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RESEARCH STRATEGY DEVELOPMENT AND MANAGEMENT AT EUROPEAN UNIVERSITIES

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□ FOREWORD

Research Strategy Development in European Universities grew out of EUA's study *Trends IV: European Universities Implementing Bologna* (2005) which, in the course of analysing how universities are responding to the challenges of implementing the Bologna reforms, highlighted how few institutions have developed institutional research strategies. This study was undertaken in order to examine in detail strategy development from its definition through to the implementation phase and the factors, both internal and external, which affect this process. Based on site visits to institutions, this report reflects the complex situation which exists in Europe's universities and demonstrates the importance of strategy development for an institution's innovation potential.

The issue of research strategy was first examined by EUA at the conference "Research in European Universities: Strategies and Funding" (Uppsala, Sweden, October 2005). This report seeks to continue the discussions begun in Uppsala, by casting new light on many questions raised and deepening EUA's knowledge in this area, recognised as being crucial in the *Glasgow Declaration* (2005) in which European universities pledge to "exercise their own responsibilities for enhancing research and innovation through the optimal use of resources and the development of institutional research strategies".

EUA would like to thank the ten institutions which agreed to participate in this study for their cooperation and enthusiasm and the individual staff members for giving up valuable time to talk openly about their experiences. Our thanks also go of course to the report's author Sybille Reichert who after identifying this issue during the analysis of *Trends IV* data agreed to investigate it further. She has produced an insightful work on a key issue for EUA members.



Professor Georg Winkler
EUA President

□ ACKNOWLEDGEMENTS

A study which looks into the inner processes of university communication depends on the openness and critical spirit of the interviewees. I am deeply grateful for the readiness with which interviewees all over Europe have engaged in reflections and open commentaries on their internal processes of strategy development. Without the many lucid and inspiring comments on research development in their institutions and national systems, this study would not have been possible. In an age of glossy magazines and omnipresent marketing skills, it should be noted that universities are refreshingly able to step outside of any marketing discourse and reflect critically on their own environment to an outside visitor. I would also like to thank the contact persons at the different universities for having helped so willingly and efficiently in the organisation of the visits.

Last but not least, I would like to thank the EUA Secretariat, in particular Lesley Wilson, for having supported this project so actively, and the editors at EUA for their Argus-eyed review of the text.

Sybille Reichert

Since completing her Ph.D. at Yale University, Sybille Reichert has been working as a consultant in higher education policy over the last ten years for individual universities, ministries of education, the European Commission and the European University Association, focusing on issues of strategic development, internationalisation and organisational reforms of universities in Europe from an internationally comparative perspective. She was the co-author of the EUA Trends III and IV reports in 2003 and 2005 which looked at the implications of the Bologna reforms for university development in Europe. Having been responsible for strategic planning at ETH Zurich until 2004, Reichert set up her own consultancy firm in 2005, specialising in policy and strategy development in higher education with projects for European organisations, national ministries and universities.

1. AIMS AND METHODOLOGY

This study aims to identify the key issues and concerns which are addressed by European universities in their research strategies. It describes the main features of the processes put in place when developing and implementing them.

Commissioned by the European University Association, the study developed from the Trends IV survey on the implementation of the Bologna educational reforms within European universities (*Trends IV: European Universities Implementing Bologna, published in 2005*). In this, institutions revealed the different effects of these far-reaching reforms on their research resources and activities. In the context of the Trends IV study it became clear that just over a third of the sixty-two university sample had actually developed institutional research strategies, even when "strategy" was liberally interpreted. In only a quarter of these universities could evidence be found that groups other than the central leadership had knowledge of such strategies or overarching goals. The Trends IV data was too unreliable regarding questions of research development for far-reaching conclusions to be drawn. Nevertheless, the question arose as to why some institutions invest time and central resources in discussions to define institutional development perspectives in research, the issues to be addressed and which methods of institutional development to use. Furthermore, why do some institutions allow their faculties to define such goals, with only a few additional institutional priorities, while others prioritise an entire range of actions at institutional level, sometimes also including thematic priorities?

To explore these and other questions regarding the content, justifications, external conditions and internal processes which characterise the process of formulating strategies at different institutions, EUA decided to fund a small follow-up project which would provide an opportunity to examine in depth a few universities that have developed research strategies. On the basis of on-site inter-

views with a wide range of different university agents, the study scrutinised why and how these strategies were defined, their implementation, and how they were seen to impact on the institutions' innovation potential.

