med å bli viktigere, de understreker også at formell, avansert og forskningsbasert kunnskap blir viktigere som umiddelbare kilder til økonomisk vekst, og utgjør en stadig større del av samfunnets og den enkeltes aktiviteter. En vil derfor også kunne forvente at den økende samfunns-messige og økonomiske betydning som avansert, forskningsbasert kunnskap får også kommer til uttrykk ved at kunnskapspolitiske spørsmål får høyere politisk prioritet, og at det fører til mer offentlig debatt og mer dekning i mediene om kunnskapsrelaterte saker, utviklingstrekk og kontroverser.

En sentral del av den politiske diskusjon om kunnskapssamfunn og kunnskapspolitikk er utvikling og aktiv bruk av en lang rekke indikatorer og rangeringer for å måle og overvåke hvordan enkeltland og -regioner plasserer seg i slike strukturelle endringsprosesser. Fra disse rangeringene har det vokst fram et bilde av enkelte nasjoner og regioner som ledende, mens andre sakker akterut. Slike rangeringer gir, som en følge av ulike metoder og ulike måter å aggregere indikatorer på, ofte ulikt resultat, men de plasserer nesten uten unntak nordiske land i topposisjoner. Dette gjelder spesielt for indikatorer som brukes av EU for å overvåke utviklingen av Europas kunnskapsbaserte økonomi. På disse blir de nordiske land generelt, og Finland og Sverige spesielt, ansett som land som viser vei for EU som helhet, og de framstår som bevis for at det er mulig og riktig å øke de nasjonale investeringene i forskning og utvikling (FoU) til tre prosent av brutto nasjonalprodukt (BNP). Det er med andre ord et element av "look to the Nordic countries" i mye global and europeisk forskningspolitisk debatt om "kunnskapsøkonomien" generelt og om FoU spesielt. Derfor kan en studie av offentlig debatt om forskningspolitiske spørsmål i de nordiske landene si noe om hvordan og i hvilken grad forskningens påstått økende betydning kommer til uttrykk i offentlig oppmerksomhet for forskning og i kjennetegn ved den offentlige debatten om forskningspolitiske spørsmål. Noen av de nordiske landene har også sterke tradisjoner for bred folkelig deltakelse i offentlig debatt, og en kan forvente at en utvidelse av interessen for og debatten om forskningsspørsmål også fører til at bredere grupper deltar i debatten enn bare de grupper innen forskning, industri og forvaltning/politikk som er direkte berørt.

I egenskap av å være framskredne velferdsstater er også de nordiske landene forpliktet på verdier som likhet og sosial sikkerhet, og det blir ofte vist til at disse landene har lykkes med å virkeliggjøre den "europeiske

sosiale modellen" ved å kombinere kunnskapsbasert økonomisk vekst og sosial solidaritet/sammenhengskraft (social cohesion). Gir debatten belegg for at det finnes en sensitivitet i befolkningen for at slike fundamentale verdier står på spill i og med utviklingen av "kunnskapssamfunnet/-økonomien"? I hvilken grad og på hvilken måte kommer evt. en slik verdibevissthet til uttrykk i den offentlige debatten om forskningspolitiske temaer?

Denne studien søker å reise slike spørsmål i form av en kombinert kvantitativ og kvalitativ studie av publiserte artikler om forskningspolitikk i 3-5 aviser i hvert av de nordiske landene i løpet av tiårsperioden fra 1998 til 2007. Vår oversikt over de viktigste forskningspolitiske utviklingstrekk og begivenheter i denne perioden viser at dette var i samtlige nordiske land en periode da et stort antall forskningspolitiske initiativ ble tatt og debattert.

Hovedfunnene i studien er disse:

***Økt offentlig debatt*.** Vårt material viser at den offentlige debatt om forskningspolitiske spørsmål økte I løpet av perioden. Mens omfanget av debatt var ganske stabilt i første halvdel av perioden, var det en generell økning io alle landene unntatt Island i perioden mellom 2002 og 2006. Økningen var imidlertid ujevnt fordelt mellom år og mellom land, og synes å korrelere godt med spesielle politiske initiativ og begivenheter.

***Forskere den mest aktive gruppen*.** Gruppen forskere og forskningsinstitusjoner er i alle land dominerende som forfattere av de artikler vårt materiale omfatter. Unntaket er Island, der journalistgruppen dominerer. Forskernes dominerende rolle er særlig tydelig i Sverige. Journalister er den nest mest aktive gruppen. Det relative tyngdeforhold mellom så vel disse to gruppene som mellom de øvrige forfattergrupper varierer imidlertid betydelig landene imellom. Vi finner kun marginal deltakelse fra det sivile samfunn, noe som ikke støtter antakelsen om at debatten utvides til å omfatte bredere grupper enn de som er direkte berørt.

Politikeres og industrirepresentanters rolle varierer mye. I Danmark spiller politikere og representanter for departementene en mer aktiv rolle enn i noen av de andre landene. denne gruppen har svært lav deltakelse i Finland. Dette gjenspeiler særtrekk ved de politiske prosessene i de to landene. Det er også stor variasjonen landene imellom i hvor stor grad representanter for næringsliv deltar i debatten. Denne gruppen spiller I Danmark en mer framtredende rolle enn i de øvrige land. Kvinner var mer aktive i Island og Danmark enn i øvrige land. Debatter ble i størst grad utløst av politiske initiativ (lovforslag, politisk beslutning, bevilgning) i Danmark og Sverige. Debatt initiert av forskere eller journalister forekom sjeldnere i Island og Finland enn I øvrige land.

Ofte referanse til politikere. Selv om politikere og departementsrepresentanter kan spille en beskjeden rolle som forfattere av artikler, er ministre/departementer den gruppe det hyppigst blir referert til i artiklene. Det gjelder alle land unntatt Finland. Innenfor denne gruppen blir det i Danmark og Finland hyppigere vist til andre departementer/ministre enn forskningsministeren/-departementet. I Island er det oftere referanser til ledere av forskningsinstitusjoner enn i andre land, mens det i Sverige er mer hyppige referanser til komiteer og lignende enn i øvrige land.

Forskere og politikere er uenige. I alle de nordiske landene var det klart mest uenighet mellom forskere og politikere. Uenighet mellom forskere forekom hyppigst i Finland og Island, mens dette forkom sjelden i Danmark.

Begrenset med eksplisitt referanse til verdier. I om lag halvparten av artiklene var det mulig å finne eksplisitte referanser til minst en av fire verdier: kunnskapssamfunnet, økonomisk vekst, velferd og bærekraftig utvikling. Klart flest referanser var til de to førstnevnte verdiene, kunnskap og vekst. Særlig i Norge og Sverige var det hyppigere referanse til vekst enn til kunnskap, mens de forekom omtrent like hyppig i Finland og Island. Danmark skiller seg ut ved et betraktelig høyere antall referanser til kunnskap enn til vekst.

Ulike tema i fokus i landene. Artiklene i materialet ble kodet på så mye som førti temaer, som igjen ble tilordnet en av seks hovedtemaer: finansiering/ressurser, organisering/ledelse, menneskelige ressurser, resultater/effekter, utfordringer og konflikter. Finansiering/ressurser, organisering/ledelse og resultater/ effekter var de dominerende hovedtemaene i alle landene, men den relative fordelingen mellom dem varierte mye fra land til land. I Danmark var debatt om organisering/ledelse mest vanlig, mens det i Finland var mest debatt om resultater/effekter. I Island, Sverige og Norge dreide debatten seg i størst grad om finansiering/ ressurser. Vår analyse av temaer er i stor grad kvalitativ og avdekker flere nasjonale særtrekk.

Mye debatt om helseforskning i noen land. Ikke overraskende dreide debatten seg i alle land i stor grad om spørsmål knyttet til naturvitenskap og teknologi, og særlig i Finland og Danmark. I Norge, Island og Sverige var diskusjon om helseforskning mer vanlig, og i Sverige og Norge var også spørsmål knyttet til humanistisk forskning vanlig, og dette forekom her i vesentlig større grad enn i de øvrige landene.

Stor interesse for grunnforskning. Når det I debatten forekom referanse til forskningsarter, var disse i alle land unntatt Finland i hovedsak til grunnforskning. I Finland var hovedreferansen til "forskning og utvikling", og denne forekom også i betydelig grad i Norge og Island. Bare i dansk debatt forekom i nevneverdig grad referanser til "strategisk forskning".

Meget sterk nasjonal slagside. Et hovedfunn i vår undersøkelse er at den forskningspolitiske debatten i alle de nordiske landene *nesten utelukkende* hadde et nasjonalt fokus. Referanser til de nordiske land eller andre regioner forekom sjelden. Referanser til EU-land utenfor Norden forekom oftere i finsk debatt enn ellers. Dette hovedbildet støttes også av at bare et fåtall artikler hadde referanser til internasjonalt forskningssamarbeid. Siden en stor del av debatten dreide seg om at forskningen har utilstrekkelige ressurser, ble henvisninger til EUs Barcelona-mål (tre prosent av BNP til FoU) ofte brukt som argument. På den måten ble EU-dimensjonen en del av den nasjonale debatten for å øve press på nasjonale regjeringer for å øke forskningsbevilgningene. På den måten kan den offentlige debatt sies å ha fungert som en "alliert" til EU som ønsker å legge press på nasjonale politikere for å øke de nasjonale forskningsbevilgningene.

1. INTRODUCTION

1.1. THE NORDIC COUNTRIES – VANGUARDS OF THE KNOWLEDGE ECONOMY?

Contemporary society is allegedly being transformed into a "knowledge society", and a large variety of indicators provide evidence that its economy is becoming increasingly "knowledge-based". These concepts not only suggest that knowledge *in general* is becoming more important, they also emphasize more particularly the increasing importance of formal, advanced, research-based knowledge as immediate sources of economic growth as a dimension that occupies a larger share of the activities of society as such and of (an increasing share of) its individual members. The notion of "the knowledge economy" has become particularly pervasive, emphasizing the increasing role of advanced, research-based scientific and technological knowledge for firms' innovative capacity and competitiveness. The increasing societal and economic role of advanced, research-based knowledge may also be expected to be mirrored in both the increasing political importance of knowledge policies, and in a stronger presence in public debate and media of knowledge-related issues, developments and controversies.

Today, in countries and regions all over the world these knowledge policies are framed in terms that borrow extensively from a narrative about the knowledge-based economy which pervades policy discourse, emphasizing in particular the increasing role of science and technology in the new global economic order. This narrative has been articulated and strongly promoted by such cross-national players as the OECD and the European Union (EU). The idea of the knowledge-based economy has also been taken up by most member countries of these organisations. This concept is at the core of the overall agenda of the EU, the Lisbon strategy, which states that the EU aims to develop the most dynamic, knowledge-based economy of the world. EU emphasizes that this "transition towards a knowledge-based economy involves a fundamental structural change … all the challenges facing Europe need to be reconsidered in the light of this new paradigm". [1]

An important part of the development of the policy framework built on the concept of the knowledge economy is the development and active use of a range of indicators and rankings to measure and monitor how individual countries and regions make progress in this process of structural change. From these rankings a map of "leading" and "lagging" nations and regions has emerged. While such rankings often vary as a function of differences between methodologies and aggregation of indicators, they invariably place some or all Nordic countries in top positions. This applies in particular for the indicators used by the EU itself in order to monitor Europe's progress towards the knowledge-based economy.[2] Within these EU rankings the Nordic member countries in general, and Finland and Sweden in particular, are seen to pave the way that the EU as a whole should follow and, specifically, to provide evidence that the target to increase R&D investments to 3 percent of GDP is possible and viable. The World Bank's "Knowledge Economy Index" (KEI) provides an even more consistent picture of *all* Nordic countries as top performers in the world on aggregate knowledge economy indicators. In the 2008 KEI rankings, Denmark occupies first position, followed by Sweden and Finland, while Norway and Iceland closely follow at 5th and 13th places respectively.[3]

There is, then, a "look to the Nordic countries" element in much global and European debate on policies for the "knowledge economy" in general and for R&D (research and development) in particular. An additional aspect of this picture is also the idea that others could and should "learn from" these countries, that they should be studied as sources of "best practices" which other countries should adopt and adapt.

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[1] European Commission (2003) *Third European Report on Science and Technology Indicators 2003. Towards a Knowledge-Based Economy*, Brussels, p. 1.

[2] European Commission (2008) *A more research-intensive and integrated European Research Area. Science, Technology and Competitiveness Key Figures Report 2008/2009*

[3] See www.worldbank.com/kam

This study does not necessarily subscribe to the ideas embedded in these indicators, rankings and assumptions about the transferability of selected "best practices" between countries. They often come with assumptions that deserve close scrutiny.[4] It is questionable that single indicators, taken in isolation or as composites, can capture the complex interplay of complementary resources and framework conditions that sustain creativity and innovation, neither do they easily capture specificities and comparative advantages that may often be hidden in combinations of "weak" and "strong" performance on single and composite indicators.

These reservations and caveats notwithstanding, such indicators do suggest that the Nordic countries may nevertheless be doing "something right" as concerns the role of knowledge, research and innovation in modern societies. Thus, what takes place in the Nordic countries may lay claim to a broader interest in terms of identifying and analyzing aspects of the emergent knowledge economy and society.

However, the broader interest of the Nordic countries reaches beyond the European agenda for developing an advanced "knowledge-based economy"; they are also, as advanced welfare states, key references in debates about that other part of the Lisbon agenda which pertains to the "social cohesion" pillar, that European progress towards the knowledge-based economy must build on and retain the fundamental values of the "European social model". The experiences of the Nordic countries in integrating and balancing the twin objectives of competitiveness and social cohesion may thus be sites of exploration of a "balanced", European venue to the future knowledge society. It cannot be assumed *a priori* that this delineates a viable venue, nor that the balance of these twin sets of objectives can be combined easily and without costs. The knowledge economy discourse and indicators tend to exclude from view tensions and compromises between these objectives. Finland, for example, is often heralded as a "super model" of the knowledge-based economy, but its performance on welfare is less stellar. Despite several periods of rapid economic growth during the last 15–20 years, several welfare indicators remain at levels comparable to the time of the severe economic recession of 1992.

While all five Nordic countries may be seen to adhere to the so-called Nordic model of democracy and of the welfare state, the narratives provided in this study are as much about different, even divergent, trajectories of development and strategic political choices, which reflect fundamental differences in socio-economic structures, national systems of innovation and science and technology policy priorities.

This is, according to some, the effect of a shift in orientation that has been clearer in Finland than any of the other Nordic countries from welfare to competition state.[5] Some speak of a specific form of Nordic capitalism that is a mixture of the competition and the welfare state. [6] Many aspects of "knowledge economy" policies have a clear "elitist" character – by emphasizing excellence, the priority of the "very best", critical mass and concentration of resources. Therefore they go against ingrained egalitarian sensitivities and are met with resistance by Nordic audiences. Another question is to what extent, and in what way, efforts to implement more market-oriented academic policies, by developing more entrepreneurial universities and increasing sensitivity in the academic community to the commercial potential of academic research, are reflected in public debate. The European dimension plays a key role in these developments. The EU takes a particular interest, within the "Open Method of Coordination" in the firmness that member states exhibit in their development of effective national policies that comply with the Lisbon agenda and the Barcelona target. Have, then, Nordic publics acted as an "ally" of the European Commission by exerting pressure on national policy-makers to increase public research funding and create conducive conditions for private research investments?

[4] See e.g., Godin, B (2006): The knowledge-based economy: conceptual framework or buzzword? *The Journal of Technology Transfer* 31.

[5] Jessop, B. (2002): *The Future of the Capitalist State*. Polity Press, Cambridge; Pelkonen, A. (2008): *The Finnish Competition State and Entrepreneurial Policies in the Helsinki Region*. University of Helsinki. Department of Sociology. Research Reports No. 254.

[6] Ollila, J. (2009): Pohjoismainen malli on kapitalismin tulevaisuus. *Helsingin Sanomat* 24.3.2009 (The Nordic Model is the future of capitalism).

It cannot, however, be assumed *a priori* that this interest and those potential lessons must necessarily be sought in what is common to these countries. When seen from a distance the Nordic countries are often lumped together, focusing on what makes them similar – strong welfare state policies, strong trade unions and well-developed mechanisms for collaboration between social partners as well as combination of flexible work markets and high social security, social equality and "compressed" wage structures. In addition, these countries have well-developed educational systems, including generous support schemes for higher education and PhD-education alongside high levels of public expenditure on R&D. These similarities and affinities are important, and provide extensive opportunities for coordination and collaboration, also within the domains of research and innovation (as epitomized by NordForsk and NICE).

Looked at from a closer standpoint, important differences emerge, many of which relate directly to "knowledge economy" issues. One key difference concerns the extensive differences in the history and structure of their economies, as seen by that extremely high level of private investments in R&D in Sweden and Finland on the one hand, compared to the moderate to low level of private R&D investments in Norway on the other. As a large number of comparative studies attest, there are important differences between these countries which have their origins in different histories, social structures, political cultures and geo-political alliances. These differences must also be accommodated in the picture of the "Nordic progress" towards the knowledge economy/society, indicating that policies need to be *appropriate*, that their effectiveness remains context-dependent, and that even when the Nordic countries are concerned there may be several, and diverging, paths to the future.

1.2. PUBLIC DEBATE – A NEGLECTED DOMAIN IN RESEARCH POLICY ANALYSES

This study is not a mapping and analysis of national and regional *policies* for knowledge and research in the Nordic area. A number of sources and studies exist which provide detailed, often explicitly comparative, maps of the region's national and regional policies for research and innovation. [7] What is often left out of these accounts of policy developments is, however, the *public debate* about these issues and developments. There are many reasons why this may be a major flaw of these accounts as well as of policies themselves that do not take into account sufficiently the role that public debate may and can play in these developments.

There is, for one, an ambition in contemporary policies, as embedded in the very concept of the knowledge economy/society, that the effective development, management and deployment of knowledge and research is becoming more central, integral and essential to the *overall* development of modern societies. Consequently, the policies for these areas have to shed their traditional character as only affecting and involving a relatively narrow range of stakeholders and experts. Knowledge and research are too important to be left to the experts alone: issues of public interest are at stake, and need to be justified and shaped in compliance with publicly voiced interests.

An increasingly attentive and knowledgeable public may thus be expected to become a critical "passage point" for any policy within this field, to which policymakers within these areas have to become increasingly attentive and responsive. Policy development and public debate may interact in several ways. Public debate may trigger responses to policy initiatives that need to be taken into account in the way they are articulated and implemented. Public debate may generate new issues or concerns to which adequate policy responses may have to be developed. Public debate may be an essential "allied" in the development and promotion of "knowledge economy/society" policies, and may be a sounding-board for the viability of policy options.

Nordic experiments and experiences on lay participation in debates about issues pertaining to issues of science, technology and innovation have achieved word-wide awareness, seen as good practice models that other countries may emulate and learn from in terms of enhancing the democratic character and public legitimacy of

[7] See for example, the parts of the European projects Erawatch (http://cordis.europa.eu/erawatch/) and PRO-INNO Europe (http://www.proinno-europe.eu/) that cover the Nordic countries.

policy processes, debates and decisions that are regarded as dominated by experts and directly affected stakeholders. Denmark in particular has a well-established, worldwide reputation as a country in which the lay public and civic groups take active part in debates on science, technology and innovation (for example, in so-called "consensus conferences") and other countries may point to similar experiences of broad and active public/civic participation in policy debates and process about such issues.[8] In this particular respect the Nordic countries may also be appropriate sites for articulating and testing hypotheses about if, how and/or to what extent public debates about research policy issues in these countries may *actually* be described as becoming more extensive and intensive. Is it empirically true that "general citizens" do take a more active part in these debates in these countries, or are they, even in these allegedly "public participation oriented" countries, as strongly as previously dominated by the "usual suspects" – stakeholders that are immediately affected, lobbyists, the familiar, narrow range of experts?

Assuming that Nordic countries are, relatively speaking, at an advanced stage in the development of knowledge economies and societies, a better understanding of public debate on research policy issues in the Nordic countries during the last 10 years may provide insight into the changing roles and characteristics which public debate plays in the development and implementation of policies for research within a knowledge economy framework. Our analyses may, *inter alia*, provide a basis for answering questions about the public support and acceptability of values that sustain knowledge economy policies, and about public sensitivity to values that are at stake in their development. There may be potential tensions and contradictions between different values associated with research and its uses within a societal and political context characterized in particular by growing awareness of the importance of knowledge as source of economic competitiveness and in "knowledge society" more pervasively. This may interact and compete with values that are entrenched in politics and public sensitivities in the Nordic countries – with welfare and equality as well as sustainability and environmental protection. Do such value sensitivities, or even tensions, surface in the debates on research and, if so, how? Are they explicitly or implicitly present in the debate? Does the relative emphasis on these values differ from one Nordic country to the other?

1.3. THE STUDY – OBJECTIVES, METHODOLOGY, PARTICIPANTS

Our analysis is based on a mapping of public debates on research policy issues that appeared in a selection of national newspapers during the 10 year period from 1998 to 2007. This was a period during which, as our overview of policy developments indicates (see Chap. 3), a large number of initiatives were launched and debated in all the Nordic countries. Most of the papers selected were available on-line. The aim of the project is to cover debates on *in principle* all main issues of research policy, and to ensure a common thematic focus for all research partners, an initial *indicative* list of topics to be covered was set up. The point of departure for developing a common coding key was on the following preliminary list of topics that was agreed upon by the team on the basis of discussions to reach consensus on a common core of "research policy" topics:

- Resource issues; the level of public and private expenditure (including the Barcelona target)
- Resource distribution, i.a. between institutions, between objectives (priorities/priority-setting), resource concentration/distribution
- Institutional structures and systems reforms (higher education institutions, public research organisations)
- Academic freedom/autonomy of research institutions
- Research ethics (gene technology, research integrity …)
- Conflicts of interests (habilitet, jäv, ...)
- Peer review, evaluation
- Needs-/policy- vs. researcher-driven research
- Quality/excellence vs. relevance/application;

[8] Häyrinen-Alestalo, M & E Kallerud (eds): *Mediating Public Concern in Biotechnology. A map of sites, actors and issues in Denmark, Finland, Norway and Sweden*, NIFU Report 2/2004, NIFU: Oslo; Hagendijk, R. and Irwin, A. (2006) Public Deliberation and Governance: Engaging with Science and Technology in Contemporary Europe, *Minerva* 44: 167-84.

- Commercialisation; collaboration research/industry;
- Research organisation and management
- Globalisation (based on results from an explorative pre-study) [9]

The code key defines a large number of specific content elements to be used for coding each unit of analysis (article, statement) and specifies further details within the topics listed above. These include identification variables, variables describing the actors (the authors of the articles), and characteristics of the research field as well as the specific policy themes and issues. To ensure comparability across countries, common selection criteria for the unit of analysis and a code key (coding scheme) were developed. The coding key included a guide on how to apply the coding criteria. Also, a common data registration procedure was developed enabling the quantitative data to be simply merged into a common data set. The code key was first developed and test coded by the Danish team in cooperation with other Nordic team members. The first version was written in Danish and later translated into English prior to the coding process. The complete code key is included in Appendix 2.

The unit of analysis in our study is defined as *a single debate article* in the selected newspapers. Altogether, close to 2300 articles have been coded. The unit of analysis is a unique debate articles that may be classified under one of the following categories:

- Column comment (DK/NO: Kronik(k), SV: Krönika, FI: Kolumni: IS: Umræðugrein)
- Comment/analysis (editorial discussion article) (DK/NO/SV: Kommentar/analys(e), FI: Kommentti; IS Fréttaskýring)
- Editorial/leader (DK/NO: Leder, SV:Ledare; FI: Pääkirjoitus; IS: Leiðari)
- Opinions (DK: Debatindlæg, NO: Debattinnlegg, SV: Debatt), FI: Mielipide/debatti; IS: Kjallaragrein)
- Letter to the editor (DK/NO: Læserbrev/leserbrev, SV: Insändere, FI: Yleisönosasto; IS: bréf til blaðsins)
- Interview focusing on research policy (NO/SV: Intervju, FI: Haastattelu)

News reports about research are not included in our material.

We selected national daily papers that are known to take up public debate on research policy. Three to five newspapers were selected in each country:

Country	*Newspaper*
Denmark	Børsen, Berlinske Tidende, Information, Jyllandsposten and Politikken
Iceland	Morgunblaðið, Fréttablaðið and 24 stundir
Finland	Helsingin Sanomat ,Kauppalehti and Turun Sanomat
Norway	Aftenposten, Dagbladet, Dagens Næringsliv and Klassekampen
Sweden	Dagens Industri, Dagens Nyheter, Svenska Dagbladet, Sydsvenska Dagbladet, Upsala Nya Tidning

The units of analysis from the majority of these papers were available in these on-line databases:

- Denmark
  Infomedia is an online database containing full text articles and was used for *Berlingske Tidende*,

[9] Kallerud, E., Häyrinen-Alestalo, M., Sandström, U., Siune, K. & Finnbjörnsson, T. (2007): Public debate on globalisation and research in the Nordic countries. *NordForsk Magasin* 1: 11–13.

Information, *Jyllandsposten* and *Politiken*. Børsens own online database, also including full text articles, was accessed because it wasn't included in the Infomedia data base.

- Iceland
  Morgunblaðið has a comprehensive database of searchable articles for all the years covered. *Fréttablaðið* has a database dating from 2003; articles from previous years were searched by pdf on the paper's web site. *24 stundir* was also searched by pdf. In addition the web site www.timarit.is was used to complement the material.

- Finland
  Finland does not have article databases as in other Nordic countries, and the team had to rely on online archives that were accessible through the internet. The three newspapers selected have online archives that cover the wanted period 1998-2007.

- Norway
  The Retriever Atekst-database was accessed in order to search for the relevant debate articles. Atekst contains full text versions of the relevant articles in the four selected Norwegian newspapers for this analysis. The database includes newspaper and specialized press articles and is updated on a daily basis.

- Sweden
  The database Artikelsøk was used in the search for articles. Most articles were found as full text version whereas some articles were tracked through the individual newspapers.

An initial set of common search strings were agreed upon, most of which were based on the 'research policy' term ("forskningspolitikk"), including truncated versions of the terms. Linguistic differences made it necessary for each partner to add unique terms from their own language in order to get as homogenous sets of data as possible.

These were the research teams involved in the project:

- Denmark
  Director of the Danish Centre for Studies in Research and Research Policy, dr.scient.pol. Karen Siune, research assistant cand.scient.pol. Erik Ravn and project assistant stud.scient.pol. Rasmus Jensen
- Finland
  Professor of Science and Technology Studies Marja Häyrinen-Alestalo and M.Soc.Sc. Terhi Tuominen Helsinki Institute of Science and Technology Studies, University of Helsinki
- Iceland
  Head of section Thorvald Finnbjörnsson at the Research Centre of Iceland-Rannis and research student Sveinbjörn Ásgeirsson University of Iceland
- Norway
  Senior researcher Egil Kallerud, and researcher Inge Ramberg, both NIFU STEP. Kallerud was also overall project coordinator.
- Sweden
  Senior researcher Lars Geschwind and research assistants Karla Anya-Carlsson and Karin Larsson, SISTER.

2. BACKGROUND - MAIN POLICY EVENTS AND ISSUES

As a background to our subsequent analysis of public debate, we provide a short overview of main trends and events in research policy in each country during the time that our analysis covers.

2.1. DENMARK

The period 1998 to 2007 is interesting in Danish research policy, spanning a period that commences five years after the establishment of a Danish Ministry for Research and Technology, by which science policy may be seen to become a policy area in itself, attracting growing public debate as such. A change in government took place in 2001 when the social-democrat government under Prime minister Poul Nyrup Rasmussen ceded to a centre–right coalition government consisting of Liberals and Conservatives lead by Prime Minister Anders Fogh Rasmussen from the Liberals.

Under the social-democrat government from 1993 to 2001, a large number of ministers were responsible for research: four different ministers were actually in office within the period 1997–2001. The rapid turnover of ministers responsible for research indicates that none of them had much the time to leave their fingerprint on the area. That was not the situation for the centre–right coalition Government.

Frank Jensen (1995–97) was responsible for reorganizing the Danish research political advisory system aiming to coordinate the numerous advisory bodies, including the research funding organisations. Jytte Hilden (1997–1998) will be remembered especially for her FREJA initiative where the focus was on female researchers. Jan Trøjborg, Minister (1998–1999) assumed responsibility not only for public research activities but also for universities. He took the initiative to establish contracts between the ministry and the universities. Birthe Weiss (1999–2001) will be remembered for the establishment of The Research Committee, even though the report of committee was not published until after the change of government in 2001.

During the end of the 1990s there were a number of initiatives from the responsible research ministers under the social-democrat government. The rationale of many of the initiatives was to reorganize public research and stimulate collaboration and interplay between public research and private business. In 1998 the government presented a research package under the title “Forskning som vækstlokomotiv”, under which appropriations were allocated during the 1998–2001 period to a number of business-oriented initiatives aiming to strengthen applications of research, innovation and technology within the private sector. In the 1999 research package the government focused on innovative universities and special funds were allocated to public research institutions, providing incentives to support innovation and commercialization, including patenting. The interplay between public and private research returned to the agenda in 2000 when fresh resources were allocated to establish contacts between different types of research centres for the 2000–2003 period.

Helge Sander from the Liberals became the research minister of the new centre-right government following the general elections in 2001. His title was new: Minister of Science, Technology and Innovation. In 2005 Prime Minister Anders Fogh Rasmussen called an election, which was won by the government coalition. Helge Sander remained in office as Minister of Science, Technology and Innovation and has established himself as the prime figure in Danish research policy debate since 2001. This period was characterized by a large number of political initiatives targeting the management of universities.