To provide a sufficient internal view of research strategy development both in terms of its contents and instruments and also as an institutional process, ten universities were selected¹ from the sixty-two institutions which had participated in the Trends IV survey. The following universities kindly agreed to host site visits:

- University of Amsterdam, Netherlands
- University of Barcelona, Spain
- University of Bergen, Norway
- University of Bremen, Germany
- University of Bristol, United Kingdom
- University of Copenhagen, Denmark
- University of Helsinki, Finland
- University of Latvia, Riga, Latvia
- University of Padua, Italy
- Trinity College Dublin, Ireland

During each of the site visits, which took place between June and October 2005, different groups from the universities were interviewed separately to ensure that all points of view, including less flattering critical ones, could be expressed. The following groups were interviewed:

1. The Rector/Vice-chancellor or Provost and other senior university officials responsible for research (or academic affairs), and vice-rector responsible for strategic development where such a function existed;
2. Some deans and department heads (or heads of schools if applicable),
3. Some professors involved in the process, including younger professors, for example, assistant professors or tenure track professors (where applicable);

4. The head of technology transfer office, IP office or other relevant administration directors dealing with research and innovation;
5. The head of finance (or whoever was responsible for internal resource allocation) and head of doctoral programmes or graduate school(s);
6. A random selection of PhD students.

At the beginning of each interview session, it was stressed that the project made no assumption about the usefulness or desirability of developing research strategies at universities. It simply sought to identify the reasons for, contents of, processes followed during the development and implementation of the strategy. It was also emphasised that examples of conditions at individual institutions would either remain anonymous, or would be identified only if the example was neutral or positive to the institution's reputation.

As shown already in other surveys² based on site-visits which focus on institutional processes at universities, open and critically reflective information about a topic which could give rise to institutional public relations responses, political correctness or the uncritical adoption of trans-national trends in other types of institutions, was freely provided. There was no suggestion that any of the groups interviewed were inclined to use the study as a public relations platform. Thus the author is confident that the data gathered provides a reliable basis for analysis. At each of the universities visited, the reasons given for developing a research strategy were remarkably consistent both among the different groups interviewed within each university but also across the universities. While some reasons were only mentioned at a few institutions, most were mentioned at all universities, albeit with different weightings and local meanings associated. In all cases, both external and internal reasons were believed to be responsible for the need to develop a research strategy. However, external factors were generally seen to lend more urgency to the need for strategic goals and actions.

¹ Given EUA's membership, the seven other higher education institutions (of which five had a research strategy) were not eligible. Of the twenty universities which had a research strategy, only those where the Trends IV survey identified some evidence that a group beyond the rector/vice chancellor's orbit were aware of the existence of an institutional research strategy were regarded to be of interest for this study, the assumption being that only then would it be possible to examine a strategy process rather than just a document. Of the remaining eighteen institutions, only one per country was eligible which excluded another four. Of the fourteen eligible institutions, ten were selected for site visits on the basis of practical reasons since all the visits were to be conducted by one person.

² such as Trends IV, but also the earlier "Eurostrat" project which looked at European policies and their relation to strategy development

2. WHY DO EUROPEAN UNIVERSITIES DEVELOP RESEARCH STRATEGIES?

At each of the universities visited, the reasons given for developing a research strategy were remarkably consistent both among the different groups interviewed within each university but also across the universities. While some reasons were only mentioned at a few institutions, most were mentioned at all universities, albeit with different weightings and local meanings associated. In all cases, both external and internal reasons were believed to be responsible for the need to develop a research strategy. However, external factors were generally seen to lend more urgency to the need for strategic goals and actions.

2.1 External factors

2.1.1. It should be noted that about half of the universities were asked by their regional (Barcelona, Bremen) or national authorities (Bristol, Copenhagen, Trinity) to describe overall strategic goals related to research, usually as part of the overall institutional plans which are regularly submitted. Such strategic plans were understood to form an integral part of the accountability which universities owe to funding authorities. In these countries or regions, the relative autonomy and the global budget grant which institutions have at their disposal is linked to the requirement of the institution to describe its strategic priorities in all major areas of activity including research. In Latvia, it was reported that the accreditation agency, rather than the government, had asked for information on strategic goals. This had led the university to examine these questions in more detail than the immediate information requests of the accreditation agency merited.

At some institutions, it was observed that an explicit relation between the institutional strategic priorities and those of the region or nation would contribute to the good will and financial support received by the institution. Where explicit regional or national priorities existed in terms of scientific or technological focus areas, institutions also felt the need to define their positions not just to respond to these priorities, but more importantly to complement them, according to their institutional strengths and potential (Bremen, Latvia, Trinity). Universities emphasise their role in providing a more long-term and pioneering vision of future scientific potential, rather than responding to externally defined priorities. In Barcelona,

Bremen and Dublin, where several groups reported that a substantive dialogue between the university and the regional authority on strategic priorities had developed, this dialogue was felt to be fruitful and likely to build trust between both partners, provided that some continuity and follow-up could be observed by each partner. (See also section 5.1 on the importance of regional support)

Closely related to the requirements of higher education authorities is the increasing tendency of the various research grant-awarding bodies to ask for research-related strategic goals to be defined. This was reported in Finland, Ireland, the Netherlands, Norway, and the UK. Such information on strategic goals, to which grant proposals could be linked, was usually justified as an attempt to assess whether the project was sufficiently embedded in a larger institutional context, thus contributing to its sustainability or reducing the financial risk to their investment. In Denmark, Finland, Ireland and the Netherlands, there were frequent criticisms that the level of institutional grants - through which strategic actions, flexibility and thus room for autonomous action become possible - is decreasing in proportion to the income generated through project grants from public agencies or private sponsors.