Initiatives in Danish research policy since 1998	
1998-2000	Research package "Forskning som vækstlokomotiv" allocated means to business-oriented initiatives focusing on economic growth through strengthening interplay between public research and private business. Research commission established (2000) with focus on Danish research landscape.
2001	Innovation politics transferred from Ministry of Business and Economy and integrated in to Ministry of Science, Technology and Innovation. Report with recommendations from Research commission; special focus on governmental research institutes, attached to different ministries.
2003	Law for universities changing management structure and changes into hiring of directors at all levels in contrast to former election of leaders.
2003	Reform of research council structure, resulting in two councils: Free research council and strategic research council.
2003	Initiatives regarding research communication, dissemination becoming the third leg at universities in addition to the traditional two: research and research based education.
2003	Plan for action: 'fra tanke til faktura'. Universities told to be more open and more adaptable to cooperation with private enterprises; economic orientation was presented as dominant in this relationship.
2004	Reform of law for governmental research institutions, bringing some of these into universities.
2005	Establishment of special funding for high technology (Højteknologifonden)
2005	Globalisation Council established with representatives from a broad spectrum of Danish society (and with participation of 5 ministries) discussing funding of public research and allocations to researchers education (Ph.D. schools) in the light of increasing globalisation.
2006	Government Strategies attached to report from The Globalisation Council, presented in the report: "Fremgang, Fornyelse og Tryghed", April 2006 Processes of Fusions among universities announced publicly March 2006
2007	Fusions among universities announced March 2006 to take place from January 2007. Result: reduction in number of universities (from 12 to 8) and integration of research institutes from ministries to universities, all but a few national centres became integrated in universities.
2008-09	Reforms of models for financing universities (indicator-based model) Among indicators are degree of external funding, cooperation with private enterprises and publication activities.
2009	Evaluations of research council structure and of university law, special issue "freedom" or lack of freedom among university researchers.

2.2. FINLAND

Commencing in the early 1990s Finland experienced a radical shift in government orientation from state-regulation towards a market-driven science, technology and innovation policy (STI). This process began earlier in Finland than in the other Nordic countries and was related to the ideological change from a welfare state to an internationally oriented competition state. The new orientation reflected an economic risk taking aiming at high positions in the global market. Government funds for research were increased by privatising state-owned companies and by using this money strategically. As a result the expenditure of R&D increased to more than 3 percent of GDP in 1999. In 2007, R&D was at 3.5 percent of GDP.

In 1998 the Finnish government comprised the Social Democrats, the Rightist Party, the Green League, the Left Alliance and the Swedish People's Party of Finland. This "rainbow government" was led by Prime Minister Lipponen (Social Democrats) who had commenced his first term of office after the electoral victory of Social Democrats in 1995. The same year Finland became a member of the EU. Lipponen's first government (1995–

1999) was followed upon his re-election by Lipponen II (1999–2003). During these years the Minister of Education came from the Rightist Party and from Social Democrats. Even though deep recession and high unemployment rates were the most demanding tasks at hand, these two governments strongly promoted technology and industrial policy.

Due to an early start towards the knowledge economy, most of the reforms during the study period are attempts at continuing the building of the knowledge economy in which the opening up of the market and competition, productivity, and new technologies are the basic elements. The Finnish policy-makers have had a strong trust in the ability of the competition state to act as a homogenizer of various policies. The government has also introduced ideas of policy integration to solve new cross-cutting global problems (energy, climate change). Within this framework universities have to be rejuvenated to fulfil the needs of a modern competition state and its aims of globalisation.

After the elections in 2003 the government was formed by the Centre party, the Social Democrats and Swedish People's Party of Finland. Matti Vanhanen (Centre Party) started his first term as prime minister (2003–2007). The Left Alliance, which had been left in opposition, directed criticism to the undermining of the welfare state, and which has been topical in the elections ever since. During Vanhanen I, the Minister of Education came from the Social Democrats. Vanhanen continued in office after the 2007 elections when the Centre Party and the National Coalition Party formed the government leaving the Social Democrats in the opposition. The Minister of Education came from the Rightist Party. The Lisbon strategy together with the issues of globalisation has become important aspect of policy.

In Finland the competition state has been strong in its economic orientation but much weaker in the promotion of the social dimension. There has been permanent tension between the economic and the social issues as well as between the public and the private sectors.[10] In order to solve the problem the governments have referred to the innovation system and introduced a broad concept of innovation. To serve government interests both economic and social innovations should be flexible. Flexibility is also mentioned as a means by which to meet the increasingly complicated elements of socio-economic progress. The current government has prepared a new strategy of innovation that also speaks of innovation policy from the viewpoint of productivity and competition. Similar tendencies can be seen in the efforts to reorganize academic and sectoral research institutions, the responsibilities of the key ministries, and the interaction between the knowledge producers, policy-makers and industry. As in the EU, the Finnish knowledge economy has been expanded to include services as the most growing sector of production. According to the studies on local and global aspects of this transformation (Pelkonen 2008) global problems also set demands for the development of national and regional needs.

The study period includes some policy events that are either directly addressed in the debate or appear in the background when certain themes are debated. Below is a short description on main policy events during 1998–2007.

1998 – 2001

Years between 1998 and 2001 cover a period of strengthening and centralizing the regional activities but also a downturn in the economy in 2001 which affected especially the ICT-sector. The Centre of Expertise Programme that had been established in 1994 was broadened in 1999 and it has been the main instrument to support regional innovation infrastructures striving for knowledge-based growth (Pelkonen 2008, 74–75). During this time the idea of a metropolitan area and urban regions with competitive locations for business gained momentum. The Regional Centre Programme was established in 2001 in attempt to establish regional network

[10] Häyrinen-Alestalo, Marja, Pelkonen, Antti, Teräväinen, Tuula & Villanen, Sampo (2005): Changing Governance for Innovation Policy Integration in Finland. In Remoe, Svend-Otto (ed.): *Governance of Innovation Systems: Volume 2: Case Studies in Innovation Policy*. Paris: OECD. pp. 111–138.

centres alongside the metropolitan area to secure balanced economic growth. As part of investing in knowledge Finland has been active in establishing programmes for the enhancement of knowledge. Most of these initiatives were launched during the study period (The Second National Information Society Strategy in 1998 and the National Information Society Programme in 2003). The Centre of Expertise Programme was established earlier in 1994 but broadened in 1999 and 2003.

2002–2004

After the poor economic outlook in 2001 globalisation issues became topical and changes were called for both in the private and public sectors. The role of services (particularly knowledge-intensive services) was emphasized as was collaboration between universities and companies. Universities in particular were supposed to assume a broader and more active role in the knowledge society (Science and Technology Council 2003, 18). At the same time speculations on the fragmentation of the university system intensified when a one-man committee published a review of the structure of university and polytechnic research (OPM 2004, 16) stating that the university system cannot be expanded anymore but more attention should be paid to the quality, content and impact of the system. Furthermore, the role of universities was addressed in a globalisation project initiated by Prime Minister Vanhanen who was concerned about the transition in global economy. One of the key actors within technology policy, Tekes (The Finnish Funding Agency for Technology and Innovation), has strengthened its role in other policy fields through technology programmes. There has been a change in the contents of the technology programmes, as business knowhow and service innovations are strongly promoted. During the last decade Tekes has stepped outside its traditional role as a technology developer since it has taken extensive initiatives in new fields such as health and social services.[11]

During the last few years the government has introduced a number of reforms and initiatives concerning education, technology and innovation policies, the reform of the university system, structural development of higher education, national innovation strategy and renewal of the sector research, to name just a few. Particularly, internationalisation and strengthening of the research and innovation funding has featured on the agenda. In 2005 the government decision on the structural development of the research system took place at the same time as the new university Act came into effect. The tendency has been to exploit the results of research and technological development more effectively. Additional pressure has been placed on the universities since the government Productivity Programme threatened to decrease personnel substantially. According to the guidelines of Science and Technology Policy Council (2006) the establishment of new Strategic Centres in Science, Technology and Innovation (STI) commenced. The centres are intended to enhance research cooperation between research units and business enterprises. The strategic centres have connections with the renewed Centre of Expertise Programme (2007) that emphasizes cluster competence and regional aspects. The latest change in is the renaming of the Science and Technology Policy Council. The new Research and Innovation Council began operating at the beginning of 2009.

[11] Tekes Annual Reviews 2005 and 2006.

Main events in Finnish science and technology policy 1998–2007	
1998	Amendment of the University law (Barcelona model introduced). The second national information society strategy is published
1999	Centre of Expertise Programme is broadened. In the period 1997–1999 the government grants the National Agency for Technology (Tekes) a significant amount of money, focus being especially on ICT.
2000	The Academy of Finland starts a Centres of Excellence Programme in Science (2000–2005) after the first Centres of Excellence had been introduced 1995–1999
2001	End of rapid growth period and a steep downturn in the economy. The Regional Centre Programme starts in attempt to establish regional network centres in areas of national importance
2002	Another Centres of Excellence Programme in Science by the Academy of Finland starts (2002–2007)
2003	General elections: Vanhanen I Government National Information Society Programme is published. Report "Knowledge, Innovation and Internationalisation" is published by the Science and Technology Policy Council
2004	Globalisation Report "Strengthening competence and openness – Finland in the Global Economy" by the Prime Minister's Office addresses the role of universities in the global economy. Speculations on the fragmentation of the university system intensify when a one-man committee publishes a review stating that the university system cannot be expanded anymore but more attention should be paid to the quality, content and impact of the system. The report "Internationalisation of Finnish Science and Technology" is published by the Science and Technology Policy Council. International Evaluation of the Academy of Finland
2005	Government makes a decision in principle on the structural development of the public research system and the University law is changed in order to shorten study times
2006	Innovation policy is highlighted and national strategy "Science, Technology, Innovation" is published by the Science and Technology policy Council. The Council also publishes a report on the establishment of Strategic Centres of Excellence in STI. The Centres are intended to enhance research cooperation between research units and business enterprises and have connections with the renewed Centre of Expertise Programme (2007) that emphasizes cluster competence. Academy of Finland and Tekes start a joint funding programme "FiDiPro – Finland Distinguished Professor Programme"
2007	General elections: Vanhanen II Government
2008	National Innovation Strategy is published
2009	New university Act comes into effect enabling private funding for universities and stipulating outside representatives in universities' boards. The new law alters the status of universities, making them legal entities. The number of universities is reduced from 20 to 16, including the establishment of Aalto University through a merger of three universities. Furthermore, Science and Technology policy Council is renamed as Research and Innovation Council

2.3. ICELAND

The Period 1998 to 2007 can be characterized as a period of change. Already before the end of the last century the former minister of Education, Science and Culture, Björn Bjarnason, laid the foundation for change that would take place by law in 2003, and entered into force in 2004.

Simultaneously a revision of the structure of higher education institution and public research institutions took place, resulting in a considerable number of mergers. In 2000 the national and city hospitals were merged into the University hospital, to be followed by mergers of sectoral research institutions and institutions in higher education and research.

The governance system of science, technology and innovation changed drastically in 2003 as a result of three laws endorsed in 2003. The laws were directed towards public support to scientific research, Science and Technology Policy Council and on public support for technological development and innovation in industry. The law on public support to scientific research stipulated a new role and organisation of the Icelandic Centre for Research (Rannis). When these laws entered into force, the former Research Council was terminated and the former office of the Council became a service organisation to the new system.

The Science and Technology Policy Council (SPTC) is headed by the Prime Minister of Iceland. Three other ministers have a permanent seat on the Council: The Minister of Education and Science, the Minister of Industry and Commerce and the Minister of Finance. At the discretion of the prime minister, two other ministers with research in their portfolio may join the Council. Currently these are the Minister of Fisheries and the Minister of Agriculture. Fourteen other members are appointed to the Council upon nominations by the Ministers with a research portfolio (6 nominations), parties to the Employers Association and Employees Union (4 nominations) and by the coordinating committee of higher education institutions (4 nominations).

The Science and Technology Policy Council have met on regular basis twice a year. The composition of the Council is to be considered well suited to meet the needs of STI society. Now politicians are actively taking part in STI policy-making. The Council publishes any resolutions after each of its meetings, issuing the main policies and emphasis.

The Council operates in three-year periods. Before each period the council publishes a policy document for the ensuing four years. The policies that have been published are for the periods 2003–6, 2006–9, and 2009–12.

In 2006 the Ministry of Education, Science and Culture embarked on a Foresight exercise to gain opinion of the science and technology community on future priorities. About 200 people took part in this exercise.

Traditionally, the financial support system for research and development together with innovation has been managed by research funds with a rather general and broad agenda. Through the period three Excellence programmes have been established.

The governance system of research, development and innovation in Iceland Evaluations has been submitted to evaluations, as have the research funds and excellence systems.

Events in the Icelandic science and technology policy 1998–2007	
1999	Rannis operates a new excellence programme on Information technology and Environment.
2000	Merger of the University Hospital system from a national and a city hospital into one hospital system.
2000	Icelandic delegation visits Finland in order to study the Finish STI governance system.
2003	Three bills for support of Science and technology and for innovation were passed by the Althingi in February 2003. - Law (2/2003) on the Science and Technology Policy Council - under the Office of the Prime Minister - Law (3/2003) on Public Support to Scientific Research - under the Ministry of Education, Science and Culture - Law (4/2003) on Public Support to Technology Development and Innovation in the Economy - under the Ministry of Industry and Commerce
2003	Establishment of the Science and Technology Policy Council (STPC).
2004	The Research fund is established as a merger of former Technology fund and Science fund. A new fund is established, the Technology Development fund. Both funds are managed by Rannis.
2004	An Excellence programme on Genetics and Nanotechnology was accepted by the Science and Technological Policy Council.
2005	The Science and Technology Policy Council publish a policy for the year 2006 to 2009 a Policy document were emphasis of the council are stated.
2005	OECD publishes a review of Icelandic innovation policy.
2006	The STPC starts a general Foresight exercise to determine the emphasis of the STI system.
2007	Evaluation of the performance of the STPC is published. The Council has reached most of the goals set in former policy documents.
2008	A new Excellence programme on Centres of Excellence and Clusters was under construction and would be in operation from 2009
2008	The STPC put together a draft for Science and Technology policy for the period 2009–2012.

2.4. NORWAY

Between 1998 and 2007 Norway had a minority centre–right government led by Prime Minister Kjell Magne Bondevik (Christian Democrats). The Minister for research was Jon Lilletun (Christian Democrats) who published a White Paper on research policy in spring 1999. After a 1½ year hiatus, when the Labour Party-based "Stoltenberg I"-government held office, a new minority centre–right government, "Bondevik II" was in power between 2001 and 2005. The Minister for research of the 2001–2005 government was Kristin Clemet (Conservative Party) who published the 2005 White Paper on research policy. After the general elections in 2005, a new centre–left majority coalition government headed by Jens Stoltenberg - hence "Stoltenberg II" - took office. Øystein Djupedal (Left Socialist Party) was its first research minister. He was replaced by his party fellow, Tora Aasland, in late 2007.

The beginning of the period covered by our study is also the last phase of a period spanning the larger part of the 1990s when there was moderate growth in public expenditure for research. This affected in particular the Research Council of Norway, established in 1993 through a fusion of the five former research councils. Contracting appropriations exacerbated governance and organisational conflicts paralysed the council during its first years, ending in early 1995 when both the Chair of the Board and the managing director were forced to resign. Controversies over the Council persisted through the first years of the period we analyse, leading up to the evaluation of the Council in 2000–2001 and its major reorganisation in 2003.

The reinvigorated council put a strong imprint on the White paper that was published in 1999. This document laid down the overall framework for research policy for most of the period covered by this study and was supported by all political parties in *the Storting*. The White Paper had the goal of raising overall national resources spent on R&D to be the highest priority of research policy: national R&D expenditure should rise to the "average level of the OECD countries", i.e. up from 1.7 percent to 2.2 percent of GDP. The target was reiterated and strengthened in the 2005 White Paper, in which the OECD target was replaced by the literal adaption of the Barcelona target.

As part of the policy for increasing public funding of research, a new Fund for Research and Innovation was established in 1999 as a mechanism to sustain stable growth in public funds for research through annual increases in the fund capital.

Both the 1999 and the 2005 White Papers expressed particularly strong concern over the low overall level of *private R&D investment* in Norway. This issue had been a top priority item on the research policy agenda since well before the start of the period of analysis, and remained a high priority issue throughout 1998–2007. Several committees were set up to review the issue and propose measures to increase private R&D expenditure during the latter part of the 1990s, including the so-called "Aakvåk-utvalget" (1995) and the "Hervig-utvalget" (2000). Based on proposal from the latter, the tax deduction scheme SkatteFUNN was introduced in 2002, as the first and only indirect R&D support scheme in Norwegian R&D policy. The scheme was controversial and underwent some redesign during its first couple of years in operation. A proposal in the 2005 White Paper to establish a new scheme to stimulate private donations for research was also endorsed by the Storting.

The 1998–2007 period was also one of extensive reorganisation of higher education institutions. A process already long underway gained speed and momentum with the reports from two commissions (the "Mjøs" and "Ryssdal" commissions), leading up to extensive reforms of higher education institutions under the heading of the "Quality Reform", by which higher education institutions acquired more institutional and financial autonomy, including freedom to establish new governance structures, (partial) separation of core funding of research and teaching – a new component of performance-based funding of research ("tellekantsystemet") – was introduced, and after a separate commission report a stipulation to protect academic freedom was– incorporated into the Higher Education Act.

The 1990s and early 2000s was also a period when the framework of "systems of innovation" was adopted and hesitantly implemented, making a strong imprint on the overall framing of research policy in both the 1999 and 2005 White Papers. The "IT Fornebu" case, the idea of a Norwegian ICT "Silicon Valley" on the location of the former Oslo airport, turned into a highly controversial case, straddling conventional party positions, which was debated in terms of enhancing Norwegian entrepreneurship and competitiveness within the emergent, increasingly globalised "new economy".

Issues of ethics, democracy and public understanding of science had emerged during the 1990s as an integral part the research policy agenda, triggered by controversial science and technology-related policy issues (GMOs, biopatent directive). An already strong research ethics system was strengthened, and the Norwegian Technology Board was established in 1998 as an institutional stronghold for lay technology assessment, and when concerns over declining interest and support of science and technology became pervasive. For a time research ethics became a particularly salient public issue with the infamous "Sudbø research fraud case" in 2006.

Main events in Norwegian research policy 1998 - 2007	
1998	The Norwegian Technology Board established
1999	The Aakvåg commission on R&D in industry
1999	White Paper on research ("Forskning ved et tidsskille"; "Research at a crossroad"); the "OECD target" introduced
1999	The Research and Innovation Fund established
2000	The Hervik-commission (NOU 2000:7 "Ny giv for nyskaping - vurdering av tiltak for økt FoU i næringslivet", "New start for innovation – assessment of measures to increase R&D in industry")
2000	The Mjøs commission on the reform of higher education institutions ("Frihet med ansvar. Om høgre utdanning og forskning i Norge"/"Autonomy with responsibility. On higher education and research in Norway")
2001	Evaluation of the Research Council of Norway
2001	General elections, the centre–right Bondevik II Government took office, with Jon Lilletun from the Christian Democrat Party as research minister
2001	Evaluation of the Research Council of Norway
2001	The Centres of Excellence scheme introduced (implemented 2002-2003)
2002	The tax deduction scheme for private R&D ("Skattefunn") established
2003	Reform of higher education institutions implemented ("Quality Reform")
2003	New funding system for higher education institutions introduced
2003	The Ryssdal Commission ("Ny lov om universiteter og høyskoler"/"New bill for higher education institutions"),
2003	Reorganisation of the Research Council of Norway
2005	New Bill for higher education institutions (on the basis of the process following the 2003 Ryssdal commission)
2005	White Paper on research ("Vilje til forskning", "Will to research"); 3% target introduced
2005	General elections, the centre-left Stoltenberg II Government took office, with Øystein Djupedal from the Left Socialist Party as research minister
2006	The Sudbø fraud case
2006	Committee report and amendment of the university law (2007) on academic freedom in higher education institutions
2006	Budget 2007, cuts in the core funding appropriations of higher education institutions ("hvileskjæret")
2007	Change of Research Minister, Tora Aasland, also from the Left Socialist Party, taking over
2009	White Paper on research ("Klima for forskning"/"Climate for research")

2.5. SWEDEN

The early years of the period being considered showed a large increase of students and higher education institutions. There was still a big expansion of the higher education and research sector. In the 1990s there was a rather confrontational climate between researchers and politicians. After the election in 1998, the general policy was to reach consensus and identify common interests in the research sector. However, when research training was reformed in 1998, it was controversial, especially among humanists and social scientists. The new doctoral education was to be more coherent, efficient and less time-consuming. In addition, the conditions for doctoral students were improved. In practice, this reform stopped admission of new doctoral students for years to come in some disciplines because of the rising costs involved. The expansion of the sector, and the

distribution of research money to a large number of institutions was debated around the turn of the millennium when university colleges in Karlstad, Växjö and Örebro were granted university status.

The early years of the 21st millennium also showed some heated debates on principles of funding and the organisation of research. The committee, Forskning 200,0 has been characterized as researchers striking back against politicians. The report argued that the state should safeguard academic freedom, promote basic research and secure more direct funding of universities. This obviously caused controversy with those actors in favour of applied research and the interaction between research and society. Also the creation of new state funding bodies was debated, including the foundation of Vetenskapsrådet (Swedish Research Council).

In 2005–2006 Swedish research policy made an interesting policy turn with more emphasis on quality, excellence and world-class. The minister of education declared that the expansion of the higher education system was over for this time and that now was time for quality. One effect of this was no more "elevation" of university colleges to university status. This development continued after the change of government in 2006. In fact, it was the former government which launched the so-called Resource Inquiry, whose task was to reform the Swedish research funding system. They presented their results in late 2007 "Resurser för kvalitet" (SOU 2007:81). In brief, they proposed a new cyclic ex-post evaluation system for both education and research. This new funding system has been debated ever since, above all the criteria used and the consequences for the Swedish research landscape in terms of institutions and research areas. Another committee proposed a new academic career system, "Karriär för kvalitet" (SOU 2007:98), inspired by the US tenure track system. The debate on the future landscape was fuelled by the recently appointed university chancellor, Anders Flodström, who suggested in an interview that five universities were enough for a small country like Sweden.

Main events in Swedish research policy 1998 - 2007	
1998	Research training reform
1998	Thomas Östros succeeds Carl Tham as Minister of Education
1998	Forskningspolitik (Research 2000) presented (SOU 1998:128)
1999	New promotion system for university teachers
1999	University colleges in Örebro, Karlstad and Växjö given full university status
1999	Government report DS 1999:68 To fund research and development "Att finansiera forskning och utveckling"
2000	Research bill Research for the future – a new organisation for research funding "Forskning för framtiden – en ny organisation för forskningsfinansiering" 1999/2000:81
2000	Research bill Research and Renewal "Forskning och förnyelse" 2000/01:3
2001	New organisation of state research funding bodies. The creation of Vetenskapsrådet, FAS, Formas and Vinnova
2004	Leif Pagrotsky succeeds Thomas Östros as Minister of Education
2004	Committee report "A New Doctoral Education" "En ny doktorsutbildning – kraftsamling för excellens och tillväxt" (SOU 2004:27)
2005	Research bill Research for a better life "Forskning för ett bättre liv" 2004/05:80
2005	University College of Mid Sweden (Mitthögskolan) gets full university status
2006	Government change, right wing liberal Fredrik Reinfeldt succeeds social democrat Göran Persson. Lars Leijonborg of the liberal party becomes minister of research and education.
2007	Committee proposed a new academic career system, Career for quality "Karriär för kvalitet" (SOU 2007:98)
2007	Committee proposed new funding system proposed in Resources for quality "Resurser för kvalitet" (SOU 2007:81)
2007	Higher education establishment boards election principles changed with the ambition to increase institutional autonomy. Academic staff could be elected chairman.
2007	The Institute for Studies of Work Life (Arbetslivsinstitutet) closed down.

3. THE PUBLIC DEBATE – WHO, WHAT, WHEN?

3.1. CHANGING TRENDS IN RESEARCH POLICY DEBATE 1998 - 2007

The notion that knowledge in general and research-based knowledge in particular are becoming increasingly important in modern societies sustains expectations that research issues are, in relative terms, on the move from the periphery to the centre of both the general political process and public debates in general media. Does our material support assumptions that this trend was effective in the Nordic countries during the period of our study?

To some extent, it does. We see an overall pattern where public debate on research policy increased during the ten year period covered. From Figure 1 we can conclude that while the extent of research policy debate remained relatively stable during the first half of the period, there was an overall increase in all countries except Iceland during the years between 2002 and 2006. The increase is uneven, and for all countries the number of articles varies widely from one year to the next. For Denmark and Finland, 2007 is a year when debate declined. In Sweden the debate peaked in 2004 and has generally declined each year since.

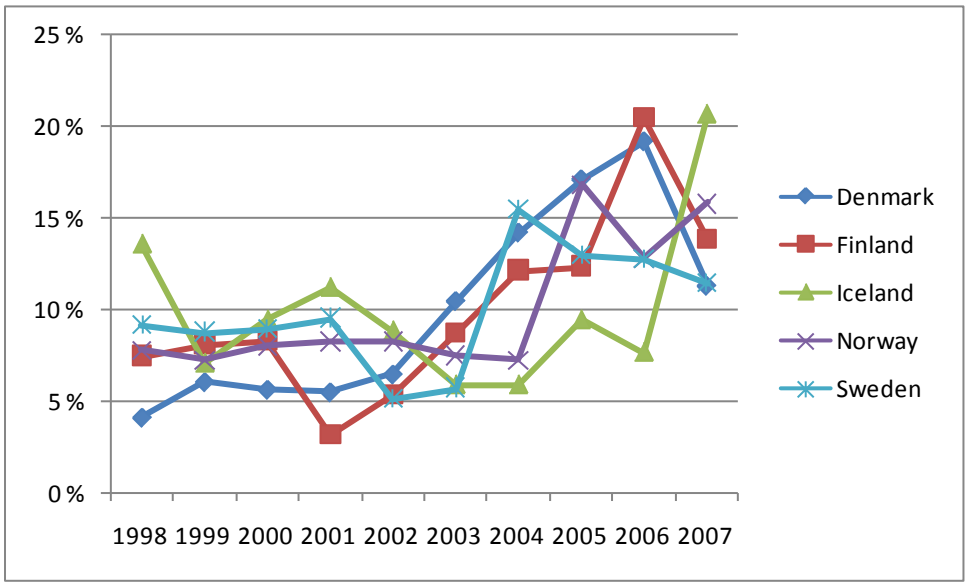

Figure 1: Articles in the PubDeb data set over the 10-year period 1998-2007. Percentages for each country (N=2263). For details refer to table A1 in the appendix

In the case of Denmark, the increase in public debate during the period from 2001 until 2006 may be seen as reflecting a number of political initiatives during that period which affected research, and especially the structure and management of research institutions. Contrarily, the drop in 2007 may reflect a situation where stakeholders were awaiting the restructuring of the research institutes that the political system had decided would take place as from 2007. At this time researchers at all levels were also expecting to benefit from the extra funding promised by the political agreement following the Globalisation Council's report in 2005.

The Finnish debate shows a steep decline in 2001. Finland's flourishing economy had come to a halt and experienced a downturn in 2001 after seven years of strong growth. There was confusion and concern about the future of national economy that had been for the most part ICT-driven. The inability of the ICT sector to hold its ground during unstable times got news coverage but did not show up in the public debate immediately. After the economic downturn the Finnish debate increased again, emphasizing ICT-based exports and other innovation opportunities. In the growing debate in the following years, innovation became a permanent

feature of the debate, and particularly after 2003. Parliamentary elections were also held in 2003 and three globalisation reports were published by the Prime Minister's Office in 2004 and 2006, focusing on the global economy and the role of education and research. The peak in the debate (2006) reflects the upswing in globalisation related issues, reflecting concerns about the incapacity of Finnish firms to develop products with commercial value.

In Iceland, the number of articles during the period was uneven but increased towards the end. In the early part of the period a discussion took place about a database with data on Icelandic population in field of health and genes. The database which the company deCode Genetics intended to establish in order to be able to be more efficient in identifying illnesses and find cures, was heavily debated. Ethical issues related to research and development in genetics were frequently the topic of articles. Research activities of universities and their capability to perform research were also debated. In the new century, the system of governance on science and technology was taken up in discussions. At that time a dialogue on small knowledge-based companies commenced and where the necessity for small firms to innovate was emphasized. In midst of the first decade of the new century, financing of research and innovation emerged as debate topics. Issues such as the structure of the governance system, ethics and university research were prominent. At the end of the period discussions were to a large extent about the opportunities for research and innovation.

As reflected in our material, the Norwegian public debate picks up momentum in 2004 and 2005 after a six year period when the number of debate articles remained fairly constant. This increase appears to be connected to the intensified lobbying and hearing process prior to the publication of the White Paper in 2005. Kristin Clemet, Minister of Research and Education in the centre–right Bondevik II government had initiated an extensive hearing process on research policy, including an open public invitation to all stakeholders to provide input to the White Paper. Interestingly, we do not see a similar peak in debate articles in 1998 and 1999 when the previous 1999 White Paper on research was prepared and published.

In Sweden, the number of articles per year increased during the period. It is however interesting to note that there was a lower number of articles during the years when the sector paper *Dagens Forskning* was published. The year 2004 was exceptional for a number of reasons. One was the proposal for a new doctoral training in Sweden. Another was that the funding levels were heavily debated. Yet another reason was the new communication policy represented by the minister of education, Thomas Östros. No former minster had been as active in the public debate as he had been. He not only used debate fora to launch new policies, but also responded to criticism when this arose.

3.2. WHICH VOICES WERE DOMINANT?

One of our research question raised in the introduction is whether public debate on research policy issues is changing in terms of who perceive themselves as affected by these issues, and are by that called upon to influence opinions and decisions. Traditionally, research has been a relatively small societal sector in most countries, and research policy may accordingly have been a relatively unique, sui generis, type of policy. Hence, to be able to understand and participate competently in the policy process and debate in this area, it seems necessary to have either extensive direct experience from research or specialised policy expertise related to this particular policy. However, research has grown fast within a relatively short period of time, and its economic, political and social impacts are often seen to have increased captured by terms such as "the knowledge society" and "a knowledge-based economy". By having become more strongly linked to technology and innovation, research and science have moved towards the centre stage of social and political processes. Some of the implication of these notions is that a wider range of social groups becomes directly and indirectly involved in research, that values and options at stake in research policy issues affect a wider range of groups than those immediately affected in terms of, for example, access to resources, conditions of work and so forth. Thus, the *sui generis* character of research policy may be diminishing. Are these assumptions and hypotheses supported by our material on who participated actively in the research policy debate during the 10 year period

in question? While a shift towards more lay or civic participation may – or may not – have taken place, the role of the "usual suspects" – immediate stakeholders in academia, industry and research institutions, as well as actors directly responsible for policy development and implementation in research ministries and agencies – will inevitably remain dominant. However, information about characteristics of and changes in the roles and relative levels of activity of these immediate stakeholders will also provide a significant indication of the kind of public debate on research, science and technology that took place in the Nordic countries during these years.

Our material was coded to provide information about these aspects of the debate. Relevant information may be extracted from the coding of types of article and, in particular, from information about the actors in the debate article.

3.2.1. EDITORIAL AND PUBLIC CONTRIBUTIONS

We obtain an initial idea about the relative activity level of different groups of participants by looking at the distribution of *types* of units. In Figure 2 these are grouped into two main categories: editorial versus public contributions. Editorial contributions encompass editorials, interviews and editorial comment/analysis, while the major types of public contributions are opinions, column comments and letters to the editor.

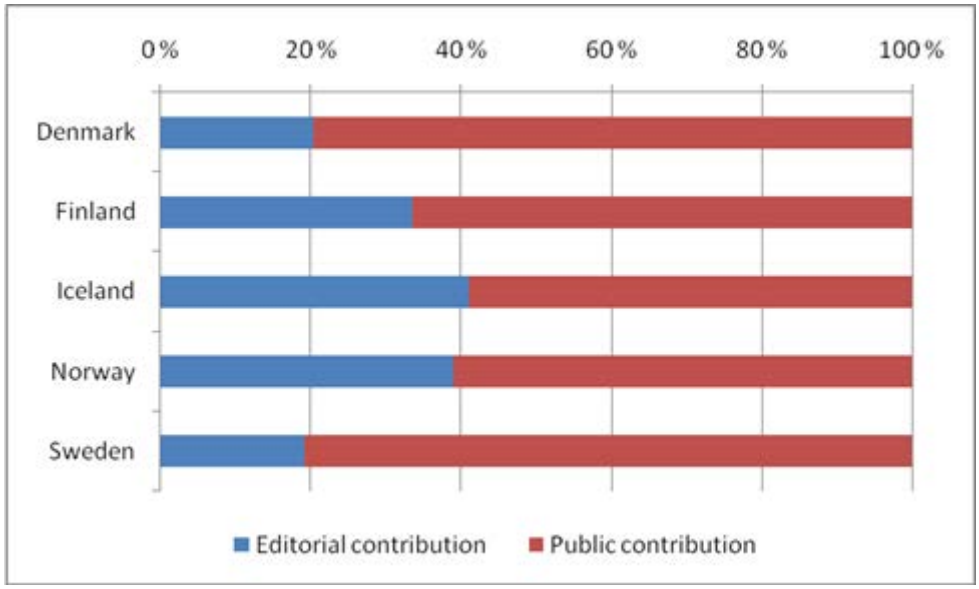

Figure 2 Editorial versus public contribution to the research policy debate in the Nordic countries. Percentages (N=2287)[12]

From Figure 2 we see that the public contribution prevails in all Nordic countries, particularly in Sweden and Denmark.

Public contributions to research policy debates provide an indication of public interest and different views on these policies which, along with main policy initiatives of the key actors, may trigger editorial contributions. The prevalence of the public contribution, however, is noteworthy, since in most Nordic countries research policy issues generally have a relatively low priority in the daily press news coverage. Research policy issues in general are often regarded as a rather esoteric policy field by journalists as well as by the general public. We return below to the issue of which actors take part in the public debate on research policy issues. First, a few supplementary comments to figure 2 on the national scene are needed.

In the Danish and Norwegian material, 'column comments' along with 'opinions' (often written by established research policy actors including highly-reputed researchers) account for 75 and 60 percent respectively of all

[12] Figure 2 is based on data from table A2 combining the respective article categories of editorial versus public contribution.

debate articles. In Sweden, 'opinions' account for close to 75 percent alone, while in Finland and Iceland 'letters to the editor' account for 38 and 59 percent respectively of the debate articles during the ten year period. Concerning editorial contributions, the national shares of 'editorials' are modest, except for Finland where this genre accounts for 25 percent of the total number of articles. It is also noteworthy that 'editorial comments/analysis' make up one third of the total number of the articles in Iceland.

One characteristic of the Swedish debate is also that there are some very active journalists. *Dagens Nyheter* in particular has a number of experienced writers in the field. The picture of a particularly high proportion of public contributions in the Danish debate partly reflects the high number of leaders of universities, associations of higher education institutions and of academic organisations who were active in the debate.

The Finnish debate shows similar tendencies as the other countries' debates, since there are also more public contributions than editorial contributions. Contrary to Sweden, Finland does not have a large number of journalists who write on science and technology policy. Some journalists do focus on university issues but nevertheless, there are not many science journalists who could attend to the issues of policy development. Therefore, many of the public contributors in the debate represent research institutions or are individual researchers.

3.2.2. MAIN ACTORS – THE AUTHORS

We acquire additional information on the relative importance of the different groups in the debate on the basis of information on the authors of the units/articles. Actors explicitly linked to the articles include both what we call main actors, i.e., the authors of the articles, but also referred actors (see section 3.2.4. below). Authors were coded by name and actor group. The actor group variables consisted of twenty categories (see Appendix 2) which in the following figures are merged into seven categories.

The relative distribution of the main actor groups in the material is seen in Figure 3.[13]

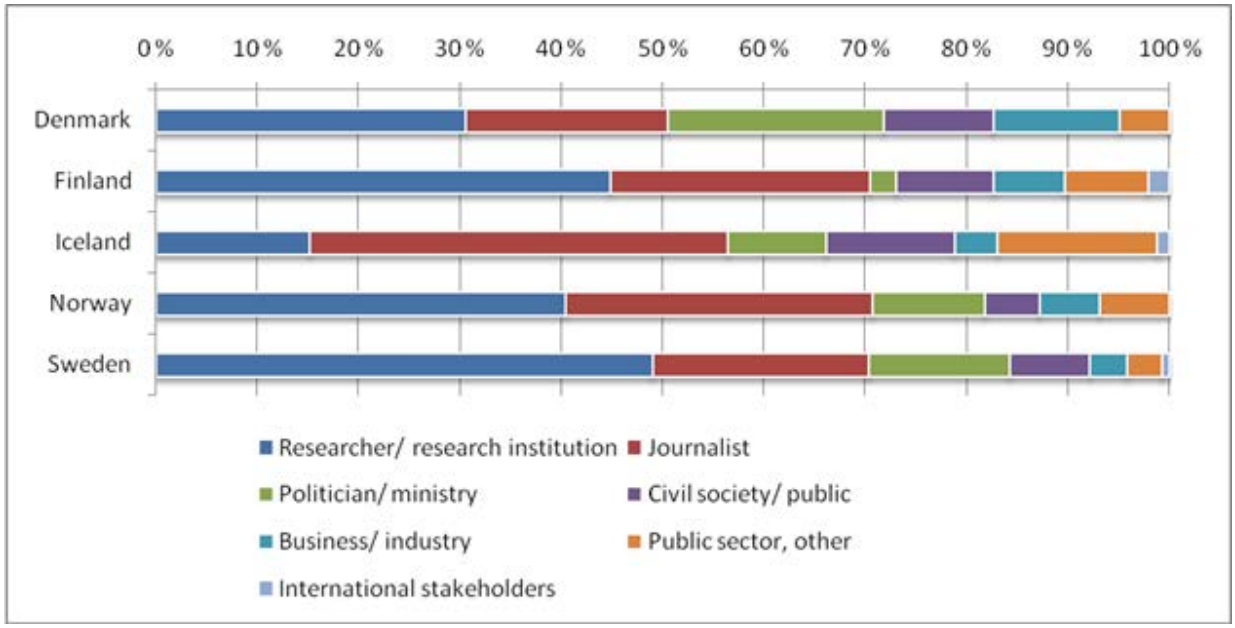

Figure 3 Groups of main actors (authors) of articles. Percent (N=2210)

[13] The category "Public sector, other" category includes representatives of research policy agencies as well as civil servant of administrative bodies on state, regional or local level. In the category "civil society/public" we find private citizens as well as representatives of organized interests outside the research community.

We see that researchers and research institutions combined are the dominant group of authors in all countries except Iceland where journalists are by far the most dominant group, and researchers/research institutions are a relatively minor author group. This could reflect the fact that press releases or text by researchers or their institutions are often processed by journalists. A large number of items by journalists in the Icelandic material refer explicitly to a specific researcher or research institution. The dominant role of researchers is particularly strong in Sweden. In all other countries except Iceland, journalists are the second largest actor group. However, the relative weight of both these two and the other groups varies considerably between the countries. The presence of civil society is relatively marginal in all countries, the least so in Iceland, and does not provide clear support for assumptions that a general shift is taking place in terms of participation in research policy debate from immediate stakeholders to wider social groups.

Denmark and Finland represent opposite extremes in terms of level of activity of politicians and representatives of the ministries. In Denmark this group is more active than in any other country. Here politicians from the government or opposition are authors of approximately a quarter of all articles. The low relative presence in Finland of authors from politics and ministries is striking. The minister/ministry of research seems to play, in relative terms, a more anonymous role in Finland than elsewhere. Representatives from the ministry do take some stand in debates, but normally only in reaction to a specific debate or criticism directed at the ministry itself. Representatives of management of research institutions, on the other hand, play a particularly salient role in the public debate in Finland. The reason for this is the different way of bringing policy issues into public. Contrary to Denmark, it is not common in Finland for ministers to take science policy issues into the public debate . Usually the government organizes meetings or briefings with the press, giving statements on policy issues at hand. Additionally, the respective ministers take part in seminars where they give speeches and make comments. Therefore the press usually cites governments or ministers in the news sections, which means less discussion in the debate sections. Occasionally, though, some issues become so controversial that they spark off a public debate as well.

We also note a sizable variation in the participation in the debate of actors from business/industry, where Danish business/industry plays a more prominent role than the counterparts in other Nordic countries. The participants in the debate were generally attached to some kind of organisation. Interest groups accounted for 17 percent, while researchers and journalists each were behind approximately 20 percent. In addition to individual researchers their organisations was behind another 11 percent. Very few units of analysis were written by somebody not formally affiliated to some kind of organisation (i.e. the categories mentioned above). Citizens, here defined as somebody not being referred to in another capacity, were very few in 1998, but their input increased over the years to close to 10 percent.

Before turning to the variation of actor-group dominance over time, we take a brief look at the gender of the authors. The gender of the authors was classified when this was possible, based on the first name of the author(s). The third category “both genders” was used only when the debate article was authored by both a male and a female. Figure 4 indicates that male authors are the dominant in all countries, and particularly so in Norway and Finland. 74 percent of all coded debate articles during the ten year period were authored by men only. However, within a qualitative point of view some female authors emerge as having played a more prominent role in national debates than what is indicated by this quantitative picture.

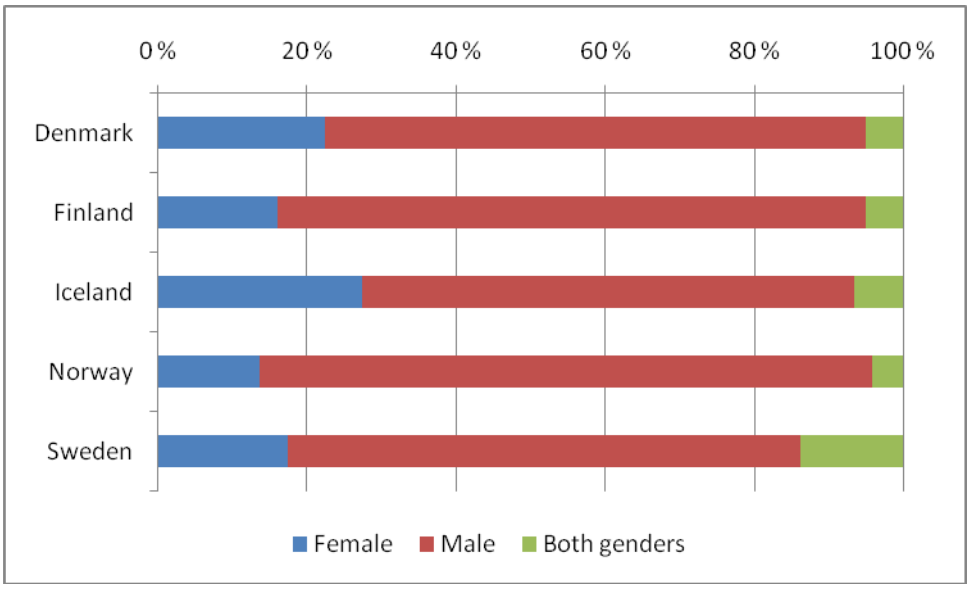

Figure 4 Gender of main actors (first authors) of articles. Percentage (N=2024)

Only in Denmark, and especially Iceland, are more than 20 percent of articles authored by women. Among the prominent female actors in the Danish debate we find ministers in the early period, and during the whole period party spokes-"men", professors and the head of research policy at the association of Danish Industries, Charlotte Rønhoff, who in most of her statements promoted more extensive cooperation among universities and industry.

In the Norwegian case, two of the ministers of research from 1998 through 2007 are women, and Kristin Clemet especially engaged extensively in the public debate on research policy. Also a female journalist in *Aftenposten* made frequent comments on the research policy issues during the period analysed.

3.2.3. DID THE RELATIVE PARTICIPATION OF MAIN ACTOR GROUPS CHANGE DURING THE PERIOD?

The analysis above provides an aggregate picture of the relative role of actors (authors) for the ten-year period as a whole. It does not indicate whether any significant changes took place during the period. Figures 4.1 through 4.5 depict annual variations in the number of articles for each country from the six most prevalent groups of authors. They cover the same actors as shown in Figure 3, with the smallest international stakeholders excluded.

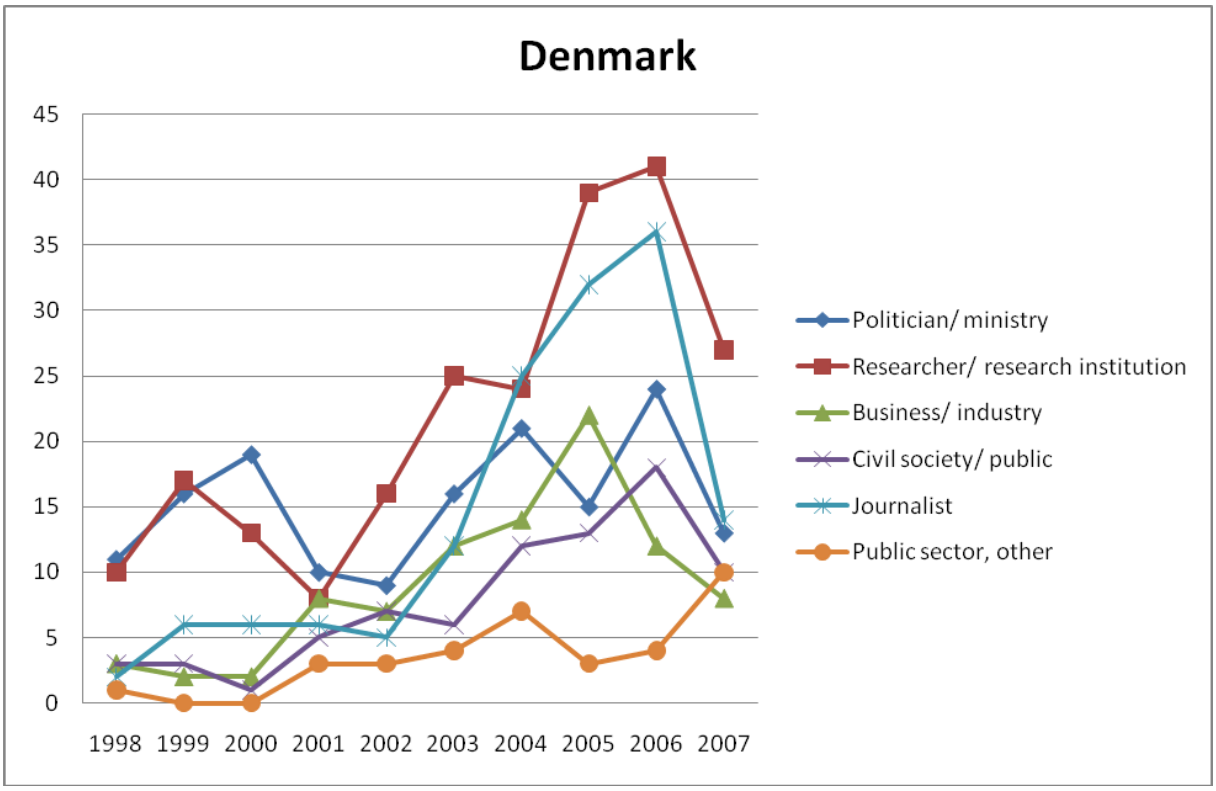

Figure 4.1 Timeline for main actors (authors) in Denmark. Count (N=722)

All Danish actors increased their activities in the period from 2001 to 2006, whereas all the large categories reduce their input to the debate in 2007: only the public sector groups show some increase in 2007. Researchers and politicians were active also before 2001, especially in 1999 and politicians continued with close to 20 articles etc., in 2000.

Among researchers, associate professor Claus Emmeche from Copenhagen University has been remarkably active. During the end of the period, using the web, Claus Emmeche collected more than 5000 signatures in protest against the activities initiated by the Minister of Science, the risk of totally losing academic researchers' freedom was the hot topic, also illustrated by articles treated in the newspapers and especially treated in *Forskerforum*, the conflict-oriented magazine produced for researchers.

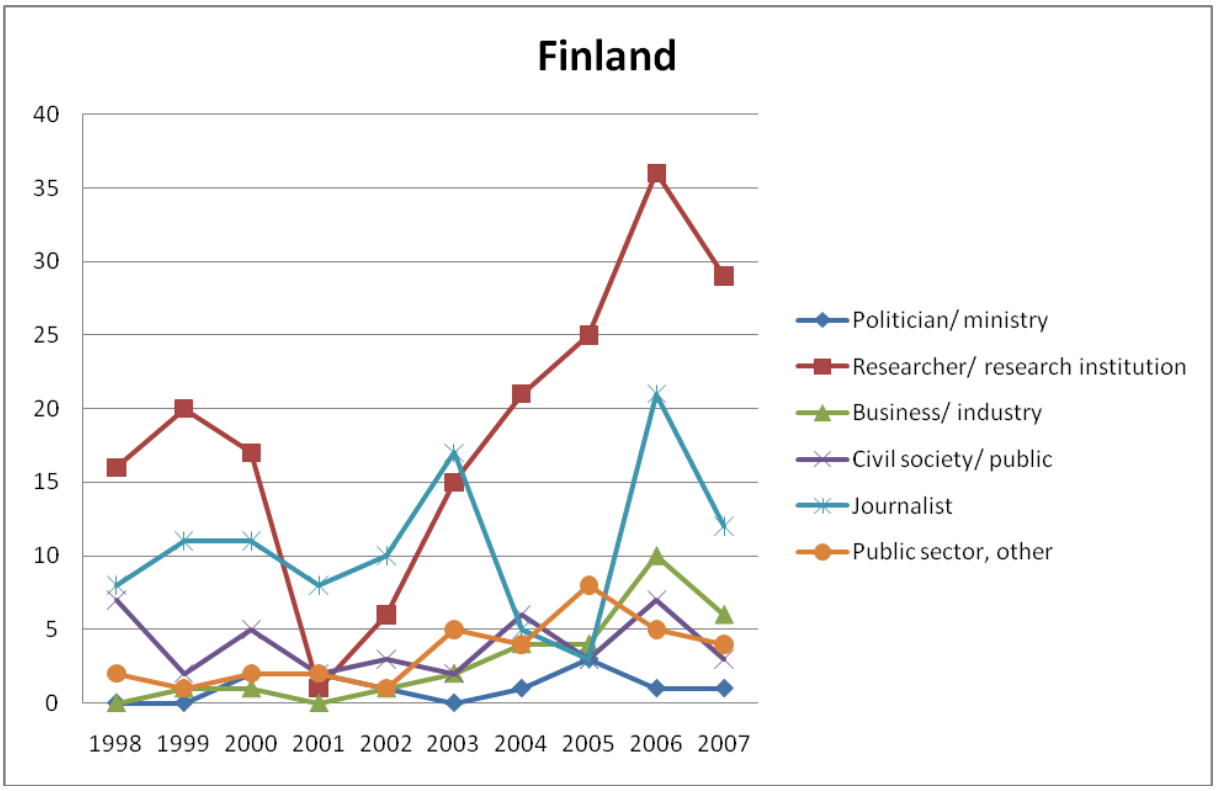

Figure 4.2 Timeline for main actors (authors) in Finland. Count (N=415)

In the Finnish debate individual researchers and representatives of research institutions dominate the debate throughout the period, even though there is a drop in researcher-initiated debate in 2001, which was a quiet year in the overall debate. Journalist initiatives also declined during 2003 and 2005, even though those years included issues that received particular attention among researchers and other debaters. These issues include the intensified globalisation debate and innovation related issues. One noteworthy feature of the Finnish debate is the low level of participation by persons at the political and ministerial levels. While ministers and politicians take a relatively active part in the debate in other countries, the picture is strikingly different in Finland. This may reflect different political cultures and also indicate that the ministries and ministers in Finland do not see it as their role to become engaged in public debate.

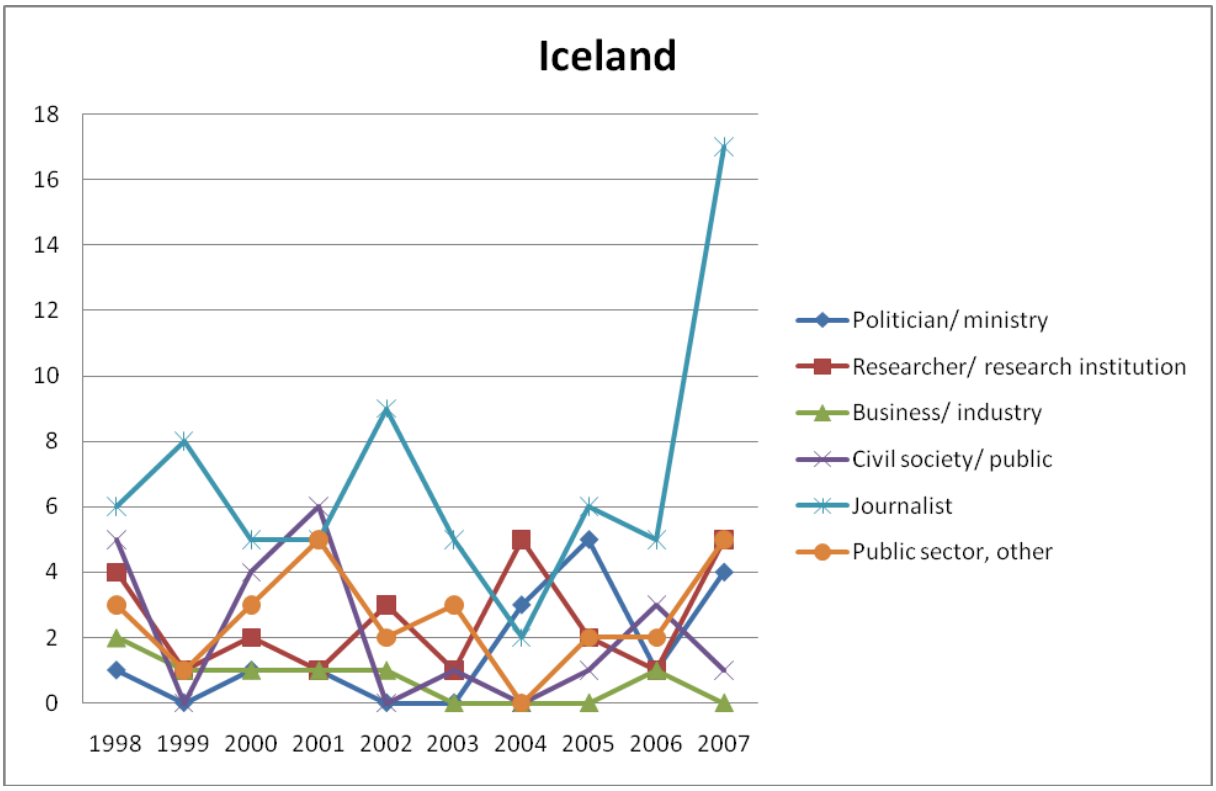

Figure 4.3 Timeline for main actors (authors) in Iceland. Count (N=165)

The relatively small number of articles in Iceland limits the scope of analyses of the frequency of articles from main authors. It is evident that journalists are the most active group with a large increase at the end of the period. The topic of Research and Development and innovation gained ground in the debate towards the end of the period, at least by professional writers. Other groups appear to be quite stable, taking into account the small number of articles.

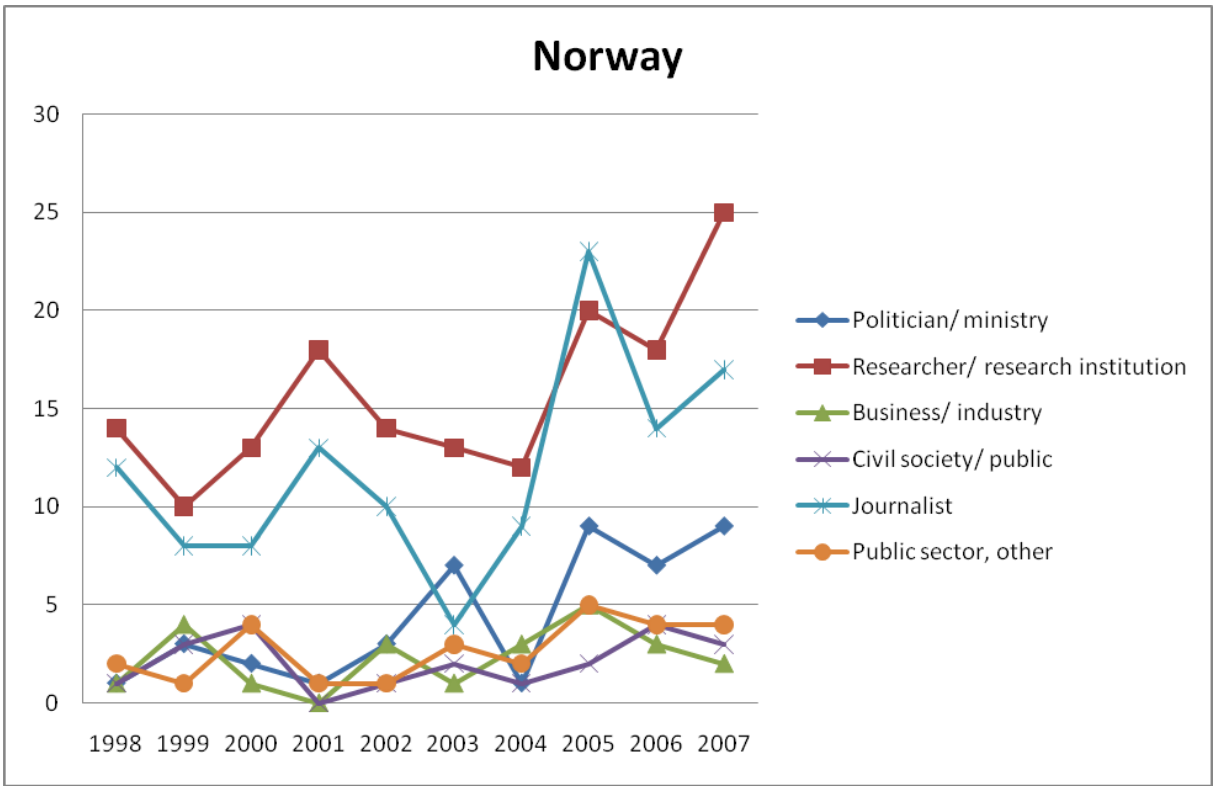

Figure 4.4 Timeline for main actors (authors) in Norway. Count (N=389)

Individual researchers and journalists are the dominant groups in Norwegian debate throughout the period, except for the low activity of journalists in 2003. The peaks on the two curves for researchers/research institutions and journalists coincide with three events. The publication and policy conclusions drawn from the international evaluation of the RCN in 2001, the preparations and publication of the white paper on research in 2006 and the turbulence following the cuts in appropriations for the higher education institutions in the budget for 2007 leading to the eventual resignation of the Minister of Research (Djupedal) in late 2007. It is noteworthy that the 1999 White Paper was not accompanied by an increase in the activity level of any group similar to that associated with the White Paper in 2005. In the latter case, politicians/ministries also take part somewhat more frequently in the public debate. Three particularly active authors of debate articles during the 10-year period stand out, representing different main groups of actors: Kristin Clemet who was active throughout the period, first as Director in The NHO - Confederation of Norwegian Enterprise, later as Minister of Research from October 2001 through 2005; one senior journalist/commentator in *Dagens Næringsliv* (Stein Hauglid) wrote many commentary articles exposing – as one of very few voices in the debate – the inappropriateness of the official growth targets, and one highly outspoken, prominent medical researcher (Per Brandtzæg), who challenged in particular the government's (university) research funding policies in a large number of articles throughout the whole ten-year period.