At all institutions, complaints were voiced that the indirect costs of project activities were decreasing the overall space for financial manoeuvre and thus for strategic action. Only projects that were regarded as strategic in their own right escaped. Indeed, the selection of project proposals which the institution should actually support, and thus allow to be submitted to grant-awarding agencies, was itself seen as an increasingly strategic issue since the decision to invest in one project and possibly sustain it after its grant expired, could result in other projects being left by the wayside.

It should be noted that all of the universities which were obliged to formulate strategic goals relating to research also found other reasons for taking such strategy formulation seriously, over and above the mere bureaucratic constraints.

Overview of national and regional stimuli for strategic development at universities

Condition	Institution ->	A	B	C	D	E	F	G	H	I	L
Ministry has research priorities (national or regional)		x	x	x	x	x	x	x	x	x	x
Main national funding authority has research priorities		x			x	x	x	x		x	
National or regional level priorities exert strong influence on research activities at institution		x	x		x		x	x		x	
Main national funding authority requires strategic priorities from institution		x			x	x		x	x	x	
Regional and other external public and private funding agencies require strategies				x	x		x	x	x	x	x
Other important funding authority (innovation oriented) has research priorities		x	x	x	x	x	x	x	x		x
New activities are mostly funded through extra external funding		x	x	x	x	x	x	x	x	x	x
Majority of research funding comes through external grants ("third party" or "second source") rather than through the institutional grant			x	x	x	x	x	x	x	x	x
Region plays a significant, "(x)", or strong, "x", role in supporting new initiatives				x	x	(x)	x		(x)		(x)

2.1.2. At all of the universities visited, most groups agreed that **the strongest external factor contributing to the need to develop a research strategy was the fiercely increasing international competition, especially in the natural and technical sciences.** Such international competition for highly qualified researchers at all levels, from doctoral students to professors, as well as national and European competition for project funding, was seen to force institutions to look for areas in which their competitive advantage is or could be strongest and where they already provide or could hope to achieve critical mass.

"It takes a concerted effort to become and remain the leader in one area globally. In order to achieve this goal we have to build on several pillars of excellence."

"In order to position our university in an international university landscape, the institution has to be associated with a few recognisable thematic strengths, which implies concentrating the limited resources on the strongest areas."

"In order to survive the Olympic games of international competition, we have to know our institutional strengths and weaknesses, relate them to an analysis of opportunities which the environment offers and concentrate our flexible resources on the most promising areas we have identified for survival. Only then do we have a chance to move up in the competition. We can only achieve international visibility, which we need if we want to sustain our claim to be the most research intensive institution in the country, in the areas where we are strongest."

(Comments by the Rectors/Vice-chancellors of three different universities)

The need to focus on areas where critical mass and internationally competitive research strengths come together was seen to be a necessary condition for competitiveness. Creating critical mass was regarded as becoming increasingly urgent as researchers in nine of the ten countries interviewed noted a growing tendency of research funding agencies to favour larger projects or centres/networks of excellence in their funding policies. This trend was observed with concern by some researchers who felt that this approach did not necessarily lead to the fostering of the most innovative research, which they felt was more likely to happen in smaller research groups.

A tension was also seen between the need to concentrate more resources on a smaller number of particularly well placed areas, and the breadth of the institution's portfolio needed to ensure an attractive teaching environment and provide a sufficient base from which new ideas and fields can emerge. Striking an optimal balance between competitive focus and sufficient breadth was regarded as one of the most challenging questions to be addressed and constantly reviewed in the strategy process. This was especially true at medium sized universities, such as Bergen, Bremen and Bristol. The leadership in Bergen stressed the importance of fostering basic disciplinary research and allowing it to compete, together with thematic and applied research, in the international research community: "Since disciplinary and basic research represent the foundations of all other thematic and applied research activities, removing disciplines means removing the foundation for all thematic and applied research activities. If there is a lack of balance between basic research in the breadth and focus on thematic and applied research, it may easily become a lose-lose situation for the overall activity of the university. Brilliant "brain seeds", in the form of young academics, will choose fields where there is a career and where research can be funded. It is our opinion that a win-win situation may be achieved only from a good balance between a competitive focus on thematic research and a competitive focus on dis-

ciplinary research. But to reach this goal, a little re-thinking in research politics with respect to how funds are divided between thematic and applied and disciplinary research activities will be required. Today there is too little money allocated to basic research both nationally and in the EU."