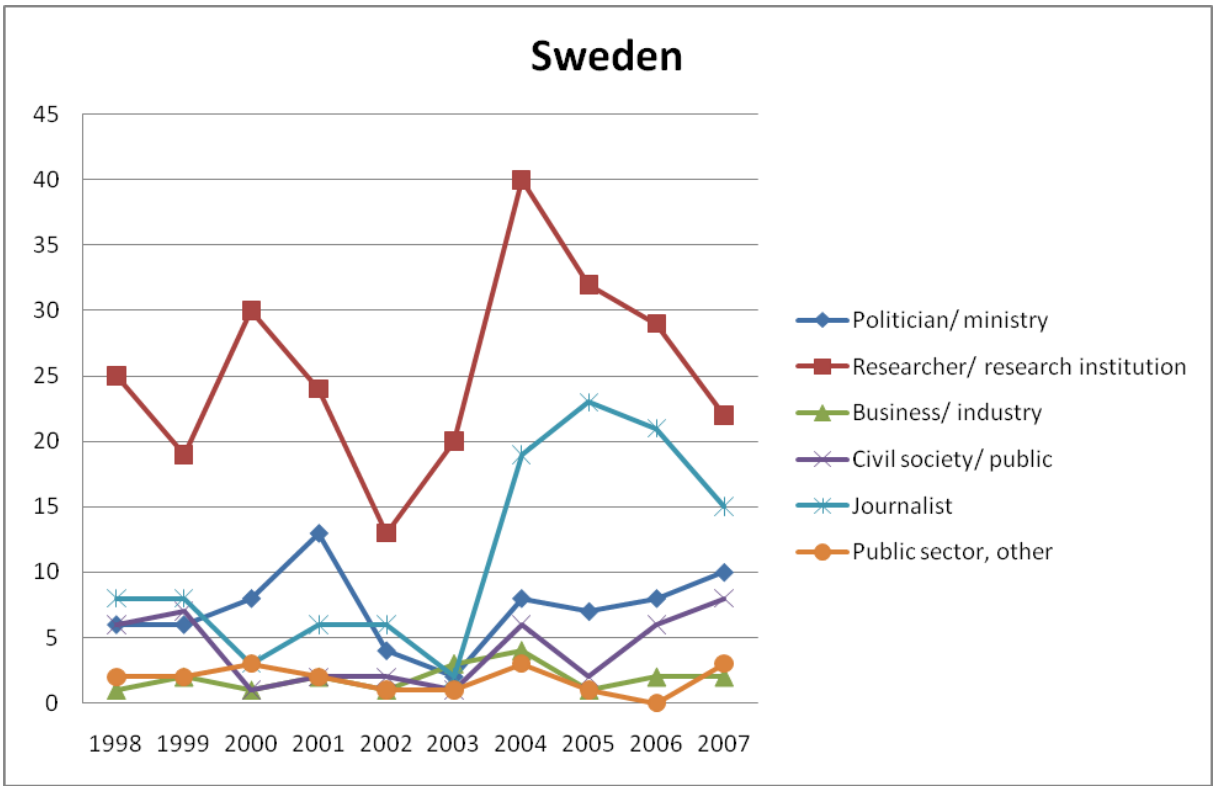

Figure 4.5 Timeline for main actors (authors) in Sweden. Count (N=519)

Over the ten-year period, researchers and journalists dominated the Swedish debate. However, politicians have also become increasingly active. Some of the milestones identified above stand out in the figure. The debate in 2003–2004 on funding levels and calls for more core research funding to higher education institutions contributed to the high numbers of articles those years. When the delayed research bill *Forskning för ett bättre liv* was finally presented in 2005 the number of articles decreased quite dramatically.

3.2.4. Setting the agenda – who, what, how?

The distribution of main authors of statements in the debate as seen in sections 3.2.1–3.2.3 above provides a first input to the relative activity levels and influence of social groups involved in the debate. While information on authors of statement is also in itself a component of the agenda-setting picture, being a main author does not always necessarily imply that the author also sets, or has set the agenda and conversely, it is possible to have an active role in setting the agenda without also taking a part in the debate as main author.

To be able to provide a more comprehensive picture of agenda-setting and influence, we also coded each article by *what caused the article to be written*. This variable classifies three main features of agendas setting in the national research policy debate. The category 'Policy initiative', which includes four subcategories: (1) A law, a bill, an executive order and similar (national level), (2) Appropriations of financial resources for research (national level), (3) Some other statement/initiative from national politicians as well as (4) Statement/initiative by EU (any form). 'Previous discussion' indicates that an article only refers to previous discussion. The residual category 'Other causes' (not in the figure) includes other references such as committee reports or statements/ initiative from interest group(s).

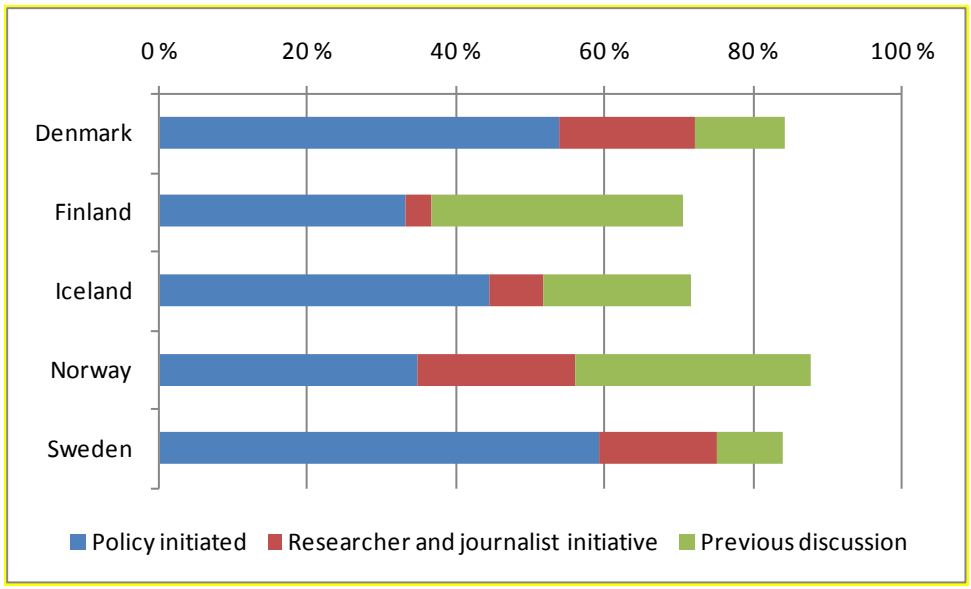

Figure 5 – Policy initiated agenda setting – policy actor initiated debate versus researcher/journalist initiated. Percentage (N=1904) The category 'previous discussion' is also included here.[14]

Figure 5 indicates a fairly broad variation among the countries in terms of actors who had initiated the debate. Sweden and Denmark display a higher degree of policy initiation (through a law, a bill, an executive order or appropriations of financial resources) compared to other Nordic countries. At the same time, the amount of researcher and journalist-initiated debate is lowest in Iceland and Finland. The third category 'previous discussion' refers to an opinion stated as continuation of previous statements by various actors. The picture of agenda-setting in the Finnish debate is more mixed, as there were no clear indications of reactions to political initiatives similar to those found for Denmark or Sweden, even though the articles reflected issues related to political agendas. Compared to the other four countries, the large number of references to previous discussions is characteristic to the Finnish debate as certain themes seem to appear with no visible association with policy initiatives. However, these debates often include references to issues that can be traced back to political agendas.

Figure 6 provides a more detailed picture of what initiated debate each of the years during the period.

[14] The less interesting category 'Something else' (accounting for about 25 percent of the total number of articles coded on this variable both in Finland and Iceland) is omitted here. Also omitted in the figure is the category 'Statement/initiative from EU' (at the most accounting for less than 6 percent in Denmark).

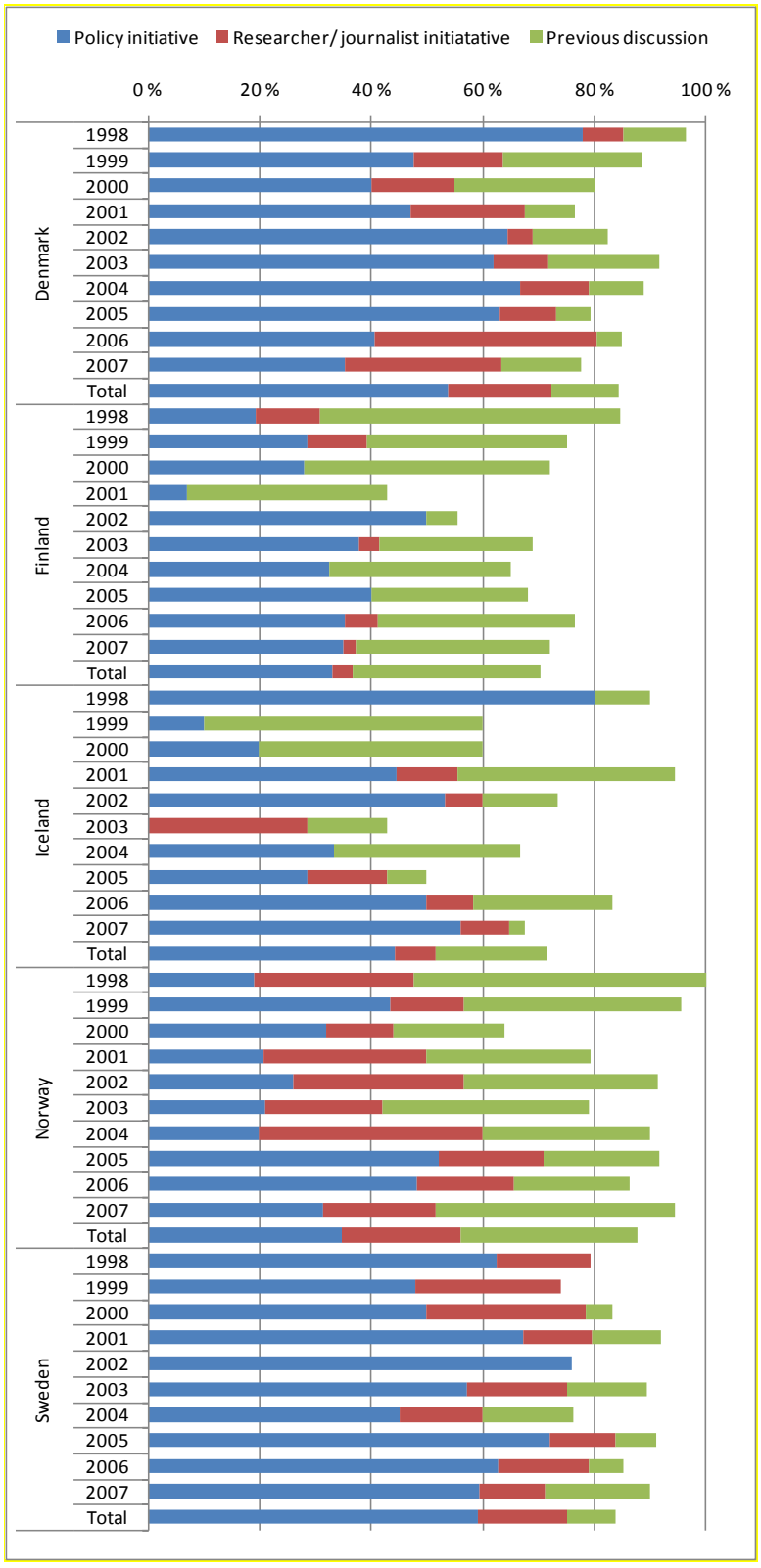

Figure 6 National timelines for policy initiated agenda setting versus researcher/journalist initiated. Percentage (N=1904)[15]

[15] The categories 'Something else' and 'Statement/initiative from EU' are omitted, se footnote 14.

The figure shows a picture of widely diverging national patterns, where the variation in the activities of journalists – or lack thereof – stands out. It again confirms the picture that the debates in Denmark and Sweden were driven by political initiative.

The picture of agenda-setting in the Finnish debate is a mixed one, since there were no direct reactions to political initiatives as in Denmark or Sweden. In 2002 and 2003 initiatives from the Ministry of Education and the Science and Technology Policy Council attracted attention in the debate. A committee appointed by the Ministry of Education published a Memorandum of the Regional Development of Higher Education at the end of 2001, triggering debate in 2002. Later, in 2005, the new University Act was debated, putting issues such as research careers, new payroll system in universities and the Government's Productivity Programme in the headlines.

For Norway, we see that some of the years with a high prevalence of policy-initiated debate (1999, 2005) were those years when White Papers were published.

An additional aspect to the picture of agenda-setting and influence may be provided on the basis of information about *referred actors* in the articles. By coding information in the articles about actors who are *referred to*, we may capture an additional venue for or dimension of agenda-setting. A referred actor in a debate article is *not* the author, but the person (representative of an institution) referred to by the author(s) in the article.

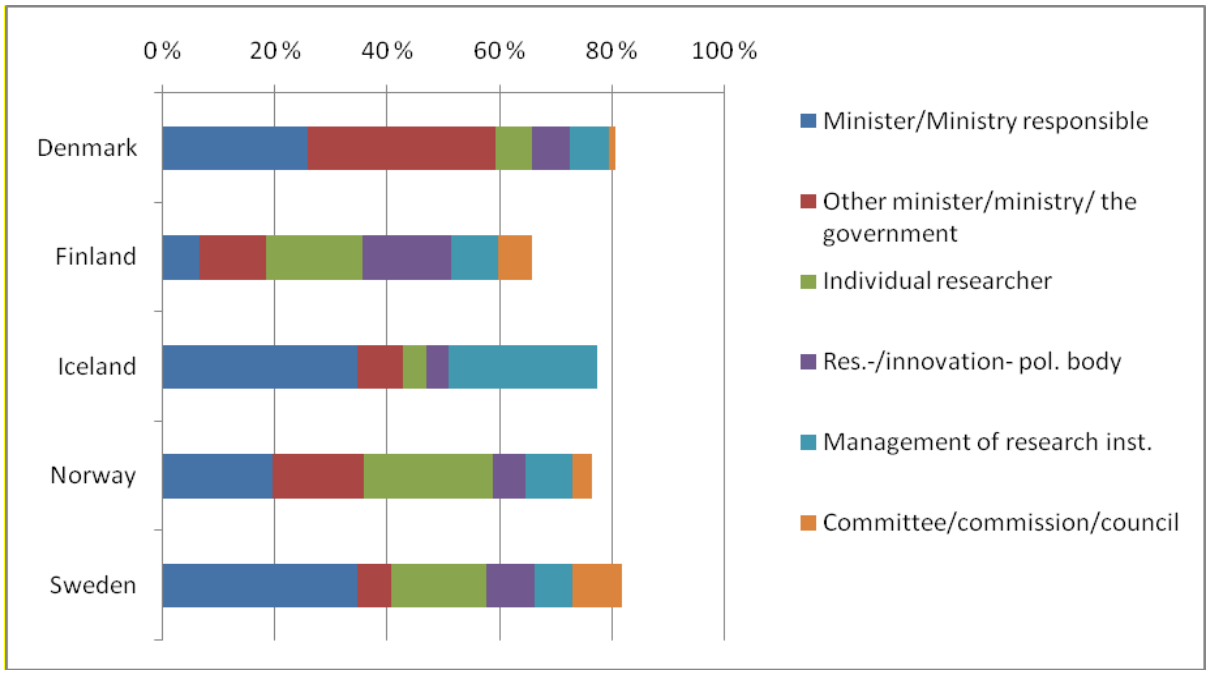

Figure 7 Referred actors (first referred actor) – the six most prevalent categories (of type 1) Percentage (N=1613)[16]

We see from Figure 7 that while the politician/ministry group had a relatively minor role as authors, the minister/Ministry of Research and other ministries taken together are by far the largest referred actor groups in all countries except Finland. Within this group, other ministers or ministries are more frequently referred to than the research minister/ministry in the debate in Denmark and Finland. In Iceland managers of research

[16] Out of the total 20 categories of referred actors identified, only the six most prevalent ones are represented in the figure, accounting for a total of 60 to over 80 percent of the registered actors in each country. Omitted in the figure is the category Representatives of the EU, which accounts for a total number of 6 percent of the total number of the Finnish articles coded on this variable. All categories of referred actors that account for 4 percent or more of the total share of the referred actors in the Nordic countries combined are represented.

institution are an actor group that is referred to much more frequently than in the other countries. In Sweden, state initiated committees/inquiries are relatively frequently referred to compared to the other Nordic countries. The debate has, in comparison, involved other ministers to a lesser extent, e.g. the prime minister, which has indeed been interpreted as research being down-prioritised by the government. In fact, one of the frequent critical remarks was that research should be higher on the political agenda. One of the reasons why the minister/Ministry for Research is a particularly small referred actor group in Finland is that the Finnish debate revolves around technology and innovation policy more often than research policy as such. Therefore, there are fewer references to the Ministry of Education, but more references to research and innovation political bodies that often include the technology and innovation political actors. There are also more references to the government than to the Ministry of Education. For Norway, as in the other countries, ministers/ministries is the most frequently referred actor, and other ministers/ministries are nearly as frequently referred to as the research minister. The prevalence of ministers/ministries pattern is particularly salient starting in 2004. Prior to this, references were given to the other types of actors almost as frequently as for ministers/ministries or for individual researchers.

Neither managers of research institutes, business people nor individual researchers are often referred to in Danish debates. This stands in some contrast to the quite active role that in particular managers of research institutions, as well as commissions and committees play as main authors.

3.2.5. WHO DISAGREES WITH WHOM?

Apart from the actor – referred actor relationship, we specifically coded explicit disagreements reflected in the articles between different groups of actors in a final set of variables of conflict. We registered conflicts between researchers and politicians, disagreements between researchers, disagreements between researchers and the business sector, between politicians and the business sector as well as conflicts among groups of citizens about research, and finally other conflicts of interest including the problems of incapacity. The main results of these dimensions of disagreements in the research policy debate are shown in Figure 8.

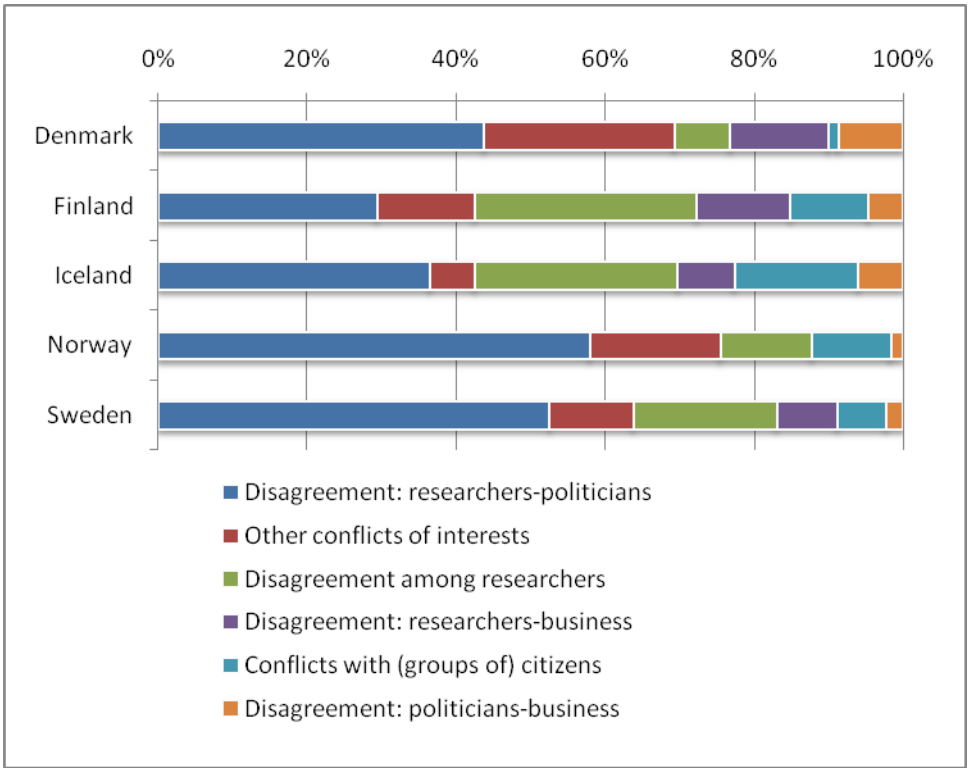

Figure 8 Conflicts by country (N=960)

Overall, we find that disagreements among researchers and politicians are by far the most common in all the Nordic countries. However, we find a higher level of disagreement among researchers in Finland and Iceland and more disagreements between politicians and researchers in Denmark, Norway and Sweden.

The themes and issues dominating the Danish debate about research policy during the period 1998 – 2007 are centreed round political initiatives, and both quantitative and qualitative information indicate that researchers increasingly respond critically to political initiatives. Conflicts are growing as an issue over the years, and the issue of freedom for researchers is the only one growing in number during the whole period in Denmark.

The interesting result from this comparison is that disagreements among researchers are rare in Danish debate compared to Iceland, Finland and Sweden. Iceland is also deviant in this comparison by the presence of more conflicts which concern disagreements that involve groups of citizens. The lively debate on the health database of the biotechnology company deCode Genetics triggered a rush of statements by individuals who were either strongly for or against the database.

Disagreements that gained attention in the Finnish debate usually questioned the reasoning behind science political decisions. Politicians were accused of making wrong decisions that would hamper research or the discipline in question. Issues that were seen mostly controversial touched the sensitive issue of regionalization of universities. Recently, the university mergers and reorganisations have also caused disagreements. Depending on the issue, the government is accused of short-sighted science policy and there have been speculation that Finland's competitiveness will suffer due to regional politicking. On the other hand, some claim that Finland has been too eager to centralize research and universities to Southern Finland.

Disagreements between researchers and politicians are by far the most frequent type of conflict in Norwegian debate. The majority of statements that fall under this category are, predictably, by researchers complaining about insufficient budget appropriations, and about politicians (generally the research minister) failing commitments to the growth target(s). Other forms of conflict are not frequent in the Norwegian material. In qualitative terms, disagreements between business and academic perspectives were implicitly and explicitly present in numerous editorial comments in the business newspaper *Dagens Nyheter*, critically commenting upon the "inappropriate" growth target, and unjustified "whimpering" of researchers about poverty in (academic) research. Some lone, but salient academic voices also went against the general current of academic positions in the debate. Conflicts involving citizens were virtually absent, unless under this category one includes conflicts over the structure of the Norwegian Technology Board in the early part of our period where the citizens' voice was represented by persons institutionally affiliated with the research ethics system.

3.2.6. VALUES AT STAKE

Debate articles in the press will normally include normative stands on policy issues. Is this also the case for debate articles on research policy? In order to study this issue, we mapped the extent to which four specific value dimensions were present as part of the argument of the statement. Each value dimension was coded 'not applicable' unless a positive, a neutral and/or negative value was found to be explicitly present (for each dimension separately) as part of an argument for research as a means to achieve these values/goals. The value dimensions coded were:

- *'knowledge society*' which targeted this term (or applied national synonyms), focusing *the contribution of research to the volume of knowledge in a society*;
- *'economic growth'* which targeted this term (or applied national synonyms), focusing *the contribution of research to the increase in total GNP or GNP per capita;*
- '*welfare'* which targeted this term (or applied national synonyms) focusing *the contribution of research to the quality of life and needs of individuals;*

- '*environment/ sustainable growth'* which targeted these combined terms (or applied national synonyms) *focusing the contribution of research to a better environment.*

The context for the Nordic research policy debate during this decade was arguably characterized by a growing awareness of the role of knowledge in the economy and in society more generally ("the knowledge society"). This awareness could, however, be embedded and implicit in the statement, without surfacing in a large number of explicit references to these terms/concepts in the public debate. Our material thus indicates whether and to what extent attitudes on these value dimensions of research policy are explicitly referred to in statements in debates.

The percentage of references to each of these value dimensions in articles is shown in Table 1 below. The total number of references to a given value is calculated in the percentage of articles with reference to the value in question out of the total number of articles coded.

Table 1 References to value dimensions in percent of total number of units for each country, 1998-2007

	Denmark	Finland	Iceland	Norway	Sweden	Total
Knowledge (society)	25	29	18	16	21	23
Economic growth	17	31	15	24	29	24
Welfare	13	17	14	7	16	14
Sustainable development	4	6	3	4	9	6
Total no. of units (N)(100%)	726	469	169	397	526	2287

We see that the knowledge society and economic growth dimensions were those most often referred to in the Nordic debate, both referred to in a quarter of all articles in the material. Economic growth is more dominant than the knowledge economy dimension particularly in Norway and Sweden, and references to these two dimensions nearly equally frequent in Finland and Iceland. Denmark differs from the other countries in this respect with sizably more references to knowledge society than to economic growth. Explicit references to value dimensions are more frequent in Finland than in the other countries, and relatively infrequent in Iceland. The presence of references to the sustainable development dimension is negligible in all countries. References to welfare are far more infrequent, and Norway is the outlier on this dimension with far fewer references than the other two main dimensions.

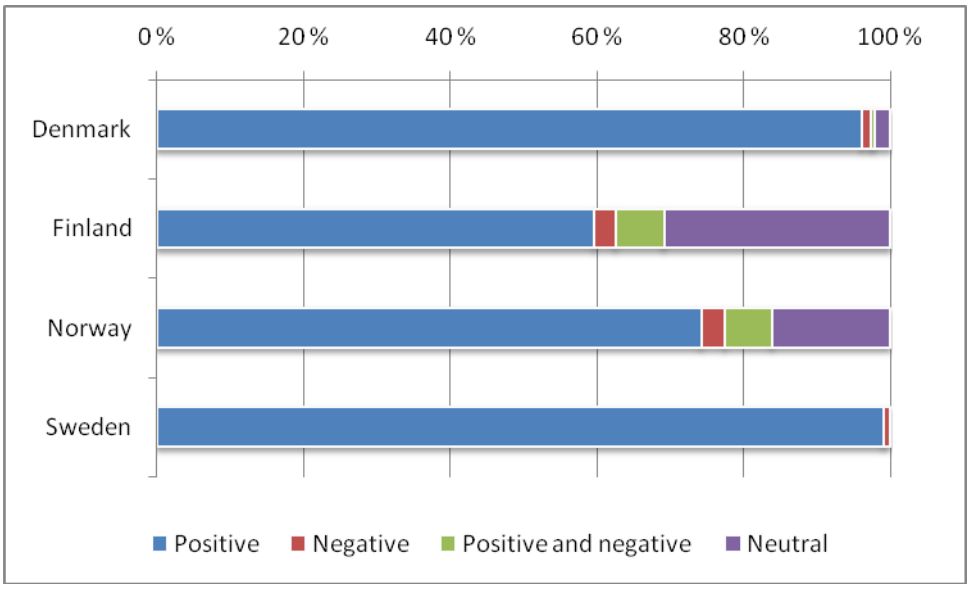

Figure 10 Attitude attributed explicitly to the contribution of research to the volume of knowledge in society. N=543. [17]

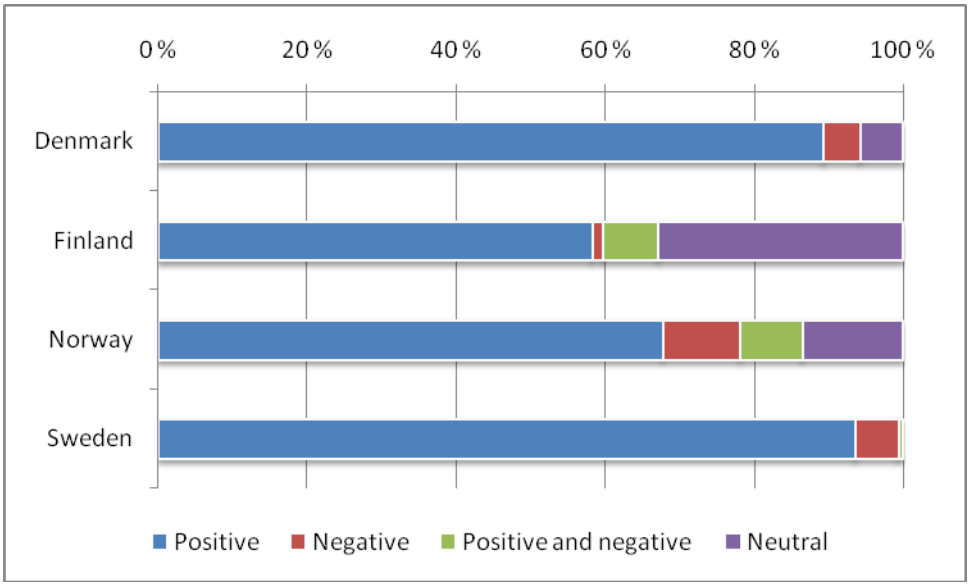

Figure 11 Attitude attributed explicitly to the application of research as instrument for economic growth. N=543. [18]

As expected, Figures 10 and 11 indicate that references to both the two dimension of knowledge society and economic growth are very predominantly positive. In the Finnish debate references are often neutral. There is a stronger presence of negative references to the growth dimension in the Norwegian debate, if these are still quite few.

[17] Articles with no references to the knowledge society were excluded. 'Positive and negative' is used if the article entails arguments both for and against the contribution of research in society. 'Neutral' is used if knowledge society is an issue in the article, but it entails no arguments for or against research. Iceland is not included in the figure due to a critically low number of article units which identified the value dimension.

[18] Articles with no references to economic growth were excluded. 'Positive and negative' is used if the article entails arguments both for and against looking at research as a means to economic growth. 'Neutral' is used, if economic growth is an issue in the article, but it entails no arguments for or against looking at research as a means to economic growth. Iceland is not included in the figure due to a critically low number of article units which identified the value dimension.

3.3. WHAT TOPICS AND ISSUES WERE DEBATED?

The general topics (policy themes) and the more specific research policy issues raised in the debate articles analysed is alongside the actor dimension the second key component of the comparative analysis. The content analysis applied a coding scheme listing some forty research policy issues in order to gain information on the topics in the articles. The six main topics groups (see Figure 12) were Financial management/ resource issues, organisational management, human resources, output-related issues, challenges and conflicts. [19]

The comparative figure in Figure 12 indicates the relative presence of each of the six topics within each national sample of debate articles. It shows a relative prevalence of economic/resource topics, organisational topics as well as output-related issues, including e.g. quality of research.[20] Also, we find that the singular most-prevalent topic groups in the countries were Denmark (organisation, management), Finland (output-related), Iceland, Norway and Sweden (economy/resources).