2.1.3. At some universities, such as Barcelona, Bremen, Copenhagen, Padua, Riga, and Trinity, the institutional leadership and some individual researchers also expressed the **need to develop a more strategic approach and institutional support for dialogue with external private business partners**, not only as employers of their graduates but also as potential supporters of their research projects and the general research cause. In Riga, this need was associated with the question of balancing activities in the new market economy process. In Barcelona, Copenhagen and Trinity College Dublin, it was felt that big business partners especially are often the best lobbyists for an increase in public research spending, in addition to being potential supporters of individual research activities of the universities. In Riga, Bergen, Bremen and Copenhagen and Helsinki, different institutional groups, not just those in managerial positions but also researchers, felt that research needs to respond to societal needs and contribute to the country's economic development.

At two institutions it was also mentioned that potential private donors often wish to know where the most promising areas and winning teams are, and how their activities fit into an institutional development plan, in order to ensure that they invest in "winners" only. Outstanding strategic projects in areas of excellence are needed as a precondition for fund raising.

Most institutions felt it was necessary to define a position more clearly towards new partners in order to make sure the university's institutional uniqueness was not only preserved but improved upon.

2.1.4. Research strategies were also justified as a **method to deal with reduced financial leeway**. At most institutions there was wide-spread pessimism concerning the overall willingness of governments to increase research spending significantly. Even in countries where the overall national research expenditure had risen, institutional representatives at all levels noted that such increases had benefited new programmes and activities, rather than increasing the institutional budgets, or had increased at a rate less than the actual research costs over the same period. Given the belief that the overall money received by the institutions would not increase or at least not sufficiently to be competitive, the conclusion inferred was that, if an institution wants to do something new, it has to withdraw from current activity. There was broad consensus that strategic choices regarding content prioritisation could not be avoided.

Linked to the perception of the declining capacity of governments to support universities and their research activities sufficiently, most institutions felt strategic choices were also necessary to **minimise the damage of decreases in government funding** (now or in the future). "We should not let the budget hamper activity in promising areas," both Bergen and Bremen agreed. Indeed, at Bremen University, past strategic choices and development had helped alleviate and even reverse budget cuts. Strategic choices, which had been made to minimise the damage caused by government budget cuts, had led to changes which convinced the government to revise its own intentions (in the late 1980s), reduce the projected cuts and even invest new money in strategic projects.

Related to this, **strategic positioning in the national higher education landscape** was felt to be necessary in light of recent trends to **increase institutional differentiation**, as mentioned in Finland, Germany, Ireland, Netherlands, Norway, and the UK. If not all universities can be research-led universities, it is important to make sure that an institution's position among the successful research-led universities is sufficiently high and likely to remain stable, or improve, in order to attract additional resources for expanding activities.

2.2 Internal Factors

2.2.1 Linked to the demands of international competition, most institutions show awareness at all levels of institutional management that there is a need to sustain, improve, foster and reward research quality. Various methods are chosen to foster quality culture with respect to a university's research performance and to mobilise its potential among its researchers. Processes for identifying and fostering excellence and prioritising among the multiplicity of projects, were seen to help nurture a culture of excellence by focussing on identified strengths. At many institutions, different groups emphasised that **fostering excellence** constituted the most important element of a research strategy. While there were differing opinions about the right methods and mechanisms to achieve the best results, the idea of defining such internal processes of identification and rewarding of excellence seemed to find overall consensus. Sometimes these measures were seen to help the institution withstand national pressures to allocate money mainly on the basis of teaching. Explicit support of the research dimension was seen as necessary to counteract national funding mechanisms. To put research performance on a visible pedestal within the institution, by providing special research support, was seen to help build a research culture which could otherwise so easily be pushed into the background by the other demands made on institutions. At Padua, for example, the institutional leadership had increased the numbers and opportunities for PhD candidates and post doctoral researchers, improved research training programmes, and launched an "elite" school of Advanced Studies for selected students, as part of an overall institutional attempt to support research culture.

In terms of quality, there is also a preoccupation with the public recognition of institutional research quality. University representatives, especially the leadership of the institution, mentioned the increasing importance attached to labels associated with research quality or performance levels. Easily readable rankings were especially seen as both a source of frustration but also of public relations opportunities. The Times Higher Education Supplement (THES) ranking of the two hundred best universities (or one hundred best science or

technology institutions) or the Shanghai Jiao Tong international ranking of research universities were mentioned at half of the institutions visited, usually associated with the desire to improve the institution's position in these rankings, even if doubts were expressed about the methodology used. Of course, the ranking with the biggest impact by far is that based on the results of the cyclical Research Assessment Exercises (RAE) in the UK, since it determines the level of future research funding of a given institution and, possibly, of a particular department in a given institution. According to researchers, the impact of the RAE can also be felt in public recognition, not only with respect to the overall performance of the institution, but also to the performance of a particular department. Thus, an important element of the institutional research strategy of Bristol University consisted of the development of concrete support instruments to help meet the overall need to excel at the next RAE in 2008.