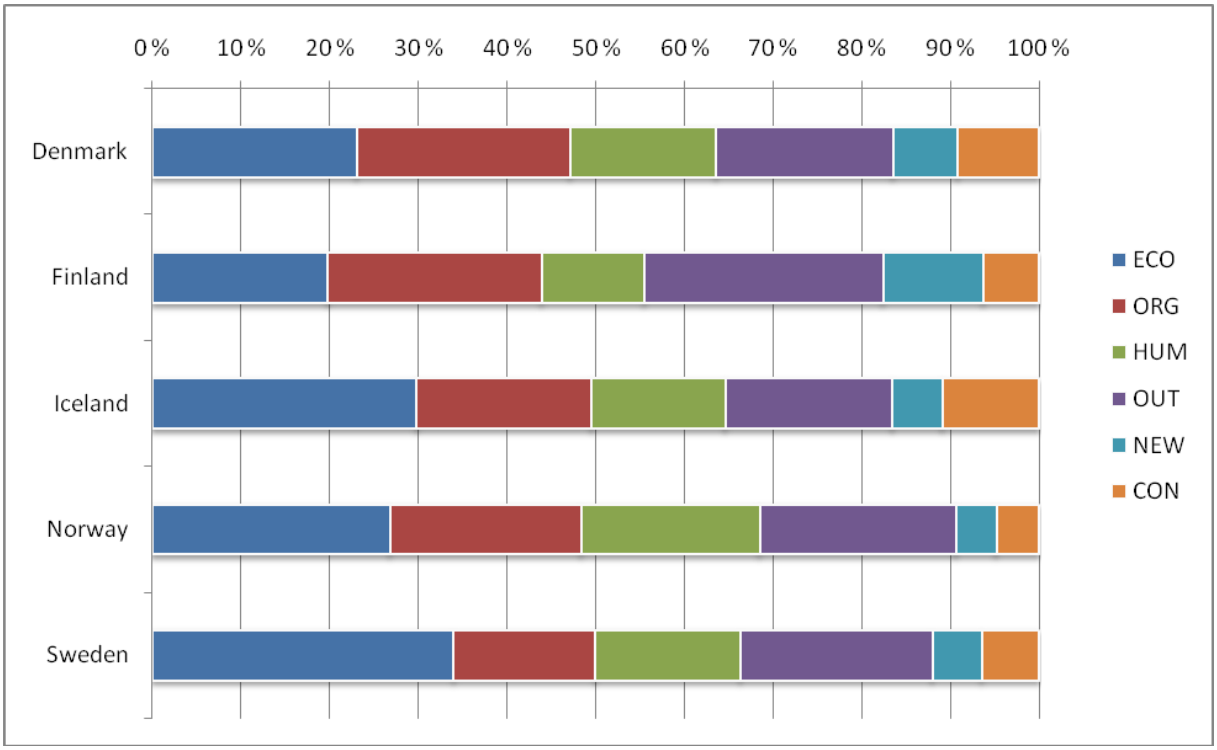

Figure 12 Research Policy themes in the Nordic countries. (N=12860 hits)
ECO = economic/resource topics; ORG = organisational topics; HUM = human resource topics; OUT = Output related topics; NEW = New challenges; CON = conflicts

As a basis for exhibiting specific characteristics of the national debates, we provide a more detailed picture of the coverage of the main topic groups in Figures 13.1 through 14.1.

[19] All the issues were coded in singular variables accordingly to their presence or absence in order to acquire as much information as possible from the article. This coding practice acquires much information, but on the other hand, it does not necessarily reflect the relative prominence of the main topics, nor the specific issues of the articles. In essence, the threshold for coding a topic as present in the article is not constant, but relative to information depth needed to code the most esoteric single research policy issues.

[20] The figure is based on a total of 12,860 hits. Hence, each of approximately 2200 articles was coded on average more than five times due to the presence of references to more than one of the 47 issues.

3.3.1. *RESOURCES AND FUNDING*

The resource/funding topic group encompasses seven issues.[21]. For Denmark, Finland and Iceland we can see a rising trend for funding/resource issues from 2002 onwards but which then declined in 2005/2006. For Iceland and Norway the trend is rather stable until 2004/2005 and reaches its highest level in 2007.

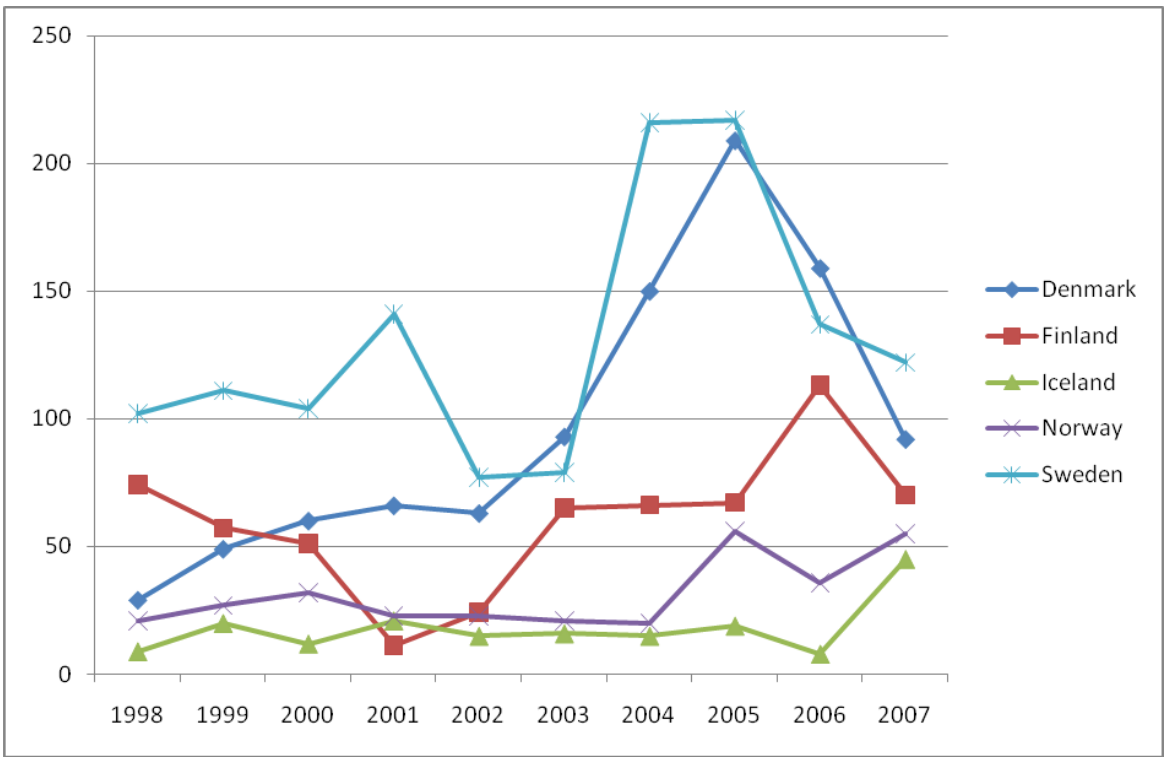

Figure 13.1 Economic issues by country and year (N=3768)

[21] V36 Total national level of financial resources for research (e.g. Percent of GNP)
V37 The distribution of financial resources for research on public and private research
V38 The distribution of financial resources for research on scientific fields
V39 The distribution of financial resources for research on different types of research
V40 The prioritization of financial resources for research between different types of research institutions (macro-level)
V41 Ways of financing total national research activity (macro-level)
V42 Ways of financing different types of research institutions/specific themes (macro-level)
V43 Different models for financing research (including different funds)

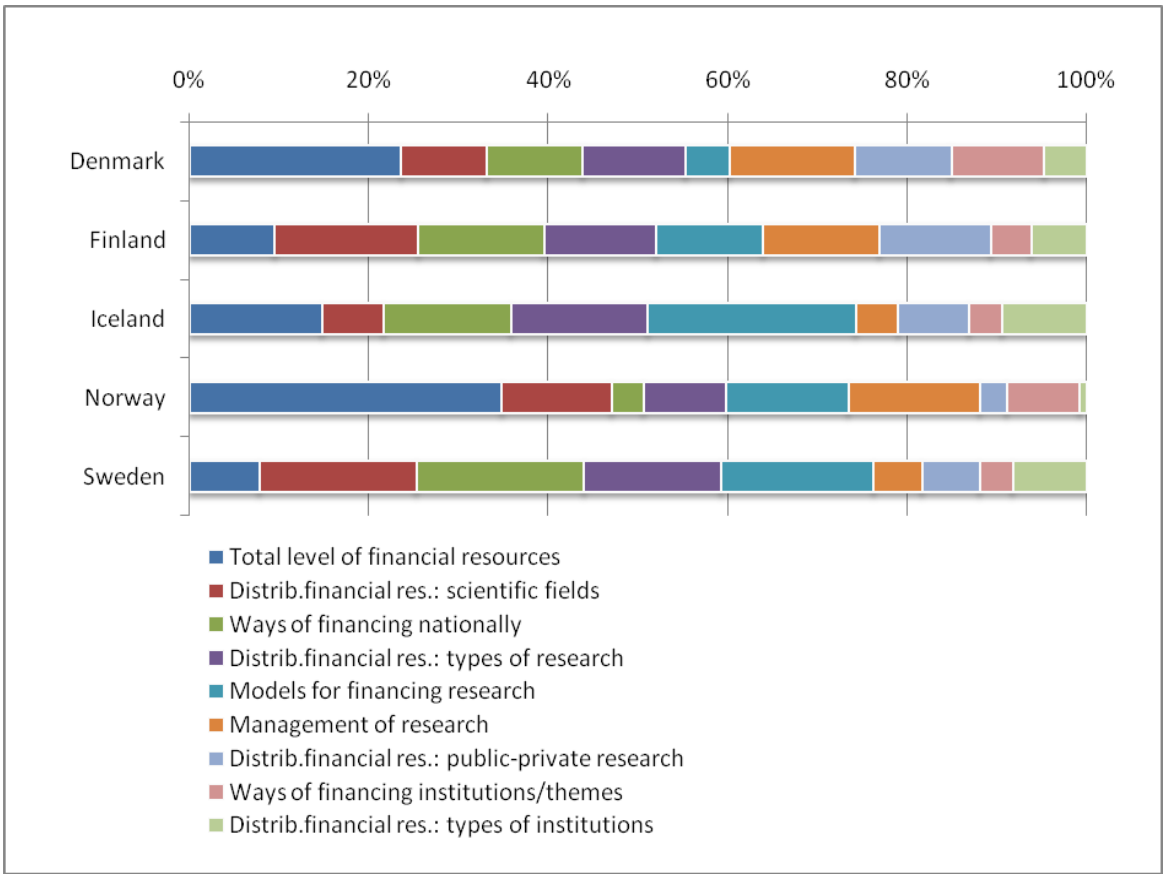

Figure 13.2 Economic issues by country and sub-themes (N=3768)

In Figure 13.2 the relative prevalence of the different financial/resource issues is indicated for each of the Nordic countries, enabling comparisons between countries for the whole 10 year period.

Denmark

In Denmark economic issues became an increasingly important topic on the public agenda until 2006 when concerns about economy declined somewhat in Denmark. The concern is primarily about the total level of national funding. Many actors were involved in this debate which put the Minister of Science, Helge Sander, under pressure to find more money for Danish universities. A regular debate has taken place about the political goal, stated and repeated by the Minister of Science every year since 2003, to reach the so-called Barcelona target of 1% of GDP to be invested in public funding. Much of the debate in Denmark focused on how far or how close Denmark was to this 1%. The Minister of Finance participated in that debate, as did several journalists, university leaders and individual researchers. In this the debate Denmark was frequently compared to Sweden and Finland.

Finland

Principles of funding have been the subject of debate over time in Finland, especially in 1998 and 2007. The distribution of resources by the Academy of Finland has provoked critical comments that question the role of the Academy, and proposals to change the status of the Academy. Accusations were made that the Academy and its committees have favoured certain circles and groups of researchers when allocating funds. The debate has been broad and covered topics such as the overall shortage of money in the universities and the one-sided funding policy of the Academy after it had started promoting the Centres of Excellence. Concerns were voiced that its funding principles would lead to unnecessary polarization between researchers by labelling some researchers as “top” researchers and others as “mediocre”.

A somewhat frequent subject in the public debate has been R&D expenditure as a share of GDP. Even though the high levels of R&D investments in Finland are usually taken as an example of success, there were critical voices in the public debate starting already in 1999. State funding had been cut in all sectors and savings were made in the early 1990s which created a deficit in funding as some writers claimed. In addition it was argued in the debate that the state's investments in R&D have not substantially increased. Furthermore, criticism has been directed at the fragmentation of research funding. In 2002 and 2003 it became clear that there was dissatisfaction with investments in R&D, especially with the relation between public and private investments in R&D. One reason for the accelerated public debate was the difficulties experienced by technology companies who had to fire employees as global competition caused a shift of jobs to low cost countries. The new government programme was criticized and commented by the editorials in Kauppalehti (2003-03-14 and 2003-04-30), stating that Prime Minister Lipponen's second government has left the R&D investments on the shoulders of private companies.

Iceland

Financial issues were important in the Icelandic debate. The structure of the financial system was frequently discussed, and increasingly so during the period. Iceland at this time was among the top five OECD nations in terms of overall R&D expenditure, and at the very top as concerns public funding of R&D. A prominent issue in this discussion was how to distribute public funds. Historically, Icelandic public organisations have been allocated a block amount to finance R&D activities, leaving to the organisations themselves to decide on the use of these funds. By increasing the competitive research funds, applicants were increasingly required to compete for financial support. Some claimed that this would harm basic research, while others saw this as an appropriate way to allocate public funds. Articles about lack of funding for either research and development or for innovation were also common. According to some, lack of funding of R&D in emerging fields could delay the possibility to exploit the opportunities of these fields.

Norway

Resource issues in general and overall levels of research funding in particular were at the core of the debate in Norway throughout the period. Sixty percent of all articles touched upon at least one resource issue, and one-third of all articles addressed resource level issues.

In 1999 Norway set the target to raise the overall level of R&D resources as proportion of GDP to "the average of the OECD countries", which at the time meant increasing the level from 1.7 to 2.3 percent of GDP. In 2005, the target was aligned with the EU Barcelona target and raised to 3 percent. While these formal targets made the overall level of research funding a core issue of research policy throughout the period, the debate on the insufficient funding and poor conditions for research in Norway predated them by far. The public debate may be seen to have exerted a pressure on the policy-making process, and contributed to its adoption. The issue of insufficient funding was initially most strongly voiced by medical researchers. The inferior position of Norwegian research and research funding compared to its Scandinavian neighbours is a rhetorical figure that pervades the debate on the resource issue throughout the period. The adoption of the targets has created a basis for depicting Norwegian research as deficient, and of Norwegian research policy as complacent, where other countries have taken up the challenge. The arguments about the low level of funding in Norway have been voiced particularly vocally by academic professionals and address, often implicitly but sometime also explicitly, university or basic research in particular. The coordinated campaign of universities for more funding on the basis of arguments drawn from the GDP indicators and targets culminated in a common statement by the six university rectors in July 2007. This statement is part of the general reactions among universities to the weak appropriation in the 2007 budget, including a cut in the core funding part of universities budgets, justified by the minister as a temporary pause in the promised growth of university funding. By using the term "hvileskjær"[22] to justify and emphasize the temporary nature of the cuts, he inadvertently provided his (university) critics with a term incorporating strong rhetorical impact to characterize what they saw as the

[22] Untranslatable term from speed skating, denoting a brief rest or pause in the even rhythm of the skater's glide.

overall failure of his (funding) policy. The term became stuck as a rallying call for this criticism, and contributed no doubt to the overall impression of his failure, leading to his resignation in the autumn of 2007. The general political consensus on both the 1999 and the 2005 GDP targets gave them a status as practically above critical debate, and just a few gave voice to skepticism and criticism. The most notable exception was one of the editors of *Dagens Næringsliv* who wrote several, sometimes harshly critical, leaders and editorial comments (nine in our material) on what he saw as an unrealistic and superfluous target.

Sweden

Economic issues were very high on the agenda in the Swedish debate already in the beginning of the period. They became particularly intensively debated in 2004 and 2005, and dropped somewhat surprisingly in 2006 and 2007. One possible explanation for this was the change of government; another might be a "wait and see" attitude towards the outcomes of the Brändström Resource Inquiry.

One major controversy in Sweden on funding levels took place in 2004 when a number of prominent actors joined forces and criticised the government. The SUHF, the Swedish Research Council, Vinnova, the Royal Academy of Sciences and the Royal Academy of Engineering Sciences signed an article which spelled out how direct state funding had decreased over a number of years. The driving force in this debate was the vice-chancellor at Uppsala University, Bo Sundqvist. When the article was not responded to, he followed up with a new article in *Svenska Dagbladet* (2004-06-23), claiming that "Swedish Research is under Threat". Preceding this campaign, the government had described Swedish funding of R&D as being at "historically high levels". Minister of education, Thomas Östros, declared that "No other OECD country allocates as much money to research". The funding issues were also commented by other actors in an article in *Uppsala Nya Tidning* (2004-11-30) written by institutional leaders from SLU (Swedish University of Agricultural Sciences).

Interestingly, the under-funding has also triggered comments from the opposition parties. "We are not responsible" (SvD 2003-07-05) was the heading of an article written by representatives from the Moderaterna. Also a Kristdemokraterna politician (SvD 2002-09-01) said that the rationalization processes in education and research were a threat to quality. The DN editor wrote that the government parties once again deceived research, and consequently lacked interest in their own future (DN 2004-09-12).

In 2006, the new government promised massive investment in research. However, the budget presented in 2007 did not impress university professors. The funding increases "were hopelessly insufficient and do not turn the negative trend" claimed Vinnova, IVA and Volvo and others in SvD (2007-10-17). While public investments in research are decreasing, industry makes the most out of them. The authors urged that public research funds be raised to at least 1 percent of GDP.

During the election campaign, the Alliance parties had promised an increase of research money to 1 percent of GDP, and they were often reminded of that fact, for instance by academics union leader, Anna Ekström: "Fulfill the one percent target" in UNT (2007-09-19). However, one journalist wrote an article about "the curse of the one percent target". Research is swept in a cross-political benevolence; everybody assures its importance but nobody is prepared to pay for it (*Expressen* 2007-04-12).

Over the years there has been growing discussion about the balance between direct state funding and competitive funding allocated, for instance, by research councils. Some strong professors, especially at Uppsala University, such as Sverker Gustavsson (DN 2000-01-11), Li Bennich-Björkman (UNT 2003-03-30) and Tore Frängsmyr (SvD 2001-01-03; 2006-06-09) have argued for more direct money to higher education institutions. Professor Håkan Eriksson claimed that increasing dependence on external funding leads to universities losing their souls (SvD 2002-10-21). One of rather few defenders of external funding has been Sverker Sörlin: "Researchers have to motivate their funds" he wrote in DN 2005-05-24.

The peer review processes have been criticized above all by individual researchers. One main issue has been the time-consuming aspects of external funding. Other aspects have included the ethical sides of peer review.

One of the most frequent debaters on this issue has been Professor Bo Rothstein at Gothenburg University. On a couple of occasions he has attacked, what he considers, a flawed and corrupt system. “Swedish Research is run by Social democrat commissars” he wrote for instance in DN (2006-06-05). In the article, several funding bodies and agencies were pointed to as being run by people with close connections to the social democratic party. Furthermore, he argued in another DN debate article that the government politicised the entire Swedish research system (DN 2005-05-08).

Increasingly, there have been arguments for more performance-based funding system in Sweden. Actually, that was one of the promises the right wing and liberal parties made before the last election in 2006. More money should be allocated directly to higher education institutions, but based on the results of ex-post quality reviews (DN 2005-04-06). The new research policy should be based upon quality, freedom for institutions, strong basic research and innovation. In fact, it was the former government which launched the so-called Resource Inquiry, whose task was to reform the Swedish research funding system. They presented their results in late 2007. In brief, they proposed a new cyclic ex-post evaluation system for both education and research. Clearly, the British RAE has been the model inspiring the inquiry. The recommendations made by the committee on the research funding system are still discussed, not least the bibliometric methods to be used. The consequences will be fundamental for the system.

3.3.2. ORGANISATION, INSTITUTIONS AND REFORM

The organisational topic consists of eight issues ranging from institutional structures/system reforms to quality/excellence versus relevance/application of research.[23].

For Denmark and Finland we observe a rising trend for organisational issues from 2001 until 2006. On the other hand, organisational issues show a quite unstable and fluctuating trend in Norway and Sweden while for Iceland there are small variations on the prevalence of these issues during the ten year period.

[23] The full list of organisational issues:
V44 Institutional structures/systems reforms related to research
V45 Management of research, including management tools at the level of institutes
V46 Research based services for governmental authorities.
V47 Cross-disciplinary research
V48 Research and the business sector
V49 Need-/policy driven versus researcher driven research
V50 Quality/excellence versus relevance/application of research
V51 Infrastructure of scientific research

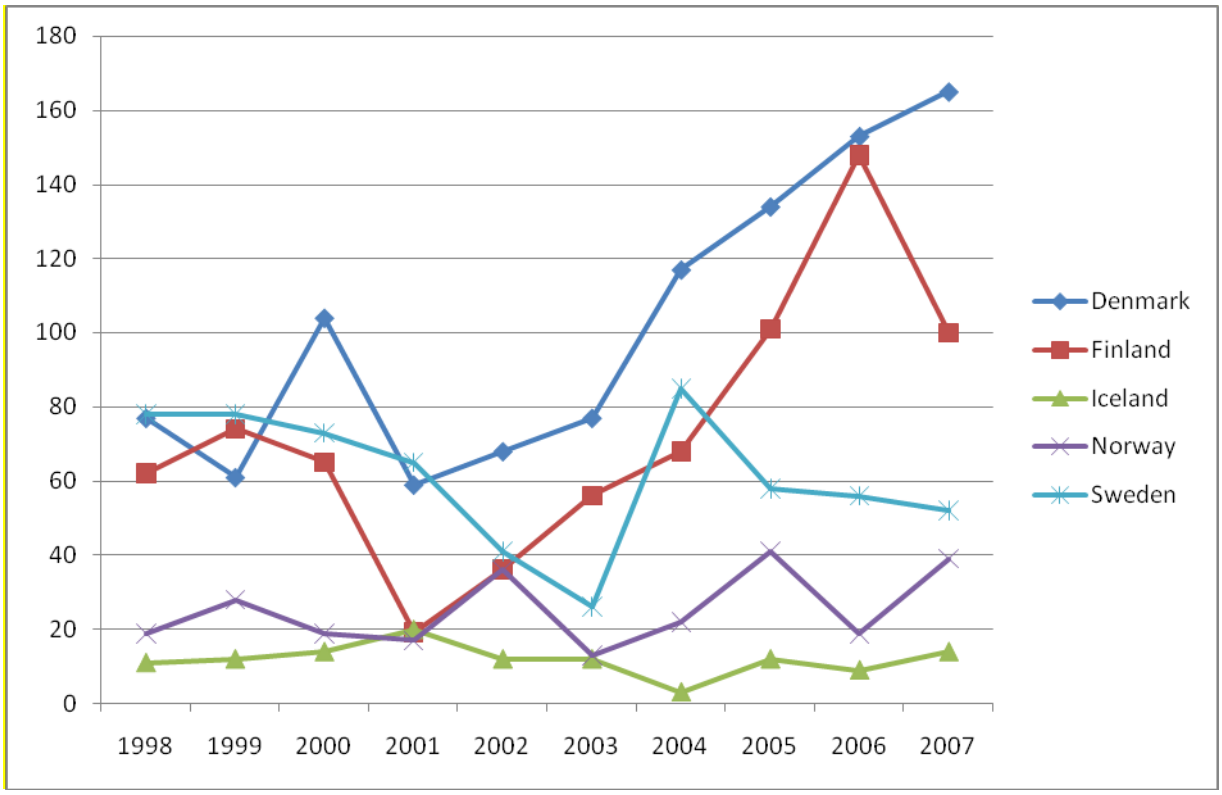

Figure 14.1 Organisational issues by country and year (N=3768):

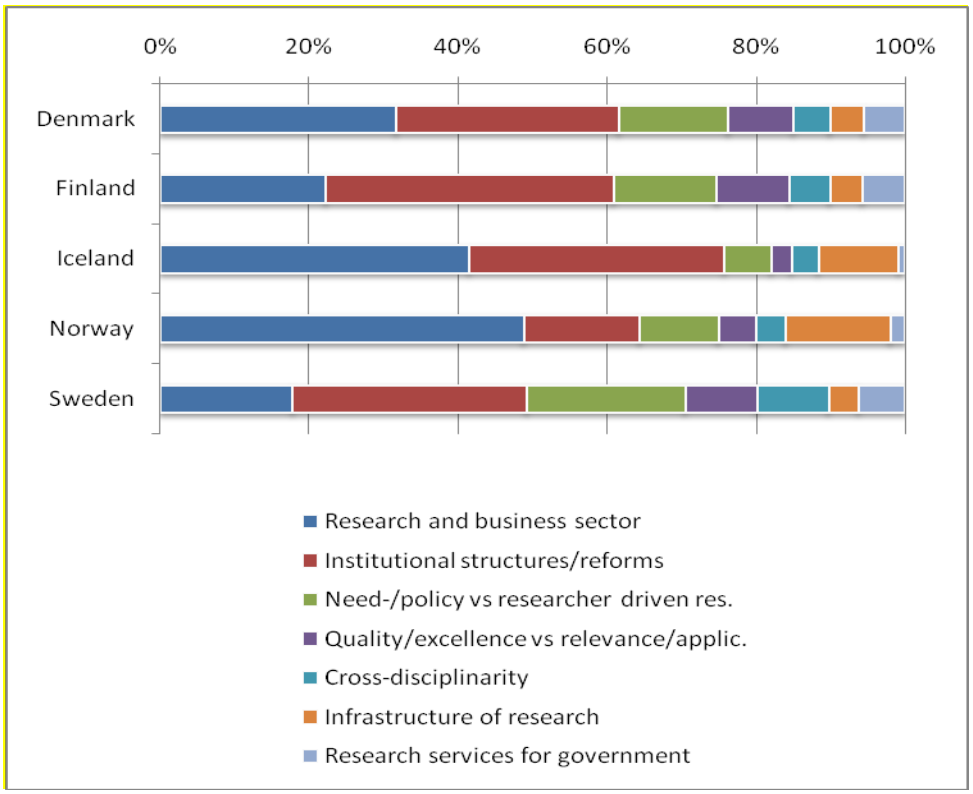

Figure 14.2: Organisational issue by country and sub-topic (N=2348)

Denmark

Organisational issues figure very frequently on the public agenda in the Danish debate. The political initiatives that set the agenda started in 2001, focusing in particular on governmental research institutes. In 2003 it was the new University Act, in 2004 the change in the law for governmental research institutes, following which some institutes were incorporated into universities, and in 2006 the political announcement of mergers between universities and governmental research institutes. *Organisation*al issues were in focus in the media in Denmark with more than 60 articles in the public debate every year since 1998. In the beginning of the period the Danish research institutes awaited the conclusions from the committee organised in 1999 and later the issue reached a peak with more than 160 articles in 2007. The majority of these were triggered by political statements, either from commissions or directly by Government/the Minister of Science.

The main rationale for reorganisation was efficiency, and to enhance contact between all parts of public research. Quality of research is also referred to in these communications, but not as main argument in any of them. Almost all the above-mentioned initiatives met with resistance from researchers, often expressing fears that the freedom of researchers would suffer. Reactions to these structural reforms came primarily from researchers working in these institutions.

Cooperation between the public research sector and the private business sector attracted quite a number of opinions, not the least from Danish Industry and others representing private business, such as the organisation for trade and service (Handel og Service).

Policy-driven research was on the agenda as well, similar to that which took place in Finland, but not to the same extent as in Sweden. Services for government were an issue connected to the discussions about structural reforms of the governmental research institutes.

Finland

Organisational issues have played an increasing role in the Finnish debate following pressure to centralize the higher education system and especially the universities. The debate increased substantially after the Prime Minister's Office commenced a project "Finland in a Global Economy" and produced a report in 2004 which proposed to increase the share of competitive funding of the universities as well as their financial autonomy. The report called for more specialization in order to form larger networks between research groups. In 2005 the government made a decision in principle on the structural development of the research system, and assigned the task of clarifying the effects on the research system to the Academy of Finland and Tekes (the Finnish Funding Agency for Technology and Innovation).

The debate in Finland on the need of structural reforms is apparent, and to some extent overlaps the issues of globalisation. The expansion of the university system has become a core issue in the debate as the role of universities is being reconsidered. The whole research system was debated in 2006 when the discussion on the resources and goals of research heated up. This was connected to the increasing debate on the innovation system and the role of research and universities associated with this. Some have pointed to the tensions between research and innovation policy goals since the production of innovations, and commercialisation of research results have been increasingly emphasized.

In addition to the need to carry out research in relevant fields, there has been a debate on which disciplines should be fostered in order to gain competitive advantages in global markets. One solution has been the merger of three universities that are said to represent the potential needed in the future. The so-called "innovation university" (now known as Aalto University) is a merger of Helsinki Business School, Helsinki University of Arts and Design, and Helsinki University of Technology. It was set up quite quickly and there was a strong push from the industry and business sector to support this new university. The government made a resolution to establish the university in 2007 but the idea was first introduced by the rector of Helsinki University of Arts and Design in 2005. The idea was received with mixed feelings in the public debate and

triggered off deliberations about the need for a Finnish "top-university". Those in favour of the merger saw it as a step towards top research and international prestige, but the opponents claimed that it would diminish the autonomy of the universities and diminish the quality of research.

Iceland

A growing discussion of organisational matters related to the research and innovation system can be noted. The former Research Council and the new Science and Technology Policy Council discussed the role of research organisations, taking into account OECD work in that area. The role of research organisations and of universities in research and development were discussed. During this period a considerable number of mergers between research organisations took place, as did various kinds of mergers between public organisations, universities and even R&D-performing firms.

Norway

The period saw extensive reforms and reorganisation within the research system. One was the so-called "quality reform" of higher education institutions which was an issue on the policy agenda throughout most of the period – first with its preparation with the Mjøs and Ryssdal commissions, its formal implementation from 2003, and its taking full effect during the following years. This process triggered much debate, but its focus was almost exclusively on governance issues and on the educational parts of the higher education institutions activities, not on research. Hence, only a part of this emerges in our material on research policy, even if arguably it did implicitly affect research. During the latter part of the period the emphasis shifted towards research, which is captured in our material. This debate combines several separate issues, including such issues as the position of free research, in particular the shrinking resource base for free, researcher-initiated academic research, but also the issue of the need for a formal legal protection of academic freedom (see Human Resources below), and the so-called "tellekantsystemet" (see the Output section below).

The other major issue of reform/reorganisation was the evaluation and subsequent reorganisation of the Research Council of Norway. The debate triggered by this process overlapped with issues concerning the reform of higher education institutions in the debate about the relationship between the council and the universities, something which has been a recurrent organisational topic in Norwegian debate throughout the period. While the tensions between these institutions have surfaced in the policy process and public debates on research policy for decades, it resurfaced at the beginning of our period through a relatively harsh response by the rector of University of Oslo to criticism of the quality and effectiveness of university research ("For mye "mosjonsforskning" i Norge" (*Aftenposten* 16.4.98 – 4079) voiced by the director of the Research Council. According to the RCN director, universities do too little to stimulate the quality of research. According to his university opponents, however, the universities are, under-funded, and the council itself is too bureaucratic and does not, through its numerous steering schemes respect to sufficient extent the autonomy of basic research. It is again academic medical researchers who voiced strong criticism of the RCN, and claim at one point that they see a "cultural clash" ("kulturkollisjon", *Aftenposten* 31.8.99 – 4361) between the universities and the council.

A strong "elitist" trend gained hegemony within both policy and public debate during this period, as seen by the implementation of a large number of "elite" schemes, including centres of excellence, centres for research-based innovation, and a scheme for generous support of the very best young researchers. We find in the record of the debate several statements that supported and justified these schemes, many by the responsible minister and Research Council officials. We find very few voices which opposed this new, saliently "elitist" thrust – often explicitly justified in that very term – of Norwegian research policies that gained momentum during the early 2000s.

The data for Norway show a strong presence of articles that in some way or another touch upon issues pertaining to public/private research relationships. While this should not be taken to indicate that such issues

were primary in debates to the extent that the distribution in Figure 14.2 suggests,[24] it does indicate a pervasive awareness of these issues, also in debates that were primarily about other issues. This may provide an indirect indication that issues related to private research, commercialisation and innovation had a stronger presence in the debate than a picture based only upon main topics might indicate.

Sweden

Increasingly, the structure of the Swedish research landscape has become an issue in public debate, following a long period of expansion of the system. There are, however, articles in the media debate that claim that resources are spread too thinly, and too many poor and mediocre research environments were funded (DN 2004-12-22). One important article, showing a shift in focus, was written by minister of education, Leif Pagrotsky, in DN (2004-04-12): "Government stops new universities". Expansion of the sector and promotion of institutions had come to an end. This was obviously bad news for those university colleges who had an ambition to reach full university status, for instance Malmö högskola and Södertörns högskola.

University chancellor Anders Flodström's proposal to reduce the number of universities to five also resulted in some discussion in the press. Three vice-chancellors in the south east of Sweden declared that they were "sick and tired of sweeping arguments of research money spread too thinly". Their own argument was to create a strategic alliance between the three institutions. An elite institution, they argued, was feasible and interesting, but there was also a need for other universities. There are, however, not many articles defending further expansion of the sector. Hence, there has been an elitist turn in the sector without much controversy. This does not necessarily indicate that there is consensus on this in the sector, but it is not easy to oppose the rhetoric on higher quality, world class, excellence (who would defend less than excellent research?)

There are a number of articles which actually deal with fundamental issues in the sector. One theme is the role division between higher education institutions and other knowledge producers, for example, the essence of academic research. Other themes include academic freedom and integrity. Universities must stand up for their academic integrity. Short term, opportunistic behaviour is a serious threat to academic values (*Sydsvenska Dagbladet* 2004-03-12). In an article in UNT in 2003 (06-10), a number of leaders of higher education institutions vented their frustration. High quality of both research and education was considered difficult to maintain. Less money per student, weaker teaching research links, too much external funding and non autonomous universities were serious threats to quality.

Many of the issues included in this theme in Sweden are related to different modes of research. This could be related to different actors in the system. Firstly, all the calls for more basic research – a core university function, are expressed by a number of actors. However, researchers at higher education institutions are represented in most of these. Professors (mostly) could either act individually or from another platform, such as SUHF (The Association of Swedish Higher Education), the Royal Academy of Sciences, or the Swedish Research Council.

On the other side, we find the "innovation lobby" (Benner 2008). The frontrunners are The Royal Academy of Engineering Sciences (IVA), often in strong alliance with the Swedish Innovation Agency (Vinnova). Other actors include the unions and the employer organisations, such as Civilingenjörsförbundet and Svenskt Näringsliv (Confederation of Swedish Enterprise).

3.3.3. HUMAN RESOURCES

The human resources topic comprises seven issues. The issues include items such as recruitment and education of researchers as well as research ethics/integrity and gender equality.[25]

[24] The coding does not distinguish between primary and secondary topics, only if a topic is present or not. There are indications of a somewhat lower threshold in the Norwegian coding the presence or not of this variable in the articles.

[25] The full list of topics in the human resources category is:

For Denmark, Finland and Iceland we can see a rising trend for human resource issues from 2001 until 2006. Then this topic suddenly drops in Finland while continuing with reinforced strength in Denmark. On the other hand, human resources issues exhibit a quite unstable and fluctuating trend in Norway and Sweden while for Iceland there are small variations on the prevalence of these issues during the ten year period.

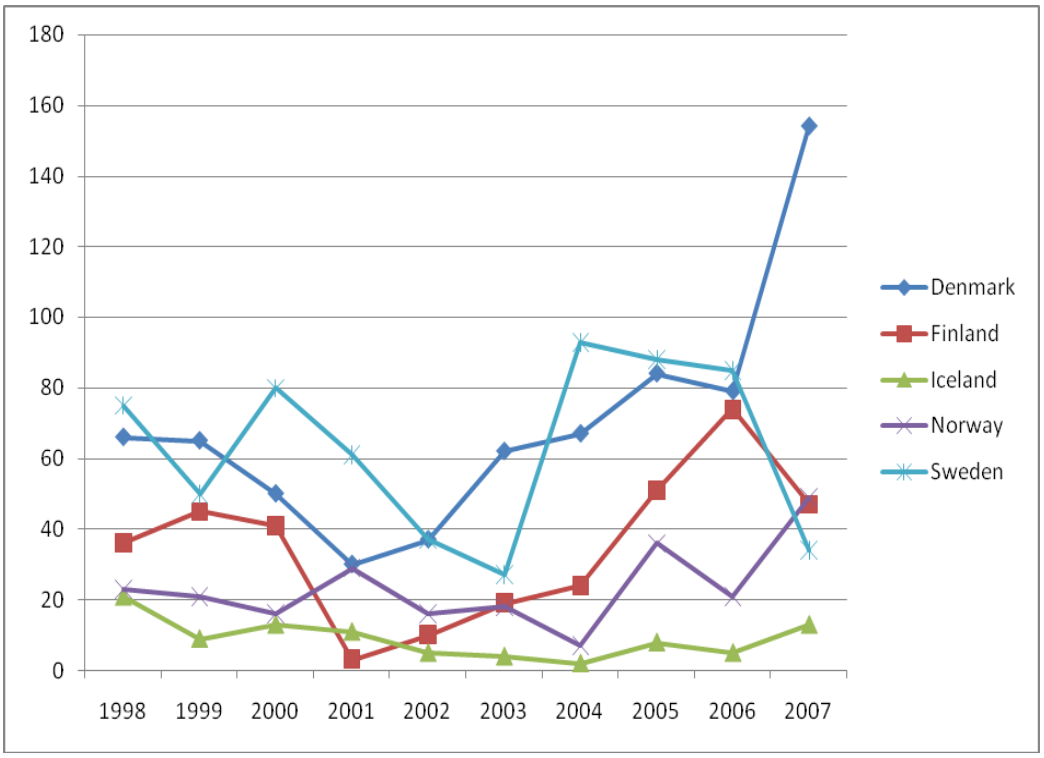

Figure 15.1 Human Resources by country and year (N=2322)

V52 Recruitment and education of researchers
V53 Salary and working conditions of researchers (e.g. degree of permanent tenure)
V54 Mobility of researchers
V55 Academic freedom/autonomy of research
V56 Collegial influence for researchers
V57 Research ethics/research integrity
V58 Gender equality

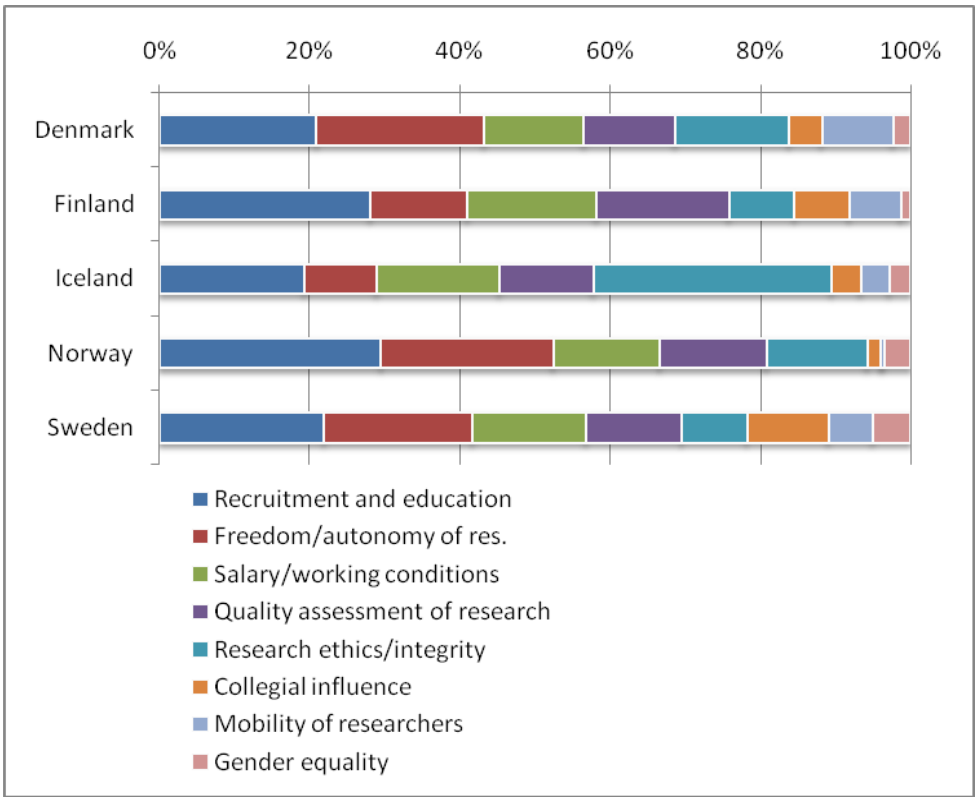

Figure 15.2: Human Resources by country and sub-topic (N=2322)

Denmark

Human resources issues, and especially recruitment and education of researchers were already high on the Danish policy agenda at the end of the 1990s, and were in particular top items on the agenda in 2004, 2005 and 2006. The issue is of great interest to many actors, and was a key issue in the Globalisation Council formed by the government in 2005. Human resources, especially education and training of new scientists, were therefore central issues in the April 2006 report from the Council. This remained high on the agenda in 2007 since the agreed increase in additional resources for human resources and more researcher-training was distributed that year. The debate increasingly turned into one on academic freedom and autonomy of research, which explains the very high level of hits on this topic group (see Figure 15.2).

Finland

Even though human resource issues are not the most dominant theme in the debate, this has evoked critical views and strong opinions whenever it arises. Some of these issues are connected to structural reforms such as the reformation of the financial and administrative status of universities in 2007. Much of the debate continued after the study period, although some of it began earlier. There have been references to the appointment principles of professors (HS 1999-05-29) as well as to the workload of professors when funding has become more competitive. Basically, this has meant that professors have had to use an excessive amount of their time in finding funding and undertaking administrative tasks, rather than carrying out research or supervising students.

One specific issue that raised critical voices was the new payroll system in the universities (HS 2006-12-08). The new system was to be more performance-based and linked to personal evaluation. The system was largely opposed by the researchers because it was said to curtail freedom and create more bureaucracy in the universities (HS 2005-04-05).

Other HR issues have been connected to the overall conditions of employment. The wage level of university employees has lagged behind and there has been an increasing use of short-term or temporary contracts (TS 2007-09-02). The European Union Year declared 2005 as the Year of the Researcher. The Academy of Finland promoted the academic career of researchers by organizing campaigns to get more young people interested in research. However, this was met with critical views as researchers complained about the poor employment conditions and salaries (HS 2005-09-03 and HS 2006-12-07).

Iceland

Ethical issues were more frequently discussed in the debate of research and development in Iceland than in the other Nordic countries. A large number of ethical questions were raised during the debate of the Health database of deCode Genetics. This topic has remained high on the public research policy agenda even though the content has shifted to other concerns. The other issue prominent in the Icelandic case was the debate around salaries and working condition of researchers. During this period an increase in doctoral education and enrolment occurred. Icelanders have traditionally gone abroad to study at foreign universities, especially for Masters and PhD degrees, but in recent years the supply in Iceland for these kinds of studies has increased dramatically.

Norway

Figure 13.2. illustrates that research recruitment and education issues played a larger part in human resource matters in Norway than in the other countries. This topic, as so many others, is closely linked to the debates about resources for university research in particular. This debate was to a large extent about insufficient recruitment of researchers, in particular within science and engineering, and about the (in)effectiveness of research education. Throughout the period ambitious quantitative targets were set for new PhDs and new research education positions. Any failure to reach those targets in annual budget appropriations provided occasion for public criticism of the allegedly inadequate funding policies.

While there are few examples where the autonomy of research (academic freedom, “free research”) is the main topic, the importance of this issue is more strongly indicated by being referred to pervasively, without being the only/main topic. About one-fifth of all articles have some reference to this type of issue. It is, for example, a key part of the debate on the funding of basic research and on the relationship between universities and the research council.

Sweden

HR issues were discussed throughout the period in Sweden. General discontent with working conditions for academic staff was expressed by researchers themselves as well as by the influential Union for University Teachers (SULF). At the system level, one journalist raised the question in DN: “Long education, high debts, low salaries, tough working conditions – is it really a priority to put more souls on the academic ghost ship” (2004-08-17).

During the first year of this study, 1998, a bill on doctoral training was launched, with the main aim of improving working conditions for students. The state also wanted to make doctoral training less time-consuming and more effective. The bill was intensely debated in Swedish media. The strongest protests came from scholars in the social science and humanities, claiming that this reform would more or less be the demise of many research environments. “Government policy creates a crisis at Humanities Faculties”, a number of doctoral students at Uppsala University wrote (UNT 1998-04-05). The Liberal party (Folkpartiet) defended the old order, with a more flexible admission policy while the new Minister of Education, Thomas Östros, referred to the old system as cynical and exploitative.

At this time, Carl Tham was minister of education. In 1999 he launched the so-called promotion reform which was another controversial issue with a strong impact on the Swedish academic staff structure. Another provocative issue was a 2004 committee report on doctoral training. This declared that in future, disciplines

would no longer be the primary base for knowledge production, which was a provocative statement for professors in the well-established disciplines. The recommendation to make doctoral training three years instead of years was regarded by some, for instance professor Bo Rothstein, as a serious threat to Sweden's international reputation and quality of doctoral theses (DN 2004-05-15).

Increasingly, as the output of doctors reached a historically high level, concern with the situation for early career academics has become pervasive. Too many researchers go abroad, in particular to the USA, where career prospects are regarded as more favourable. The Swedish/European system is characterized by apprenticeship, disciplinary conflict, nepotism and inertia. The lack of mobility endangers the Swedish system. One radical solution suggested was to create posts at higher education institutions for non-Swedes only (DN 2005-12-10).

In 2000, 125 researchers signed an article which focused on the poor working conditions for young researchers in Sweden. The career system needed a thorough restructuring, they argued: a whole generation of researchers is moving to other countries, due to insecure working conditions, poor salaries and lack of funding opportunities (see also DN Debate 2004-09-12). Head of editorial at DN called the current research HR policy a "proletarization of researchers" (DN 2006-03-19).

An article on human resources, but also on the research landscape, by a professor at Karolinska Institute stated that "It is meaningless to appoint new professors in Karlstad, Örebro and Växjö, and to make senior lecturers professors". The promoted professors cause inflation in the career system, so there should be fewer professors than today (DN 1998-07-17). A state committee report proposed a new academic career system, "Karriär för kvalitet" (SOU 2007:98), inspired by the US tenure track system. This has not, however, caused much debate so far.

3.3.4. OUTPUT ISSUES

The output topic consists of eleven issues ranging from quality assessments to patents.[26].

Denmark and Finland exhibit a rising trend for output issues from 2001 until 2004/2005. Output issues show an unstable and fluctuating trend in Denmark, Iceland and Sweden in particular during the ten year period. In addition these issues were far less frequently taken up in the debate in Norway and Iceland than in the other countries.

[26] The full list of topics in the output category:
V59 Quality assessment of research (including methods and indicators)
V60 Assessment of productivity of researchers (including methods and indicators)
V61 Ranking of research institutions (including criteria)
V62 Research based education
V63 Communication of research results
V64 Developmental work, patents
V65 Innovation
V66 Research and small-/medium-sized enterprises
V67 Research and international competitiveness/productivity at a national economic level
V68 Returns from research/societal utility
V69 Citizens and research

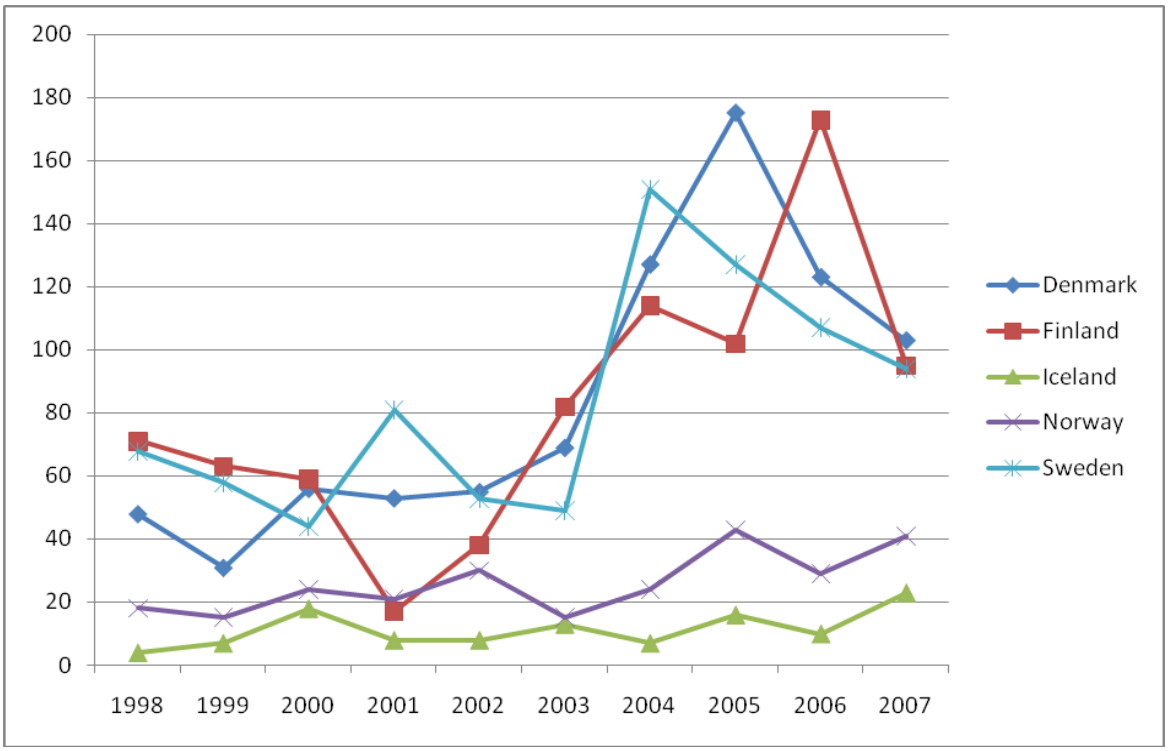

Figure 16.1: Output-related issues by country and year (N=2553)

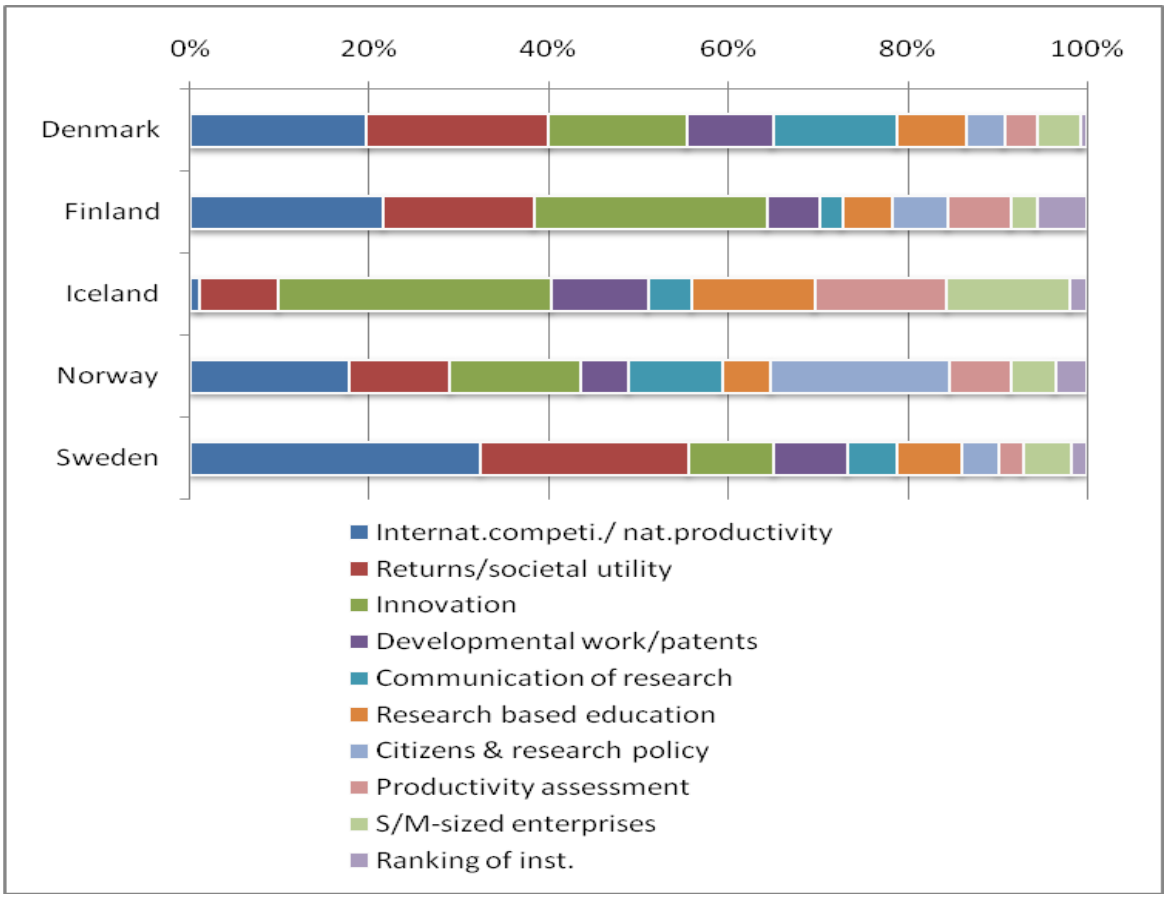

Figure 16.2 Output-related issues by country and sub-topic (N=2553)

Denmark

Output-related issues were increasingly taken up in research policy debate in Denmark from 1998 to 2005. The change in government in 2001 increased the focus on this aspect, partly triggered by a new action plan in 2003 from Helge Sander, who became Minister of Science, Innovation and Technology in 2001. The publication of this action plan, promoting closer cooperation between universities and the private sector, is the main explanation of the frequency of the societal utility category in Danish debate at this time.

Innovation during the ten-year period is not a theme that is as salient in the public debate as it was in Iceland and Finland. This, despite the fact that Denmark may be seen to perform strongly on innovation policy, and given the many initiatives that have been taken that relate to innovation (see Pro-Inno Europe Trend Chart). Innovation has increasingly become a central element on the agenda for research policy.

Finland

Output-related issues were the dominant theme in the Finnish debate during the period, and increase at a time when the debate peaked in 2006. This is connected to the debate about the structure of the university system and the new role of universities. The debate at that time revolved around innovation due to the absorption of science and technology policies into innovation policy. There is an increase in innovation-related debate in 2003 which continues steadily and peaks in 2006, when three-fifths of all articles address this issue. Some of the articles use innovation only as a rhetorical tool, but nevertheless there is a strong connection between research, innovation and national competitiveness.

Whenever the innovation system is addressed, universities and research are considered to be vital elements. However, criticism is addressed at the education and research system for favouring quantity over quality. This is especially related to mathematics and technical sciences where resources for teaching and basic research are allegedly weak (KL 2006-01-20). International competitiveness became topical during 2003–2006, and there is a strong tendency to see innovation as a key factor in promoting global competitiveness and supporting the national economy. Concerning the returns from research or societal utility, the debate seems to have been somewhat topical during 1998–2000, but declined thereafter, re-emerging in 2003 since when it is addressed just occasionally.

Another issue closely related to innovation and competitiveness is the incapacity of universities and companies to develop products and commercialise them. There are frequent proposals to establish a national programme for promoting business know-how and studies within business and marketing (HS 2000-04-14, KL 2002-02-20 and KL 2003-01-15). The fact that output-related issues dominate the debate can be seen as the need for strengthening the national economy, especially since the ICT-sector has proved to be unable to create the competitive advantage is was assumed to have.

Iceland

While Icelandic research policy has been strongly focused on input issues, the debate in recent years has shifted towards output, with a considerable increase in concern for innovation and the need for support of new knowledge-based firms. The need to broaden the industrial base has been focused and innovation is seen as essential for that development. The discussion about small and medium-sized firms has increased. Lack of financing of start-up firms has been criticized. Knowledge-based firms have started a forum within the boundaries of the Confederation of Icelandic industries, the members of which have taken an active part in the debate. Debate on research-based education has increased in recent years with expanded opportunities for studying for Masters and PhD degrees in Iceland itself. It is noticeable that the international competitiveness and productivity of firms has not been more extensively taken up in the debate, given the extensive coverage of the World Economic Forum in the period.

Norway

One relatively extensively debated output-related issue was how the component in the new budgeting system for higher education institutions for calculating a minor part of institutional funds on the basis of registered scientific publications would affect researchers' behaviour. Although the scheme triggered much controversy, parts of which also surfaced in the general media, little opposition can be discerned in the debate against the principle that a scheme of performance-based funding crediting scientific publication activity is justified. The controversy focused on aspects of the *design* of the scheme, in particular pertaining to aspects that would, allegedly, have distorting effects on publication practices: Norwegian will lose out as scholarly language; participation in public debate and dissemination activities are not credited; quality will deteriorate as a consequence of splitting up results into as many separate publications as possible and seeking "easy" publication outlets. Judged by well-documented changes[27] in the publication behaviour of university researchers, they seem to support the system top a higher extent than the extensive public controversy about its introduction may indicate.

As seen in Figure 14.2, the issue of university rankings is a relatively minor issue in Norwegian debate. When it did emerge, it was often linked to the issue of enabling colleges to become universities, and the debate about "elite universities".

The design and implementation of the Skattefunn scheme for tax deduction for R&D expenses was controversial and the scheme found its final form after several years of discussion and re-design. Its major justification was the novel scheme required to respond to the challenge of the low level of private R&D funding in Norway. This paved the way for the scheme despite strong reluctance and resistance (which did *not* surface in the debate) within Government and, initially, in the RCN itself. Part of the controversy surfaced in the public debates where some, in particular as stated in editorial comments in *Dagens Næringsliv*, saw the scheme as an unproductive subsidy to private companies

Figure 14.2 indicates that issues pertaining to the role of citizens in research policy have been more salient in Norwegian debate than in other Nordic countries. Citizen's issues may, indeed, be seen to be a strong dimension in Norwegian research policy. Norway has a highly well-developed system for addressing issues of research ethics: the Technology Board which was established in 1998 on the Danish model for supporting lay technology assessment, and the many public controversies during the early part of the period over gene technology research, may be expected to have spilled over into research policy debates in the more restricted sense of the term, as applied within this project. Some resonance can also be found at the beginning of our period of a debate which peaked earlier on the collusion of research and politics and the integrity of research triggered by some cases of dubious commissioned research. It seems, however, that Figure 14.2 may overstate the role of citizen related issues in Norwegian debate, perhaps due to differences in coding. While there are some articles with this as their main topic, including articles that pertain to the Technology Board controversy in 1998, public dissemination of research (see also "tellekantsystemet" above), and – in particular – the infamous Sudbø fraud case that exploded in early 2006 and made Norwegian research an unwelcome news item all over the world for a few weeks. With a restrictive application of the "citizens and research" criteria, this topic does not seem to have been salient during the period. We saw also in Figure 3 (section 4.2.2) that few "outsiders" beyond the immediate stakeholders groups took active parts in the debate.

It is also noteworthy that Norwegian debate has a much higher number of references to citizens than in any other country.

Sweden

Issues related to international competition have been very common during the period. Many articles draw a picture in which Sweden's position is threatened, or might be threatened unless action is taken. Thus, other

[27] Ulf Sandström, *Forskningspolitikk* 1/2009

countries are mainly referred to as competitors and benchmarks. The ranking issues are not yet raised in Sweden; however they might be in the near future, in addition to publication issues. The calls for Nobel prizes to Sweden could be seen in that perspective.