2.2.2 At all of the institutions visited, institutional and faculty/school leaders emphasised the need to foster synergies between different research directions, breaking down traditional borders between schools and disciplines, as well as more rarely and to a limited extent, between institutions. Thus, one of the reasons for developing strategies was seen to consist of a **more targeted approach of creating opportunities for cross-fertilisation among research departments and units**. Often it was emphasised that the need to facilitate cross-disciplinary and other forms of horizontal communication did not reflect a mere political fashion, but was seen to arise from the increasing fragmentation of science brought about by specialisation. At a few institutions, it was also stressed that it was necessary to cross disciplinary boundaries in order to **be able to address major pressing societal problems which do not naturally fit into orderly disciplinary categories**. Finding solutions to urgent long term social problems, such as climate change or infectious diseases or the growing demands of public health, was seen as a primary task of a research university and therefore strategies were needed to help institutions confront such challenges.

2.2.3 Another internal factor which justified the development of an institutional research strategy concerned the **efficient use of resources, especially for research infrastructure**. Given the rising costs of scientific infrastructure, the university leadership and their staff expressed the (often urgently felt) **need to prioritise acquisitions**. Often such cost efficiency was associated with the creation of technology platforms where equipment could be shared among a wider range of users (as mentioned in Barcelona, Copenhagen, Helsinki, Trinity).

2.2.4 Half of the universities visited developed strategies in order to make the most of the generational change among professors, as noted by rectors/Vice-Chancellors and deans at the universities of Bergen, Bremen, Bristol, Helsinki, and Latvia. These institutions emphasised that the most important expression of an institutional research strategy would be the plan for hiring professors or priorities for recruitment. At the level of concrete research activities, the identification of the most promising research areas is obviously up to individual researchers so that the future of an institution can depend very significantly on its intellectual capacities and foresight. Thus **the recruitment of the most promising professors who could determine the research future of the institution, were seen to be the most decisive strategic choices of an institution**. Conversely, one university expressed its concern regarding a recent constitutional court ruling which had declared that enforced retirement at a given age was a violation of the constitutional right to equal treatment so that professorial retirements were now only allowed upon the consent of the individual. Since pensions are well below professorial income the disincentive for a professor to retire is considerable, resulting in a serious impediment to the institution's capacity to refresh its research innovation through new intellectual human resources. Only if positions were cut entirely, because whole units or departments were closed down, which could not easily be done on a regular basis, did the university have the right to ask a given individual to leave. Given the problems which were reported at that same university with an older generation standing in the way of

some of the most forward-looking new developments in research, these barriers to the renewal of human resources was seen to be one of the most serious threats to an institution's research development. A view, this, shared by some of the other institutions.

2.2.5 At three institutions, the institutional strategies were also intended to help to **confront the tougher competition for science and engineering students and doctoral candidates**. Making science and engineering more attractive to school leavers and making the institution the chosen site for graduate education were seen as two urgent issues to address.

Against this backdrop, it was observed at several institutions that the pressure to justify such strategy development internally had decreased noticeably over the years and that strategic work is becoming more accepted by the university community. With this increased acceptance, priority setting has also increased as the process develops (as noted by Bergen, Bremen, Bristol). However, some individuals observed a proliferation of strategies for all kinds of different aspects of institutional provision and management, and this was felt to result in increasing strategy fatigue. Generally, as will be explored later, more emphasis was placed on implementing strategic choices rather than on drawing up elaborate plans.

3.1 *Fostering excellence and improving performance*

First and foremost, most institutions (eight out of ten) focussed very strongly on **internal incentives and procedures to strengthen the quality** (and to some extent also the quantity) of research performance. This was not only mentioned in the strategic plans, but was also a regular point in the discussions and negotiations between the institutional leadership, its committees and the decentralised units.

At five institutions, the strategy included an explicitly uncompromising quality culture which included these core elements:

- Redirection of considerable funds to the strongest groups or units,
- Explicit demands for improvement from the weaker research groups or individuals,
- Continuous attempts to improve the transparency of procedures and formal reference points, including targets wherever possible,
- Unambiguous communication of expected quality levels

Competitive mechanisms were seen to be an important element of research quality culture and were usually mentioned in the strategic plans. Several institutions provided **internal competitive research grants or graduate positions** to help identify and foster emerging groups quickly and flexibly or to provide seed money for nascent projects that could not yet apply for external grants (Bergen, Bremen, Copenhagen, Latvia, Trinity). In Latvia and Bremen, there is a pool of doctoral positions, distributed on a competitive basis. In Bremen, 125 such positions are centrally distributed by the research commission. At the University of Helsinki, a pool of professorial positions has been established at central level, which centres, institutes or faculties can apply for. After a competitive call, the university senate then decides on the recipient on the basis of a recommendation from the Research Council.

At all institutions, professors as well as leaders at institutional and faculty level emphasised how important it was to encourage bottom-up initiatives. At some institutions, particular attention was also paid to young and emerging research groups.

Indicator-based performance funding had been introduced at most institutions in varying degrees, with the intention of serving as another means to help improve performance levels. This was usually not mentioned in the strategic plans, but regarded as part of the overall strategic aim of increasing performance culture (see section 4.5 for more details).

3. WHAT ISSUES ARE ADDRESSED AND INCLUDED IN UNIVERSITY RESEARCH STRATEGIES?

3.2 Thematic priorities

Prominently, and somewhat controversially within each institution, most research strategies (eight out of ten) included some prioritisation of a few thematic areas of research. To take away some of the sense of injustice of such prioritisation, these were usually defined very broadly. The areas deemed deserving of particular attention and a high concentration of resources were those identified within the institution (usually by a commission) as performing particularly well, and as having the best potential for future scientific development.

Institutions have very different approaches to this prioritisation: some favour soft methods of encouragement which allocate some additional funds without decreasing other units' budgets – a method which only seems to be financially feasible at a minority of institutions and by allocating very limited resources for a limited duration. Others actually redistribute funds to favour these areas. This approach means that the process of identifying and justifying priorities has to be transparent and solid enough to withstand the harsh scrutiny of researchers.

Most universities felt such priorities should also lead to a certain number of new appointments in the identified areas. Often a pool of graduate or junior research positions was reserved for these areas (although funds still had to be sought through individual proposals to maintain quality standards). Some institutions formed new research institutes around their prioritised areas in order to give them additional visibility and competitive standing (e.g. at Barcelona, Copenhagen, Helsinki). Finally, most institutions expected the institutional leadership to play some part, especially in terms of communicating the strengths of these areas to relevant external parties.

Among the different research universities there was a remarkable degree of overlap between the priority research areas identified, which presumably has to do with the wide definition of these

areas. In particular, nanoscience, biotechnology, information and communication technologies, neuroscience, biomedicine, and advanced materials were frequently mentioned as areas for expansion and prioritised attention. Of course, these larger areas were often complemented with an issue of particular interest which reflects the institution's strength or niche. This trend can be seen in the focus areas of the new institutes or centres which had been established to support priority areas. Nutrition, food technologies, public health and environmental technologies were mentioned by several institutions. However, there were also one or two areas which were only highlighted at single institutions and which were associated with their unique institutional profile, strengths and traditions, certainly in a national context, but often also in the international arena. For example, marine research and development related research were central areas of the institutional profile at the University of Bergen, while techno-mathematics, process modelling or research into transition economy and related social problems were among the unique areas included in the institutional profile of the University of Latvia. Sometimes, the universities highlighted areas of urgent social concern which the institution felt it was in a good position to address, such as water management, economic research into job creation, or technologies for food safety (e.g. Barcelona, Bremen, Latvia).

Related to concern with thematic prioritisation, were the strategic concerns regarding the concentration of excellence and the need to build critical mass. Medium-sized institutions, especially, felt under pressure to work in fewer but stronger fields in order to meet international competition better. A few academic leaders noted that clusters of excellence were being fostered at national or European level and emphasised the importance of taking part in those which are relevant in order to ensure the institution's competitive position.

3.3 Internal horizontal communication, cooperation, interdisciplinarity and cross-fertilisation

At most institutions, there were concerns regarding the fragmentation, or lack, of internal communication between potentially relevant research areas. Such fragmentation was seen to be an inevitable result of the increasing specialisation in science upon which scientific progress is predicated. Through helping the formation of larger research centres and research groups, some rectors and deans hoped to address such fragmentation, in order to be able to tackle a wider range of scientific and societal issues and enhance visibility. Thus, it was felt that strategic actions were needed to **help internal communication and cooperation and so create stronger and more visible research areas**. While it was acknowledged that researchers already tend to cooperate actively with outside partners, university leaders at institutional and faculty level felt that their institution's position, in terms of national and international competition, would be enhanced if internal communication could bring together more researchers from related fields. Enabling interdisciplinary cooperation internally and forging larger clusters of excellence would help the institution make a bigger impact in the competitive world. Institutional leaders and researchers observed that not only funding authorities but also institutional leadership were paying increasing attention to, and making efforts to foster, research consortia.