The teaching research links are sometimes discussed, not only in relation to doctoral training. Some articles on research policy refer to the need of close relations to education, almost routine-like with references to the Humboldtian ideas. One exception was the director at the Swedish Research Council, who suggested separate units for education and research at higher education institutions. Departments should be abolished and institutions should try other ways to organize their activities, he argued (DN 2003-07-27).

On the whole, there has been an important and clear shift from expansion and quantity to consolidation, concentration of resources and emphasis on excellence. Another important shift is the increasing focus on innovation. The use of that concept has indeed developed over time and, significantly, the latest government research bill was called the research *and innovation* bill.

3.3.5. WHICH TOPICS AND ISSUES WERE MOST FREQUENTLY DISCUSSED?

Figure 17 below provides an overview of the specific issues that were the most frequently taken up by the articles in our material. The figure indicates that out of the total 47 issues covered by our analysis, the 24 in the figure were the most frequently discussed, with the most frequent at the bottom of the figure. Each country is represented by the number of articles on that topic in that country.

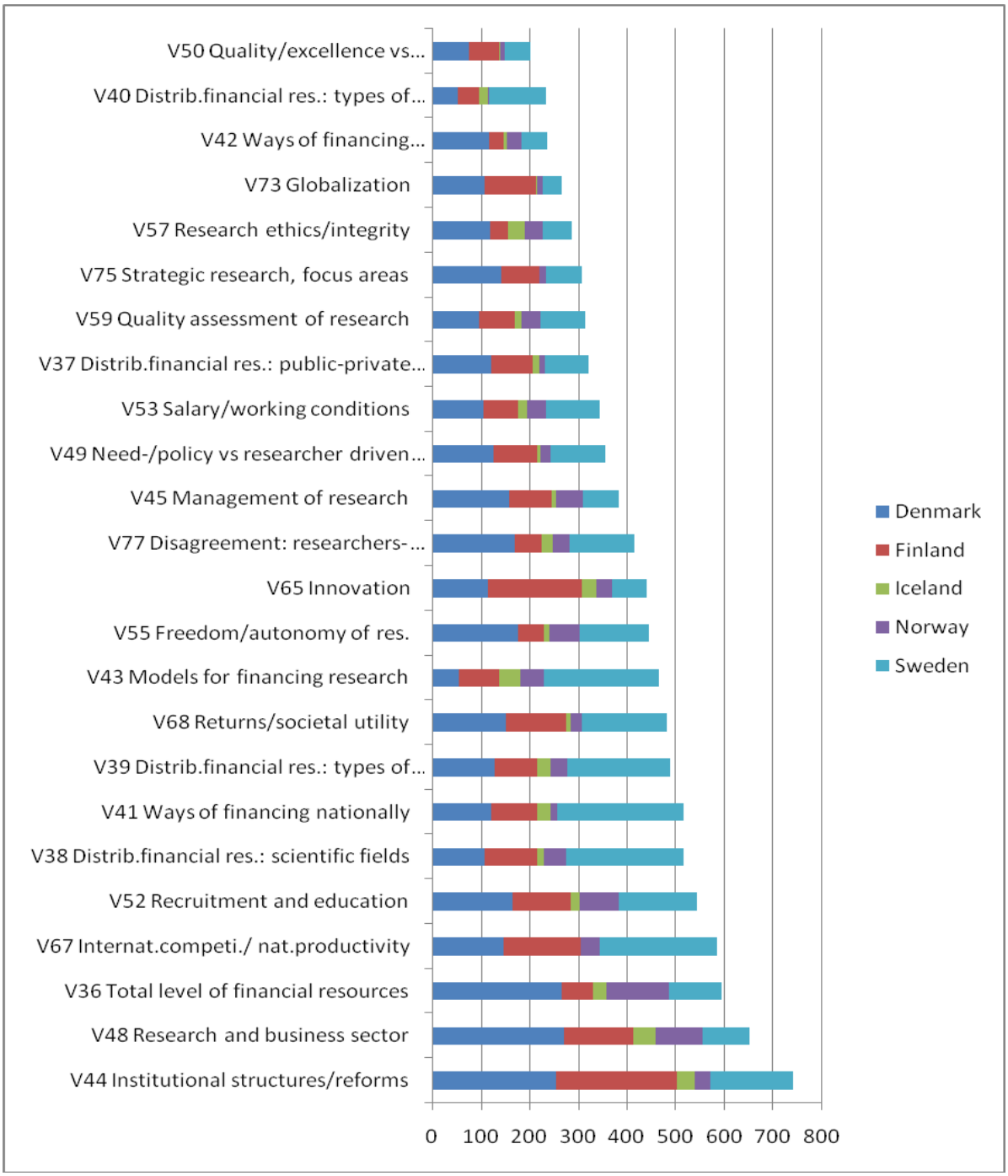

Figure 17 Specific sub-topics on top of the Nordic public agenda (N=12880)

The order of frequency in the overall material is different from that of each country taken separately. For example, in Denmark the issue "research and business sector" (V48) is relatively more prevalent than the "institutional structures/ reform" issue (V44). The opposite is the case for Finland. While the "models for financing research" issue (V43), is among the most frequently occurring issue in the Swedish material; it is only at position number ten in the total for the all Nordic countries during the period.

3.4. WHICH DISCIPLINES WERE DISCUSSED?

In this sub-chapter we map the content of debate articles in terms of which scientific fields and what forms of research (basic/applied research, e.g.) that are discussed in them. These aspects of article content are only

indirectly related to the specific topics and issues. The measure "scientific field referred to" is coded according to the dominant field in the article. If no specific field or dominant is mentioned, the article is coded 'research in general'.

The coding encompasses six categories. The category 'agricultural, veterinary and fishery science, forestry included' was virtually unused in the categorization of the debate article. The term 'research in general' on the other hand was frequently applied in all countries except for Norway as indicated in Figure 18. For all countries considered together, technical science/new technology is the dominant category, followed by health science. At national level, the health science field was the most dominant category in Iceland and Norway, while playing a more subdued role in Denmark and Finland where technical science/new technology prevailed. The humanities had a comparatively more prominent role in Danish, Norwegian and Swedish debate articles than in the Finnish and Icelandic material [28].

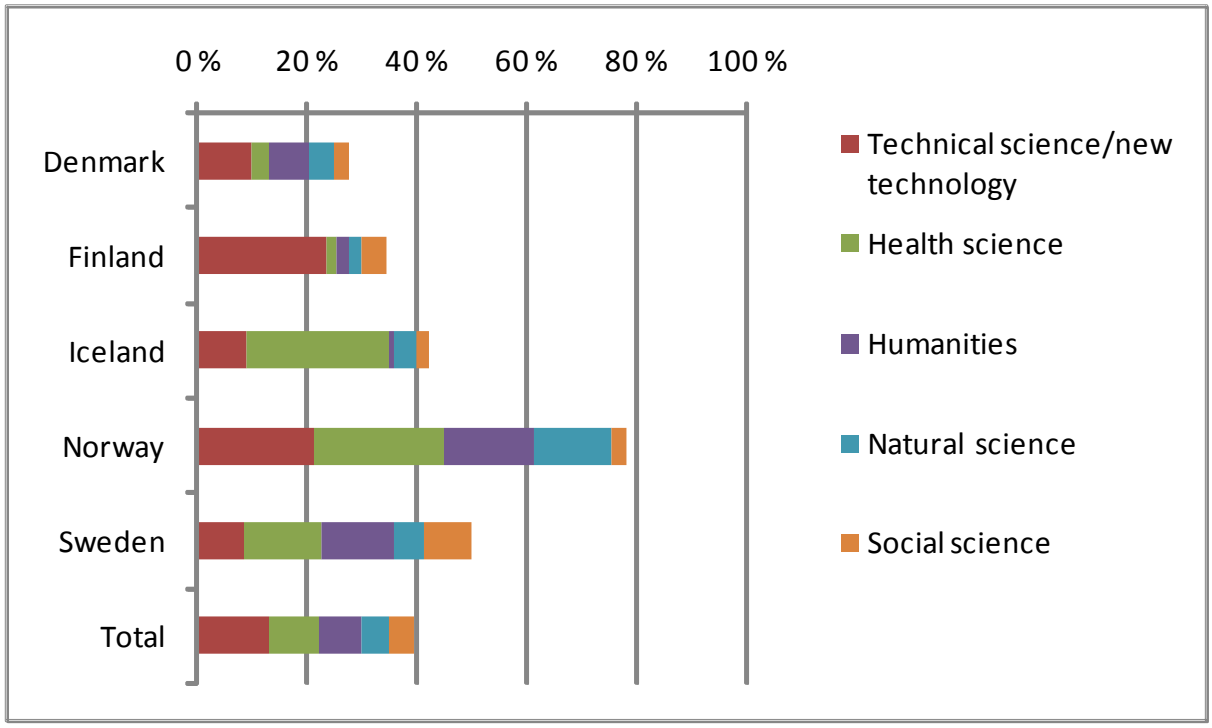

Figure 18 Scientific field referred to – the five most prevalent categories, excluding 'research in general (references to a plurality of fields)'. Percentage (N=1703)

The forms of research referred to in articles were also coded for differences along the research/application dimension, see Figure 19 below.[29] We observe that the categories "basic research" and "research and development" are the forms of research that are most frequently addressed in the articles. These patterns may be seen to confirm that the large part of research policy debates had a university (research) bias, and also that the notion that "R&D" should be seen as a whole, often as a share of GDP, played a salient role in these debates. To what extent this is a direct impact of the European Barcelona target is more uncertain; in some cases – such as Norway – the "R&D share of GDP" issue predated the Barcelona target. But these results can probably be taken as an indication of any influence by the EU agenda on national policy debates.

[28] Only 40 percent of the total set of articles that were coded in the five countries was classified as about specific fields of research, i.e. the majority were coded under 'research in general'. For Norway only 20 percent of the articles were coded as 'research in general'. This difference may partly be the result of different interpretation of the categories used in the coding.

[29] If several forms of research are addressed, but no form has a dominant role in the content of the article, up to three forms of research may be coded. Different applications in the coding of categories for 'form of research' may to a large extent also account for the deviating results for Norway. See footnote 18.

Figure 19 provides a picture of the distribution of articles in terms of the forms of research addressed. We see that basic research is the dominant reference in all countries except Finland where the more applied 'Research and development' is much more prevalent. We also note that 'strategic research' is more prominent in the Danish and Finnish debates than in the other countries.[30]

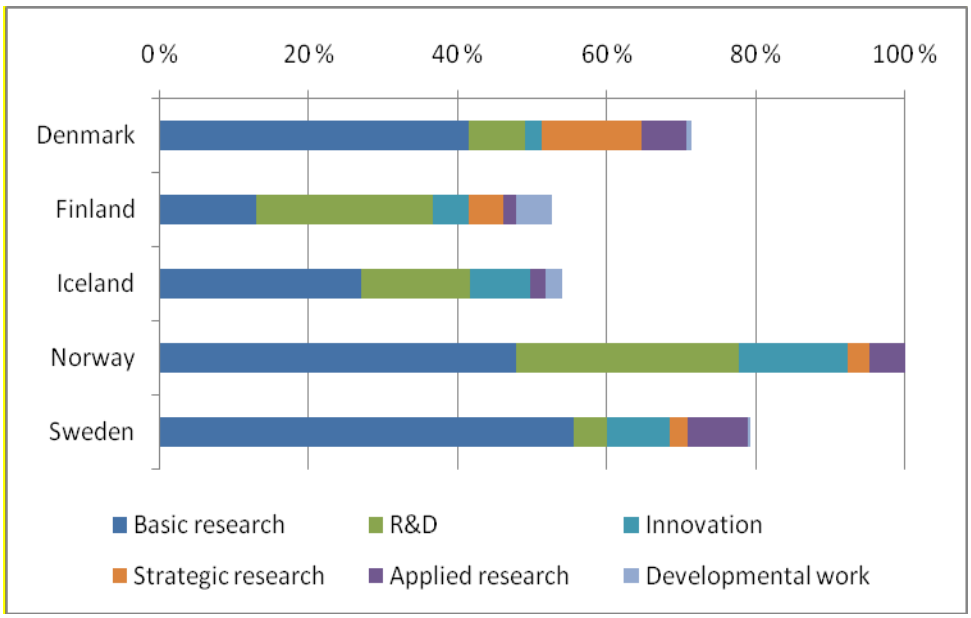

Figure 19 Forms of research, the category 'Research in general' is excluded. Percentage (N=1703)

Denmark

This figure shows that more than two-thirds of the debates in Denmark refer to science policy in general, indicating that it is the situation for science in general which is featured on the agenda, more so than for specific scientific fields.

Finland

Technical science and new technology play a prominent part in the Finnish debate. Figure 19 shows that in Finland R&D is the dominant form of research referred to. Even though basic research seems to be somewhat neglected, the debaters have been concerned about its role compared to R&D investments. This has been especially mentioned in the debates on external funding and research as a service activity. Researchers are afraid that they will not be able to use funding for basic research or teaching because the external funders expect to benefit from the research in a certain way and will steer the research strategically (HS 2003-01-30).

Iceland

Similarly to the other Nordic countries except Finland, basic research is referred to in half the cases which can be assigned to a specific area of research and development. This may be seen to reflect the vigorous debate on university research. When scientific field is taken into consideration, Health and Medicine is quite prominent. Research and development in general is also rather prominent.

[30] Caution must be exercised in drawing conclusions on this point since this dimension is sensitive to national particularities in the wording of the terms. The criteria to code this variable were however based on the principle that the central words of the substantial categories (or their synonyms) were explicitly present in the text. All terms where defined in the guide to the code key and referred to the international standard for research and development statistical purposes, i.e., the OECD *Frascati Manual*.

Norway

The relative distribution of scientific fields reflects the salient role that university researchers in general and medical researchers in particular have played in Norwegian debates. Medical researchers were highly active during the late 1990s when resource issues rose to the top of the research agenda, and the poverty of Norwegian medical research was focused, and documented. The active role of medical researchers lingered through active role of some highly prominent and visible players, such as the 1999–2001 rector of the University of Oslo (Kåre Norum), and professor Per Brandtzæg, who wrote several long debate articles throughout the period under analysis (and continues to do so to this day). While phrasing his arguments in terms of "research", using the low Norwegian "R&D share of GDP" as evidence, he generally refers to university research, and often to experience from his own (fields of) research. We also note a relatively high frequency of articles that address the humanities.

Sweden

As for scientific fields, the majority of the articles in Sweden concern Humanities and Medicine. One obvious, or at least relatively unsurprising, reason is that both fields demand more money, although not always as straightforwardly phrased as: "More money for Humanities Research!" (UNT 2005-05-15). However, the fields differ somewhat in the way they argue. As far as medicine is concerned, there seems to be no requirement to argue for the societal needs for research in this field. The starting point is rather that Swedish Medicine research is losing ground in an international perspective. International competition is the argument for more resources. A bibliometric report from the Swedish Research Council showed that Sweden was losing ground to other countries such as the US, which spent far more money on medicine and health science research. The internationalisation issues have been discussed in the Humanities as well. Swedish Humanities scholars should be more internationally recognized and active in networks, one journalist wrote (DN 2005-04-12). In fact, the great Humanities debate in 2005 started with professor Sverker Sörlin's critical reflections on Swedish universities' positions in the ranking tables. However, the debate soon became narrower, more national and even disciplinary. The lack of international contacts and national publishing in Swedish Humanities research has been discussed by a number of writers, although most of them represent only a few disciplines such as literature and history of ideas.

3.5. WHAT CHALLENGES WERE PICKED UP?

The forms of research classification are also linked to the topic 'New Challenges' which we defined as a collection of strategic issues of research policy. The 'new challenges' topic consists of seven issues ranging from local/ regional initiatives to globalisation, see Figure 20.[31]

[31] A full list of issues under the "new challenges" category:
V70 Nordic initiatives on research policy (e.g. NORIA)
V71 European initiatives on research policy
V72 Other international initiatives on research policy (e.g. from OECD, GLOREA)
V73 Globalisation
V74 Policy interaction/Policy-mix
V75 Strategic research focus areas
V76 Local-/regional considerations

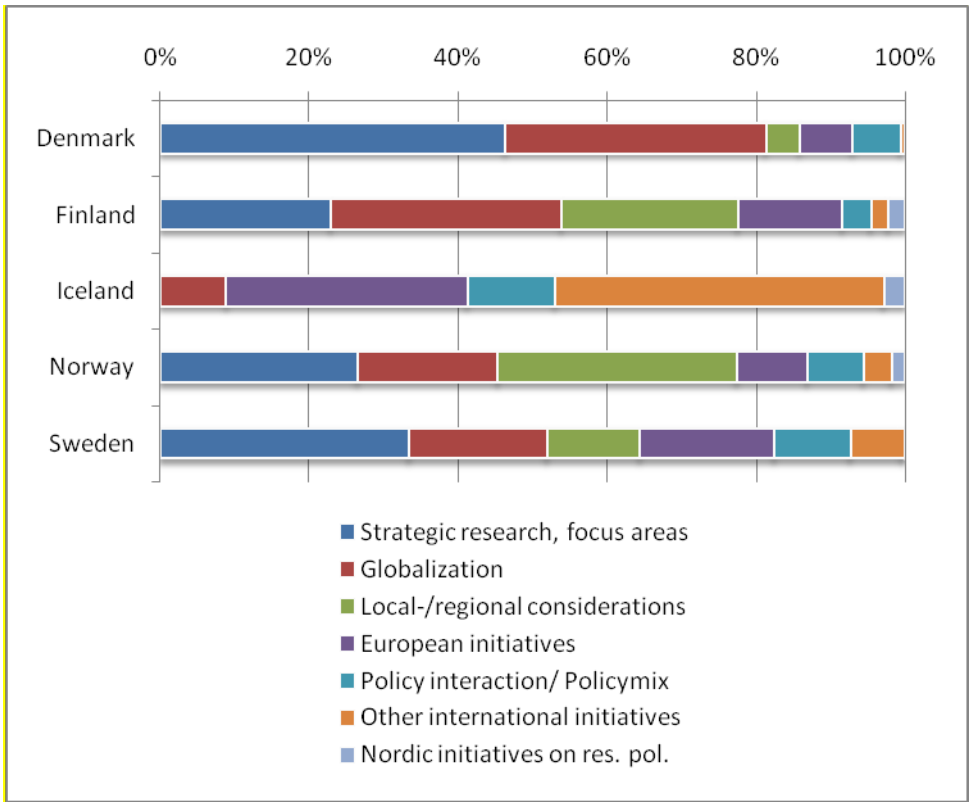

Figure 20: New Challenges by country and sub-topic (N=954)

Figure 20 indicates that the two categories Strategic research focus areas [32] (selected by research councils/ government) as well as references to the globalisation challenge prevailed in the debate articles in all countries except Iceland. In Iceland, funding of R&D through research programmes has not been common. The largest part of competitive funding has been for general research funds rather than programmes. R&D programmes have increased in importance after the establishment of the Science and Technology Policy Council, but their budgets remain rather small.

Denmark

As shown in Figure 18 strategic research is on the agenda in Denmark more than in any other Nordic country, and this discussion includes references to initiatives presented by research funding councils especially created for strategic research.

Finland

Globalisation issues turn up clearly in 2004 when the first globalisation report was published. The background for the report was Prime Minister Vanhanen's initiative to find out the possible consequences of the upturn in the economies of China and other low-cost countries. In the Preface, the globalisation report states that the starting point for the report is the same as Wim Kok's committee, and a clear reference is made to the European Union and its targets (VN 2004, 5). As globalisation is the major challenge in the Finnish debate, education and research play a crucial part in this.

Globalisation is linked with the efforts to move from science and technology policy to innovation policy in all areas of society. This also emerges in the debate since innovation issues become topical at the same time when globalisation is debated. The occurrence of the so-called China phenomenon can be seen in all the

[32] Note that "strategic research" is one form of research, see figure 19, as well as a challenge "strategic research focus areas", see figure 20.

papers, and to some extent the debate reflects the ideas presented by the Science and Technology Council and the second globalisation report in 2006 when a decision was made to establish Strategic Centres of Excellence.

Another aspect of the globalisation debate is the tension between global and local issues. The regional dimension of the education and research system has been extensive but as globalisation has paved the way for a need to reshape the innovation system, universities and higher education are challenged. Behind this is the idea that Finland cannot afford to sustain the university system as such and more specialization is needed. At the same time, however, there is a push towards bigger units and networks, preferably with some international cooperation.

Iceland

The Icelandic system of research and development is very small and it is difficult to reach a critical mass of research in most fields of science, even though research in earth sciences and medical and health science is considerable in Iceland relative to the size of the country. Thus, foreign cooperation is essential, and the debate reflects the necessity for Iceland to take part in international cooperation, including the European Framework programmes, Nordic cooperation and international cooperation based on individual research organisations.

Norway

As in virtually every developed country research policy has in Norway, has been increasingly framed in terms of enhancing the competitiveness of the national economy. This reflects, apparently, the framing of EU science, technology and innovation policy in its Lisbon agenda in general, and the Barcelona target in particular. Hence, the linking of competitiveness as core policy objective and issues of national/regional R&D finding may be seen to reflect the influence of EU STI policy. This is also the case for Norway, despite its not being a EU-member, *inter alia* through the adoption of the Barcelona target in the 2005 White Paper on research policy. It seems, however, that the specific EU phrasing of the competitiveness/R&D funding nexus did not shape the Norwegian debate to the same extent as in other Nordic countries. While globalisation is salient within the set of articles that discusses one or more topic within the "new challenges" category, that set consists of only one tenth of all Norwegian articles. Local/regional aspects, on the other hand, are highly salient in the Norwegian debate, more so than in any other country. These include both supportive and critical articles.

Sweden

As far as Sweden is concerned, globalisation is primarily mentioned at the beginning of newspaper articles, as a point of departure for the ensuing argument. For instance: "In a globalised world, Sweden has to remain competitive in research and innovation". There was a globalisation committee founded in 2006, including many prominent representatives from the sector, and chaired by the minister of education and research, Lars Leijonborg. The committee has produced many reports, many of which are related to R&D issues.

3.6. INTERNATIONAL DIMENSIONS OF RESEARCH OVERSHADOWED BY THE NATIONAL

The articles were also coded to capture references to geographic areas and to international cooperation. "Geographic area" covers both the country and regional levels in order to see whether or not the research policy debate in the Nordic countries looks to other countries or regions for lessons and/or models.

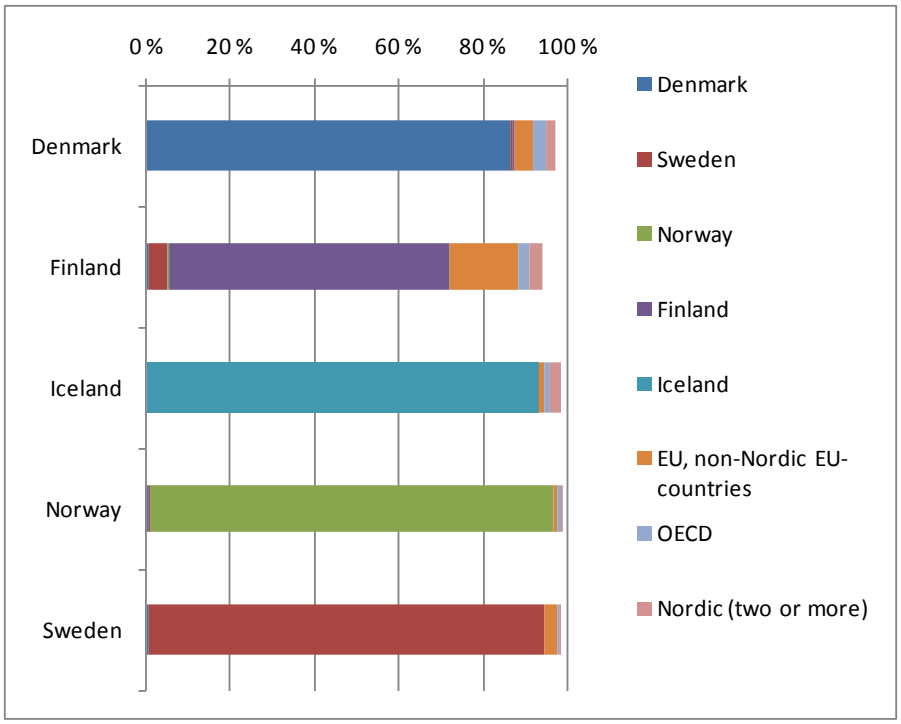

Figure 21.1 Geographic area referred to. Percentage (N=2267)

Figure 21.1 indicates that in all the Nordic countries the research policy debate had an almost exclusively national focus. References to the Nordic countries or other regions were seldom. References to non-Nordic EU countries were more frequent in Finnish debate articles than in articles in other Nordic countries.

Figure 21.2 maps the types of international collaboration which was the topic of a relatively low number of articles that did refer to international research cooperation. This variable was coded accordingly to the most dominant feature of international cooperation the articles. For all countries except Norway, EU cooperation is the most prevalent form of international collaboration discussed.

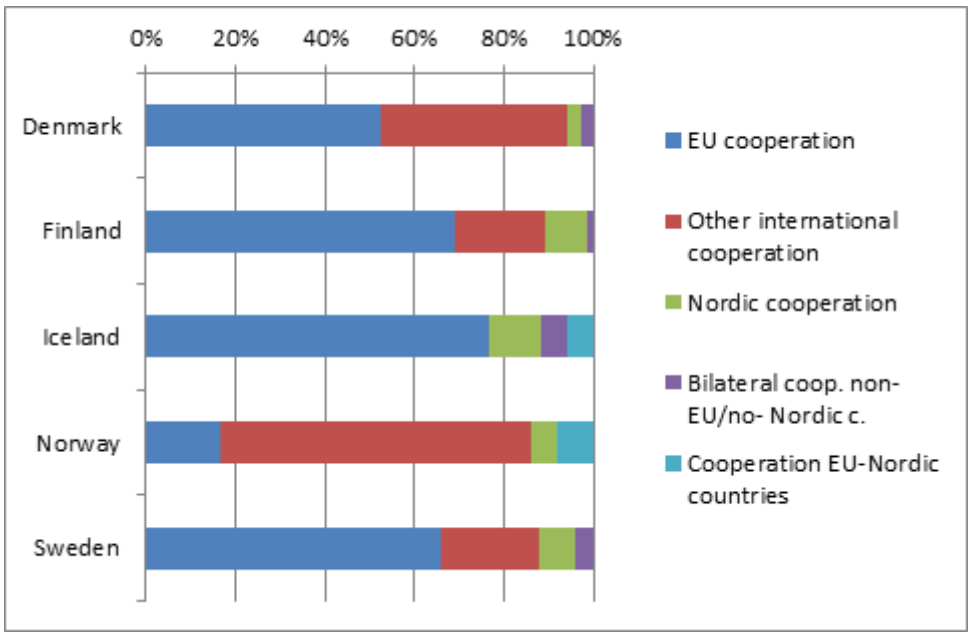

Figure 21.2 Reference to international research cooperation. Percentage (N=275)

Denmark

As in the other Nordic countries the Danish debate is almost exclusively national. This is partly due to the fact that the scientific environment has undergone large transformations. Many of these transformations have been made without making comparisons to the other countries which Denmark is ordinarily compared to. References to other countries have therefore been kept to a minimum. When reference to international research has been on the agenda – as seen in Figure 17.2 – this has been caused by the Lisbon agreement in 2000 and the Barcelona target from 2002. The Danish "Globalisation Council" from 2005 also brought up references to the EU cooperation. In other words the EU has functioned as a frame of reference when we depart from pure national orientation. The OECD closely follows because of the many recommendations and references also included in the "Globalisation Councils" report in 2005.

Finland

While the research policy debate is very national in focus and scope in all the countries, articles in Finland refer to the European Union more frequently (see Fig. 21.1.) This includes debates on guidelines of European research policy, and the establishment of the European Technology Institute (KL 2006-03-31 and KL 2006-04-07). It also seems that the Finnish debaters tend to compare the targets of the Finnish policy with those of the EU. Therefore any achievement at the European level is automatically regarded as an example of success.

As concerns Nordic aspects of the debate, a short exchange of views took place in *Helsingin Sanomat* in 2007 when a proposal was made that the Nordic countries should build a network of technology centres outside Europe (HS 2007-06-11). It was argued that especially in the fields of science, technology and culture, all five countries could share a common potential. Nordic cooperation seems, it was noted, to diminish in the wake of European integration, and these countries should invest more in utilization of technology. Some rather daring debaters urged the Nordic countries to maintain dialogical connections and creative thinking but to close down the Nordic Council and the Nordic Council of Ministers (HS 2007-06-12). To replace the Councils a think tank institute was suggested to be established.

Iceland

Iceland has had access to the EU framework programmes since the coming into force of the European Economic Area (EEA) in 1994. Unsurprisingly, discussions have emerged about the opportunities for Iceland in this cooperation. The Nordic financial system has also been extensively utilized by Icelandic researchers for the benefit of their work. One might have expected to see a larger proportion of articles dedicated to bilateral cooperation with non-Nordic and non-EU countries where cooperation on an institutional basis has been quite frequent in Iceland.

Norway

As seen in Figure 17.1, the debate in Norway has an almost exclusive focus on national issues. References to other countries are most often in the form of comparisons particularly with other Nordic countries, substantiating claims that Norway is lagging behind on virtually every indicator of "sound" R&D policy. Nordic and European research policy are rarely the topic of the debate, with some exceptions. One of these exceptions was an article by the director of the RCN in 2005 supporting the Lisbon strategy (Aftp. 18-09-2006). It is noteworthy that the only references in our material to specific Nordic policies (NordForsk, NORIA) are found in just one article – by Nordic ministers on the establishment of NordForsk and of the NORIA conception from July 2004.

Sweden

Also the Swedish debate's main concern is the national level. References to other countries are seldom, and most often, as in the Norwegian comparisons, almost exclusively with the aim to show how Sweden is lagging behind and losing out in the global competition. There are a few references to EU issues and even fewer to other Nordic countries.