Linking to this, research strategies sometimes included some structural goals. For example, the creation of new **cross-reaching structures** such as "institutes" (Amsterdam, Barcelona, Helsinki, Latvia), clusters or centres (Amsterdam, Bergen, Bremen, Copenhagen) or themes (Bristol).

Enhancing **interdisciplinarity** was regarded as an aim at all of the institutions, either because the most exciting scientific questions could not be answered without it, or because it enabled universities to help address real life problems which do not easily fall into scientific disciplines. It was observed that, in order to foster interdisciplinary

research on a wider scale, a university needs more researchers who have had the exposure of working as "translators" between different disciplinary communities and methods. As noted in the literature on innovation processes, there is a need to have a sufficient number of "gatekeepers" to act as links between units/organisations and disciplinary communities: "Since it takes related knowledge to absorb knowledge, the effectiveness of the transfer of a technology from one entity to another is a function of the extent to which the receiving entity has related knowledge to allow it to absorb the knowledge being transferred." (Afuah 2003) However, few institutional leaders seemed to know how to attract and promote these "gatekeepers". Only in Bremen, where interdisciplinary research forms an important part of the institution's identity, there was an explicit instrument to promote such "gatekeepers". There the rector and senate had decided to make the ability to communicate across boundaries an explicit criterion for recruiting professors. Thus, recruitment commissions are asked to pay particular attention to the communicative skills of potential faculty members and their ability to reach out across disciplines.

However, the trend to favour interdisciplinary over other kinds of research was regarded with some scepticism. While it was generally accepted that many interesting new developments occur at the interface or boundaries between disciplines, many researchers and a few academic leaders stressed that these developments would be promoted most effectively if strong disciplinary research was supported. It was felt that researchers working and meeting on a purely disciplinary basis and with similar scientific interests would be better promoters.

Many researchers emphasised, with some urgency, that sufficient time and space was needed to consider and make use of such opportunities. If people are overloaded with duties, an expanding portfolio of tasks and too many short term pressures, they do not have enough space to navigate in and engage with truly innovative research environ-

ments (as mentioned in Bremen, Bristol, Copenhagen and Dublin).

Some researchers also stressed that the readiness to communicate across disciplinary and organisational boundaries was strongly determined by personal disposition and interpersonal relations. Interdisciplinary approaches cannot and should not be forced: they have to emerge from research questions, ideas and the wishes of individual researchers in order to become genuine paths of scientific development, rather than superficial exercises. The risk is that, otherwise, researchers could submit convincing proposals in order to obtain interdisciplinary funds and then use them in their respective areas with no reference to interdisciplinarity.

Interestingly, the above described strategic efforts to foster consortial research and interdisciplinary cooperation also included the social sciences and humanities (in Amsterdam, Bremen, Bristol, Copenhagen, and Helsinki) which were seen as traditionally less adapted to group research. These attempts met with mixed responses, often more negative from the older generation than the younger. Generally, it was felt that some fields within the social sciences or humanities lend themselves more easily to group-based research and interdisciplinary cooperation than others, and that an overly rigid prioritisation on group efforts in these sciences could actually undermine overall quality and motivation. Nevertheless, it was also stressed by many individuals that new research opportunities and paths had been created or revealed with the help of such “consortial prejudice”, and had proven to be exciting and rewarding for the individual researchers.

3.4 Increasing external research grant income and improving research services

Several institutions have included the aim of increasing their **external research** income in their research strategies. At one institution quantitative targets were even mentioned in this context. At the same time, the issue of addressing the costs associated with externally funded research was a major institutional concern at most universities, since general infrastructure and service costs were either not covered at all, or only met in part, by

grant funding. In Ireland, as in other countries, a major study had been commissioned to compare existing practices and develop a national policy framework for research funding and institutional overheads. Several institutions (such as Amsterdam, Copenhagen, Helsinki) were concerned with the increasing proportion of grant-based external research funding, versus research money that was provided through the institutional grant, since it was mainly through the latter that space for strategic manoeuvre was made possible.

To support external grant acquisition, most institutions are **expanding their research support services**, the majority of which had been founded originally to deal with the complicated grant applications for EU funds. With the rapidly increasing multiplicity of tasks and contacts, new competences and significant personnel development are needed to tackle the new portfolio of research support and innovation services. (See also 3.5 below, concerning the expansion of technology transfer services)

3.5 Expanding knowledge transfer, building partnerships with industry and creating a mentality of innovation

All institutions included the **expansion of knowledge transfer and innovation activities** in their research strategies and strategic actions. Entrepreneurship and connections with industry were reported as the most important evidence of an activity having relevance in the current political and economic contexts. Indeed, outreach, seen as service to society and the contribution of university research to national economic growth and social needs, has been, or is being established, as the third main function of universities, notably in Denmark, Finland, Ireland, Italy, Latvia, Norway, and the United Kingdom. While innovation is usually seen as one facet of the possible services which a university can provide, this is now more prominent in terms of how an institution demonstrates its relevance to modern society.