4. DISCUSSION AND CONCLUSIONS

In this study we raised questions about what a more detailed mapping of research public debate during this recent ten-year period could say about the main trends of research policy developments in the Nordic countries. These countries – or at least most of them, are "frontier" countries in the progress towards the "knowledge-based economy" and "knowledge society", if international rankings and benchmarks are to be believed. Does this mean that research issues become more intensely and widely debated by the general public and in the media in these countries? Do groups beyond the inner circle of "usual suspects" – immediate stakeholders and directly affected parties in research and industry – make a stronger impact on the public debate? Are issues and forces that are often seen to drive developments such as competition and innovation, internationalisation and globalisation debated to an increasing extent?

At the same time, allegedly, there is a unique "Nordic approach" to these developments in which retaining the qualities of the welfare state, while pursuing the goals of competitiveness and innovation, are seen to be essential. Is this seen to raise conflicts that find expression in public concern, and how and to what extent does public debate play a critical and/or promotional role in relation to policy development and implementation? Is public debate primarily "reactive" or does it anticipate and push issues that are still not taken up on the policy agenda?

Our data do not provide simple and conclusive answers to these questions. In our analyses we have found a number of similarities and parallel developments, but also variation and divergences.

We asked if our material would support the assumption that research issues, in relative terms, are on the move from the periphery to the centre of both the general political process and public debates in general news media. We did indeed find some support for this. We saw (Figure 1) that while the extent of research policy debate remained relatively stable during the first half of the period, there was an overall increase in all countries except Iceland during the period 2002–2006. The increase was, however, uneven, and for all countries the number of articles fluctuated widely from one year to the next. These variations could to some extent be seen to reflect peculiarities of policy developments in each country supporting the interpretation that the increasing importance of knowledge in the economy and society also makes an impact on the volume of public debate on research.

A key question is, however, whether a more pervasive societal influence of knowledge in public perceptions also has an impact on the structure of public debate, in terms of which social groups take an active part in these debates. It follows from the assumption that knowledge is perceived to become increasingly important that broader sections of the public would also see themselves as affected to an increasing extent by research policy issues and decisions. Or, contrary to these predictions, does research policy remain a confined, *sui generis* type of policy, in which the role of the "usual suspects" – immediate stakeholders in academia, industry and research institutions, as well as actors directly responsible for policy development and implementation in research ministries and agencies – remain as dominant as they have been?

We did not find much support to for the assumption that extensive change is taking place in the structure of public debate. The role of researchers and representatives of research institutions combined as the dominant group of authors of interventions in the debate was clear in all countries except Iceland where controversy over a genetic database has triggered a broad public debate. The dominant role in the debate of researchers is particularly strong in Sweden. The presence of civil society remains marginal in all countries, the least so in Iceland, which does not provide much support for the idea that a general shift is taking place in terms of participation in research policy debate from immediate stakeholders to wider social groups. The perception of the Nordic countries as countries where civil society and the lay public play particularly active roles in public debates and policy process concerning science and technology is thus not confirmed by our data. This appears at least to be the case for issues of research policy as defined in our project. There is, independently of this

project, strong evidence that these groups *do* generally take active part in debates where research, technology and innovation issues are strongly linked to applications and/or broader policy issues, such as ethics (e.g., gene technology), environmental and health policy (e.g., risk regulation).[33]

We did find a notable difference in particular between Denmark and Finland concerning the relative roles of politicians and representatives of ministries. While this group was particularly active in Denmark, it took a much less prominent role in Finnish debates. The role of business was also relatively minor in all countries, but was more active in Denmark than in the other countries.

We also found (Figure 5) that public debate on research policy issues are to a large extent *policy-driven* in most countries. The policy-making process and actors largely determine and frame the agenda of the debate, which responds to and follows initiatives and statements by policymakers. If this is a feature of the debates in all countries, it is much more salient in Denmark and Sweden than in Norway and Finland. This pattern is also valid for the "referred actors" variable (Figure 7). While other ministers than the minister responsible for research were often referred to in Denmark, the Finnish minister for research and education was hardly referred to at all. Researchers were the most dominant "referred actor" group in Norway, as it was, if to a lesser extent, in Finland and Sweden.

Overall, we find that disagreements between researchers and politicians are by far the most common in all the Nordic countries. However, we find a higher level of disagreement among researchers in Finland and Iceland and more disagreements between politicians and researchers in Denmark, Norway and Sweden.

We could see little evidence that potential conflicts between values at stake surfaced in the debate. There were few explicit references to sustainability/environment and to welfare: references to economic growth and knowledge society were more frequent. This was particularly the case for Finland, and – for the knowledge society – for Denmark. There were very few negative references to the role of research as sustaining these values. A few more negative references to research as instrument for economic growth did appear in the Norwegian debate.

There was a similar overall research policy agenda in all the countries. Main issues in all of these were resource issues, in particular unmet resource needs in research and the level of overall national research investments; the reorganisation of research institutions, in particular higher education institution; the freedom of research, including both the availability of funds for "free" research and academic freedom. A less homogenous picture emerges when we move from the "core" of research policy to the interface of research with society, in terms of the role of research for innovation and enhancing the competitiveness of the national economy. These issues were more strongly voiced and advanced in the research policies in Finland and Denmark, and consequently were more salient in the debates on research in these countries. "Innovation" is the output issue that was the most extensively debated in Finland where technology policy has been more dominant than science policy both in the official policy documents and in the public debate. Recently innovation policy has taken the lead and become linked to all policy sectors making innovation an important aspect of both economic and academic performance. The role of innovation policy has become particularly evident through globalisation reports, restructuring of the university system and innovation strategies that have been formulated at the end of the 2000s.

Even though public debates respond to, and are triggered by policy initiatives and agendas, this does not mean that all important initiatives and issues within the policy are also reflected in the debate. One may argue that in

[33] See e.g., Gutteling et al. (2003), Media coverage 1973–1996:Ttrends and dynamics, in M. Bauer & G. Gaskell: *Biotechnology. The Making of a Controversy*, pp. 95–128, Cambridge University Press: Cambridge. For a somewhat different picture for Finland: Karoliina Snell (2009), *Social Responsibility in Developing New Biotechnology: Interpretations on Responsibility in the Governance of Finnish Biotechnology*, University of Helsinki.

some cases policy initiatives and decisions that were particularly important in terms of long-term structural impact on the research system were developed and implemented without rising above the threshold of public attention and debate. This applies to the Norwegian debate where key policy decisions during this period such as the establishment of the Research Fund, the introduction of the Centres of Excellence scheme, the new structure of funding of higher education institutions, with performance-based funding and (partial) separation of funding for research and teaching, and the steep increase in the costs of Norwegian participation in EU framework programmes for research, all proceeded without much controversy or debate in the general media. Similar features may be found in the Finnish debate, while in Denmark all policy initiatives are published by the Ministry of Science in newspaper articles and following debated by the immediate stakeholders.

One may see the quasi-absence in the Norwegian debate of any controversy on the Centres of Excellence scheme at the time it was introduced and implemented as relevant to our research question about potential conflicts between policies for the knowledge-based economy and incumbent "Nordic" concerns with welfare and equality. While policies for the knowledge-based economy will often emphasize concerns with global competitiveness, the virtues of "world-class excellence", and the necessity to concentrate resources to create "critical mass" research, one would expect these to be resisted or dampened by "Nordic"concerns with distributional equity and equality in society. Research and innovation policies within all the Nordic countries have arguably adopted elements of the former, "elitist" type of approach to an increasing extent. While these might be expected to run against strong egalitarian attitudes in Nordic societies and cause public controversy, we see to the contrary that this movement towards more saliently "elitist" policies in research met with little protest and was widely embraced in the public debate

As resource issues are the dominant set of topics in the debate, and much of this debate was about overall national funding of research in general, and about funding targets derived from or similar to the Barcelona target, one might argue that the European dimension did play a direct role in the national debates, despite scarce explicit references to the EU. As this debate was – and is –largely concerned with exerting pressure on national governments to increase (public) funding of research, there is a confluence of European policies within the framework of its "open method of coordination" (OMC) approach and the dominant voices in the national research policy debate: both exert pressure on national governments to increase the national funding of research. Numerous references to the Barcelona target in such statements indicate a European influence on national debates about this issue. We saw in Figure 15 that the "total level of financial resources" was for the Nordic countries taken together the third most frequently discussed topic. It was particularly salient in Denmark and Norway. To a certain extent, public debate may be seen to have acted as an "ally" to the European Union, exerting pressure on national policy-makers to increase research funding. To this extent, the Barcelona target may be seen to have worked as intended within the EU OMC framework.

The stronger focus on innovation and competitiveness in the global knowledge economy may also be seen to explain that policy debates in Finland differ notably from that of the other countries by a stronger presence of international issues and perspectives. We saw (Figure 17.1) that the debates in all countries have an extremely strong national focus, with few articles containing references to other geographic areas than its own. Finland differs again from the others by a larger number of articles with references to the EU area. The stronger EU focus of the Finnish debate is also emphasised by the higher number of articles that address international collaboration within the EU (Figure 14.2). The Nordic dimension, as indicated by references to Nordic countries, separately or as a group, or to Nordic collaboration(s), is virtually absent from the debate in all the Nordic countries.

We also see the strong imprint on the national debate by some particularly active individuals, including not only the responsible minister(s), but also leaders of academic institutions and research institutions, journalists who cover these debates over an extended period of time, as well as "intellectuals" and individual researchers with no formal position. This, together with our observations, that civil society still does not play a very active role in these debates, may indicate that even in the Nordic countries, research policy remains largely a policy

area located at the margins of the general political process, most often attracting only the interests of immediate stakeholders and people with expert knowledge about the specific area.

The ten-year period of our analysis illustrates extensive, even continual, institutional reforms in research as it concerns higher education institutions. Autonomy, institutional research strategies, commercialisation and entrepreneurship, as well as evaluation/performance/accountability and stronger linkages and collaboration between academic research and industry reveal adaptations to the knowledge-based economy. The debate also focuses on the effects that these changes may have on the academic professions and institutions in the long-term.

5. APPENDICES

APPENDIX 1: CROSS TABLES AND FIGURES

Table A1: Distribution of articles in the 10-year period 1998–2007

	Denmark	Finland	Iceland	Norway	Sweden	Total
1998	30	35	23	31	48	167
	4.1%	7.5%	13.6%	7.8%	9.2%	7.3%
1999	44	38	12	29	46	169
	6.1%	8.1%	7.1%	7.3%	8.8%	7.4%
2000	41	39	16	32	47	175
	5.6%	8.3%	9.5%	8.0%	9.0%	7.7%
2001	40	15	19	33	50	157
	5.5%	3.2%	11.2%	8.3%	9.5%	6.9%
2002	47	25	15	33	27	147
	6.5%	5.3%	8.9%	8.3%	5.2%	6.4%
2003	76	41	10	30	30	187
	10.5%	8.7%	5.9%	7.5%	5.7%	8.2%
2004	103	57	10	29	81	280
	14.2%	12.2%	5.9%	7.3%	15.5%	12.2%
2005	124	58	16	67	68	333
	17.1%	12.4%	9.5%	16.8%	13.0%	14.6%
2006	139	96	13	51	67	366
	19.1%	20.5%	7.7%	12.8%	12.8%	16.0%
2007	82	65	35	63	60	305
	11.3%	13.9%	20.7%	15.8%	11.5%	13.3%
Total	726	469	169	398	524	2286
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table A2: Type of article unit – distribution within the Nordic countries.

	Column comment	Editorial/ leader	Opinions	Letter to the editor	Interview	Comment/ analysis	Another type	Total
Denmark	110	88	436	32	53	7	0	726
	15.2%	12.1%	60.1%	4.4%	7.3%	1.0%	0.0%	100.0%
Finland	36	116	98	177	38	3	1	469
	7.7%	24.7%	20.9%	37.7%	8.1%	.6%	0.2%	100.0%
Iceland	0	5	0	99	4	60	1	169
	0.0%	3.0%	0.0%	58.6%	2.4%	35.5%	0.6%	100.0%
Norway	123	30	113	3	48	75	5	397
	31.0%	7.6%	28.5%	.8%	12.1%	18.9%	1.3%	100.0%
Sweden	33	46	392	0	21	34	0	526
	6.3%	8.7%	74.5%	0.0%	4.0%	6.5%	0.0%	100.0%
Total	302	285	1039	311	164	179	7	2287
	13.2%	12.5%	45.4%	13.6%	7.2%	7.8%	.3%	100.0%

Table A3: Main Actor (author)

	Denmark	Finland	Iceland	Norway	Sweden	Total
Minister/Ministry responsible	64	2	7	21	18	112
	8.9%	0.5%	4.2%	5.4%	3.5%	5.1%
Other minister/ministry/ the government	5	1	0	4	0	10
	.7%	0.2%	0.0%	1.0%	0.0%	0.5%
MP parties in government	36	1	1	9	16	63
	5.0%	0.2%	0.6%	2.3%	3.1%	2.9%
MP not parties in government	45	3	7	9	27	91
	6.2%	0.7%	4.2%	2.3%	5.2%	4.1%
Politician subnational	4	4	1	0	11	20
	.6%	1.0%	0.6%	0.0%	2.1%	.9%
Res.-/innovation- pol. body	31	21	23	26	11	112
	4.3%	5.1%	13.9%	6.7%	2.1%	5.1%
Another civil servant	4	13	3	1	7	28
	.6%	3.1%	1.8%	0.3%	1.3%	1.3%
Management of research inst.	54	61	19	28	41	203
	7.5%	14.7%	11.5%	7.2%	7.9%	9.2%
Organisation/union for researchers	16	8	3	14	23	64
	2.2%	1.9%	1.8%	3.6%	4.4%	2.9%
Industry	40	4	2	2	8	56
	5.5%	1.0%	1.2%	.5%	1.5%	2.5%
Other parts of/all business	41	16	1	13	8	79
	5.7%	3.9%	0.6%	3.3%	1.5%	3.6%
Another organized interest	29	9	4	7	20	69
	4.0%	2.2%	2.4%	1.8%	3.9%	3.1%
A business enterprise	9	9	4	8	3	33
	1.2%	2.2%	2.4%	2.1%	.6%	1.5%
Committee/commission/council	3	4	3	5	8	23
	.4%	1.0%	1.8%	1.3%	1.5%	1.0%
Individual researcher	150	117	3	115	190	575
	20.8%	28.2%	1.8%	29.6%	36.6%	26.0%
Journalist	144	106	68	118	111	547
	19.9%	25.5%	41.2%	30.3%	21.4%	24.8%
Another type (incl. citizen)	46	27	14	9	13	109
	6.4%	6.5%	8.5%	2.3%	2.5%	4.9%
EU	1	7	1	0	4	13
	.1%	1.7%	0.6%	0.0%	0.8%	0.6%
Another international organisation	0	2	1	0	0	3
	0.0%	0.5%	0.6%	0.0%	0.0%	0.1%
Total	722	415	165	389	519	2210
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

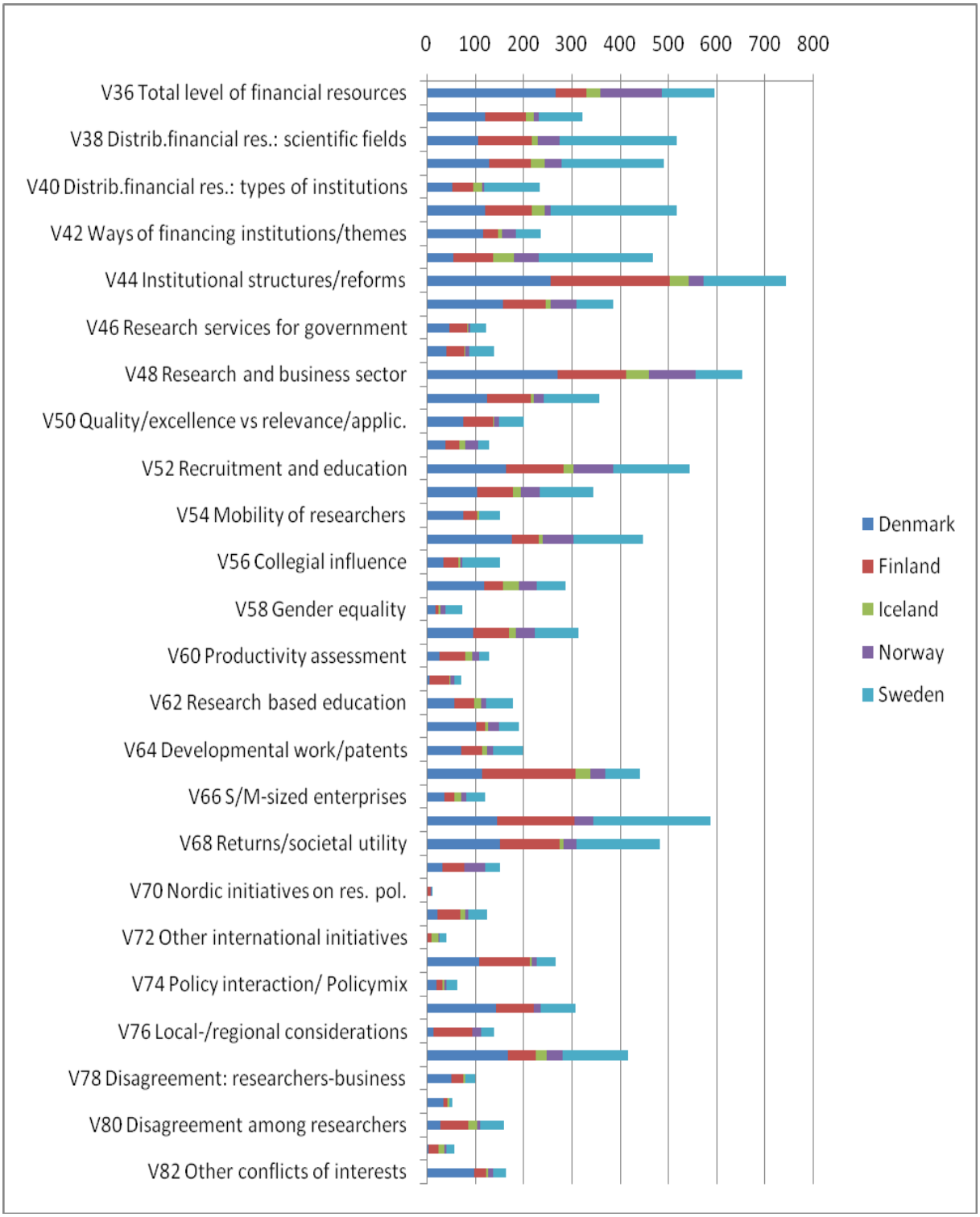

Figure A1: Frequency of sub-topics by country. Count (N=12880)

APPENDIX 2: CODE KEY FOR THE CONTENT ANALYSIS

Code key for The Comparative Nordic Study of Public Debate on Research Policy in the Nordic Countries 1998-2007

Variable	**Variable values**				
Identification variables					
V1 **Identification of the unit of analysis (uoa)**	(DK:1000-1999, FIN: 2000-2999, ICE: 3000-3999, NOR: 4000-4999, SWE: 5000-5999)				
V2 **Media**	Den (1)	Fin (2)	Ice (3)	Nor (4)	Swe (5)
	11 Berl 12 Inf 13 JP 14 Pol 15 Børs	21 22	31 32	41 42	51 52
V3 **Date** of issue	dd-mmm-yyyy				
V4 **Headline** (optional)	Textstring				
V5 **Writer(s)** of uoa **(1st +2nd name(s))**	Textstring				
V6 **Type of uoa**	1. Column comment (DK/NO: Kronik(k), SV: Krönika?) 2. Editorial/leader (DK/NO: Leder, SV:Ledare) 3. Opinions (not 1-2 and not 4-7) (DK: Debatindlæg, NO: Debattinnlegg, SV: Debatt) 4. Letter to the editor (DK/NO: Læserbrev/leserbrev, SV: Insändere) 5. Interview (NO/SV: Intervju) 6. Comment/analysis (editorial discussion article) DK/NO/SV: Kommentar/analys(e) 7. Another type (**excluding news reporting**)				

Agent variables	
V7 Writer's(')**sex**	1. Female 2. Male 3. Both sexes 0. Not specified
Type of agent who **wrote** the unit of analysis (uoa). V8 Type of agent 1 V9 Type of agent 2	1. Minister/Ministry responsible for research 2. Other minister/ministry (including those responsible for governmental research institutions) or government as a collective entity 3. Other MP from party/-ies in government 4. MP from party/-ies not in government 5. Politician from subnational levels 6. Representative of a research- and innovation- political body 7. Another civil servant as a representative of an administrative body on state, regional or local level 8. Representative of the different levels of management of research institutions 9. Representative of some organisation/trade union for researchers 10. Representative of industry 11. Representative of other parts of business or of business in general 12. Representative of another organised interest 13. Person from a business enterprise 14. Spokesman for a committee/commission/council (not mentioned above) 15. Individual researcher 16. Journalist 17. Another type (including a private individual, a citizen without indication of the 1-16,18-20 mentioned affiliations) 18. Representative of/ publication from EU 19. Representative of/ publication from OECD 20. Representative of another international organisation 0. Not specified

Type of agent furthermore **cited** in uoa V10 Type of agent3 V11 Type of agent4	1. Minister/Ministry responsible for research 2. Other minister/ministry (including those responsible for governmental research institutions) or government as a collective entity 3. Other MP from party/-ies in government 4. MP from party/-ies not in government 5. Politician from subnational levels 6. Representative of a research- and innovation- political body 7. Another civil servant as a representative of an administrative body on state, regional or local level) 8. Representative of the different levels of management of research institutions 9. Representative of some organisation/trade union for researchers 10. Representative of industry.

	11. Representative of other parts of business or of business in general 12. Representative of another organized interest 13. Person from a business enterprise 14. Spokesman for a committee/commission/council (not mentioned above) 15. Individual researcher 16. Journalist 17. Another type (including a private individual, a citizen without indication of the 1-16,18-20 mentioned affiliations) 18. Representative of/ publication from EU 19. Representative of/ publication from OECD 20. Representative of another international organisation 0. No type cited

Type of agent **referred to** in uoa. V12 Type of agent 5 V13 Type of agent 6 V14 Type of agent 7	1. Minister/Ministry responsible for research 2. Other minister/ministry (including those responsible for governmental research institutions) or government as a collective entity 3. Other MP from party/-ies in government 4. MP from party/-ies not in government 5. Politician from subnational levels 6. Representative of a research- and innovation- political body 7. Another civil servant as a representative of an administrative body on state, regional or local level) 8. Representative of the different levels of management of research institutions 9. Representative of some organisation/trade union for researchers 10. Representative of industry. 11. Representative of other parts of business or of business in general 12. Representative of another organized interest 13. Person from a business enterprise 14. Spokesman for a committee/commission/council (not mentioned above) 15. Individual researcher 16. Journalist 17. Another type (including a private individual, a citizen without indication of the 1-16,18-20 mentioned affiliations) 18. Representative of/ publication from EU 19. Representative of/ publication from OECD 20. Representative of another international organisation 0. Not specified

V15 **What caused** the uoa?	1. A law, a bill, an executive order and the like (national level) 2. Appropriations of financial resources for research (national level) 3. Some other statement/initiative from national politicians 4. Statement/initiative fra EU (all forms) 5. Statement/initiative from interest group(s) /NGO(s) 6. Statement/initiative from researcher(s) 7. Journalist' initiative 8. Something else (e.g. committee reports) 9. Previous discussion (not 1–8) 0. Not indicated

Type of researcher cited in uoa V16 Type 1 V17 Type 2	1. Professor/Head of a medical division at a hospital 2. Head of research/director of a research institution/head of a developmental division 3. Associate professor/senior lecturer 4. Ph.D./research assistant/lecturer 5. Researcher, in general 6. Other type 0. No researcher cited

Type of researcher referred to in uoa V18 Type 1 V19 Type 2	1. Professor/ Head of a medical division at a hospital 2. Head of research/director of a research institution/head of a developmental division 3. Associate professor/senior lecturer 4. Ph.D/research assistant/lecturer 5. Researcher, in general 6. Other type 0. No researcher referred to

Characteristics of the research field of public debate	
V20 **Scientific field** referred to in uoa	1. Natural science 2. Technical science/new technology 3. Health science 4. Agricultural, veterinary and fishery science plus forestry 5. Social science 6. Humanities 7. Cross-disciplinary research 8. Research in general (or reference to plurality of fields) 0. Not specified

Type of **research institution** referred to in uoa V21 Type 1 V22 Type 2 V23 Type 3	1. Universities and other higher education institutions (i.e. research based education). 2. Hospitals, health services 3. Governmental research institutes 4. Other public non-governmental/regional research institutions 5. Private non-profit research institutions 6. Research institutions of the private business sector 7. Another type 0. Not specified

Forms of research referred to in uoa V24 Form 1 V25 Form 2 V26 Form 3	1. Basic research 2. Strategic research 3. Applied research 4. Research, in general 5. Developmental work 6. Research and development 7. Innovation 0. Not specified

V27 **Policy field** referred to in uoa	1. Economic policy 2. Innovation policy 3. Business policy 4. Foreign policy 5. Finance policy 6. Employment policy 7. Law policy 8. Cultural policy 9. Taxation policy 10. Education policy 11. Social policy/welfare policy 12. Gender policy 13. Development assistance policy 14. Defence policy 15. Policy on agriculture, fishery and forestry 16. Energy policy 17. Transportation policy 18. Health policy 19. Policy on refugees and immigrants 20. Environmental policy 21. Another specified policy field 22. Two or more of the above mentioned policy areas 23. Regional Policy 0. Not specified
V28 **Geographic area** in focus in uoa	1. Denmark 2. Norway 3. Sweden

	4. Finland 5. Iceland 6. Nordic countries, two or more of them 7. EU, non-nordic EU-country(-ies) 8. OECD 9. USA 10. USA **and** one or more asian countries 11. Asia (one or more countries) 12. Other countries (including African countries) 0. No specific reference

V29 Reference of uoa to international **cooperation** on research policy	1. Nordic cooperation 2. EU cooperation 3. Cooperation between EU and the Nordic countries 4. Other sorts of international cooperation 5. Bilateral cooperation with countries not part of EU and not Nordic countries 0. No reference

V30 Focus of uoa in relation to **public-private sector for research**	1. Public sector research 2. Private sector research 3. Public and private sector research 0. Not specified

V31 **Time perspective** in uoa	1. Present 2. Past 3. Future 4. Present + future 5. Present + past 6. Past + present + future 0. Not specified

V32 Attitude in uoa on research as a means to **economic growth**	1. Positive 2. Negative 3. Positive and negative 4. Neutral 0. Not applicable

V33 Attitude in uoa on research as a means to **welfare (incl. life quality)**	1. Positive 2. Negative 3. Positive and negative 4. Neutral 0. Not applicable
V34 Attitude in uoa on research as a means to **knowledge/knowledge society**	1. Positive 2. Negative 3. Positive and negative 4. Neutral 0. Not applicable
V35 Attitude in uoa on research as a means to **better environment /sustainable development**	1. Positive 2. Negative 3. Positive and negative 4. Neutral 0. Not applicable

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Policy themes and issues 0: Issue not present in uoa 1: Issue present in uoa	
Financial management - Resource issues	
V36 **Total** national level of financial resources for research (e.g. % af GNP)	0 1
V37 The distribution of financial resources for research on **public and private** research	0 1
V38 The distribution of financial resources for research on **scientific fields**	0 1
V39 The distribution of financial resources for research on different **types of research**	0 1
V40 The prioritization of financial resources for research between different **types of research institutions** (macro-level)	0 1
V41 **Ways** of financing **total** national research activity (macro-level)	0 1
V42 **Ways** of financing different types of research **institutions/specific themes** (macro-level)	0 1
V43 Different **models** for financing research (including different funds)	0 1

Organisational management	
V44 Institutional **structures/**systems **reforms** related to research	0 1
V45 **Management** of research, including management **tools** at the level of institutes	0 1
V46 Research based **services for governmental** authorities.	0 1
V47 **Crossdisciplinary** research	0 1
V48 Research and the **business** sector	0 1
V49 **Need-/policy** driven versus **researcher** driven research	0 1
V50 **Quality/excellence** versus **relevance/application** of research	0 1
V51 **Infrastructure** of scientific research	0 1
Human resources	
V52 **Recruitment** and **education** of researchers	0 1
V53 **Salary** and working **conditions** of researchers (e.g. degree of permanent tenure)	0 1
V54 **Mobility** of researchers	0 1
V55 Academic **freedom/autonomy** of research	0 1
V56 **Collegial influence** for researchers	0 1
V57 Research **ethics**/research **integrity**	0 1
V58 **Gender equality**	0 1
Output-related issues	
V59 **Quality** assessment of research (including methods and indicators)	0 1
V60 Assessment of **productivity** of researchers (including methods and indicators)	0 1
V61 **Ranking** of research institutions (including criteria)	0 1
V62 **Research based education**	0 1
V63 **Communication** of research results	0 1

V64 **Developmental** work, patents	0 1
V65 **Innovation**	0 1
V66 Research and **small-/medium-sized** enterprises	0 1
V67 Research and international **competitiveness/productivity** at a national economic level	0 1
V68 **Returns** from research/societal utility	0 1
V69 **Citizens** and research	0 1

Challenges	
V70 **Nordic** initiatives on research policy (e.g. NORIA)	0 1
V71 **European** initiatives on research policy	0 1
V72 **Other international** initiatives on research policy (e.g. from OECD, GLOREA)	0 1
V73 **Globalisation**	0 1
V74 **Policy interaction/ Policymix**	0 1
V75 Strategic research **focus areas**	0 1
V76 **Local-/regional** considerations	0 1
Conflicts	
V77 Disagreement between **researchers and politicians**	0 1
V78 Disagreement between **researchers and the business sector**	0 1
V79 Disagreement between **politicians and the business sector**	0 1
V80 Disagreement among **researchers**	0 1
V81 Conflicts involving **citizens** (or groups of citizens) about research	0 1
V82 **Other conflicts** of interests (including problems of **incapacity)**.	0 1
V83 **Relevance of uoa for qualitative analysis** 0: No 1: Yes	0 1

Nordisk institutt for studier av
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