Several aspects of cooperation with industry were highlighted in strategic initiatives and plans. Firstly, all universities mentioned the expansion of already well-established forms of cooperation and public-

private partnerships, such as research projects, co-financed doctoral positions (Bremen, Barcelona, Padua, Riga, Trinity), industry-sponsored chairs (medium term or fully endowed), courses taught by industrial experts or courses co-taught by professors and industrial experts, common use of infrastructure and industrial researchers as residents on campus (Trinity). In each institution, it was frequently emphasised that such cooperation requires some learning by both parties. Sometimes businesses do not yet see the relevance of university knowledge production to their own concerns (Latvia, Bergen, Bremen). Here, universities are making an effort to inform the companies of the **potential interest** and benefit to them of university research. For example, the University of Latvia is creating a database and organising exhibitions on the university research environment. According to university representatives at this institution and several others, small and medium sized enterprises (SMEs) especially, do not usually consider that universities could address their research problems. Thus the University of Latvia tries to be as accommodating as possible and, when unable to respond to the problem itself, it refers the issue to another institution, so that the SME concerned still feels that approaching the university is worthwhile. In Copenhagen, the Center for Science Innovation is being set up as a “one stop shop” where companies can come with ideas which they want to develop further in cooperation with university researchers. In order to realise its strategic goal of expanding research-based innovation, the University of Helsinki’s innovation services, organised as a company (“Licentia”), is introducing a matchmaking process. As a first step it has started mapping companies and their objectives, in order to try and match these with potential partners within the university who could then be approached.

Generally speaking, at most universities there was a considerable number of representatives, especially among the institutional leadership, deans and experimental scientists, who found it strategically important to address the business perception that science is too academic, as well as address the university researchers’ fears that businesses (especially small and medium sized enterprises) sometimes demand too great a degree of responsiveness to their industrial concerns from university

research. The fears concerning the attitude of each party were widely regarded to be the main stumbling blocks in the initial phase of building durable university-business partnerships and which have to be addressed in order to implement an open innovation strategy.

Given the increase in tasks and institutional demands, it is hardly surprising that most research strategies included the aim to expand the **tasks and size of technology transfer and innovation services**. Some institutions have already had technology transfer or innovation offices for a number of years but are continually expanding their scope and competences. Others however have only recently set up such services.

An example of the rapidly increasing attention given to innovation in research-intensive universities can be found at the University of Copenhagen.

At the University of Copenhagen, a survey revealed a far greater level of entrepreneurial activity and industry cooperation of university researchers than the university leadership had actually expected. In order to allow the institution to benefit from these activities and to expand them further, a one stop support service was created in 2003 to identify, protect and commercialise university research results and support researchers’ innovation activities. In addition, the institution developed an institutional innovation policy (2001) and formed a committee for commercial policy, including the Vice Rector Research for strategic decisions. All these initiatives were in response to, and in anticipation of, a new Danish law on inventions in public research institutions (2000) and a new law on technology transfer (2004). With respect to costs, the Tech Transfer unit aims to break even and develop a net gain within the next ten to fifteen years.

Against the backdrop of a strong commitment to innovation at most of the universities visited, it should be noted that the major strategic concern identified is for the need for a shift in the mentality of university researchers and how to orchestrate such a change. The three central questions are how to remove the fear that innovation necessarily undermines the engagement in basic research,

how to make researchers identify more often the potential innovation dimension in their research and how best to address this in their projects. Often, the technology transfer or innovation offices were seen to work proactively in trying to push forward the strategic agenda of increased openness towards the needs of industry. However, some university innovation directors report that, given the limited resources, they concentrate their efforts on those researchers who in general are more proactive, or indeed on the younger generation who are less reluctant to engage with industry.

As reported at several institutions, one obstacle to innovation initiatives sometimes may be the fact that researchers simply do not know how to pursue innovation activities. This is easily remedied by innovation services. Teaching scientists, especially the younger generation, entrepreneurial skills and trying to foster an entrepreneurial spirit, are regarded as extremely important contributions to creating an environment where entrepreneurial activity can prosper. In Riga, the university now provides entrepreneurial training for younger scientists and PhD students who then can bring these skills to the research groups in which they work. This has resulted in promising increases in entrepreneurial activity.

All directors of innovation services emphasised that they saw no necessary contradiction between outstanding performance in basic research and high level of activity in innovation. Quite often, those who are most active in innovation are also among the most successful in basic research. Once their successes with innovation activities become known, and are associated at the same time with outstanding achievements in science, a snowball effect start to occur, as representatives from Trinity report. There, after years of mobilisation and enhancing opportunities, a major increase in innovation activity can now be seen. At all universities, technology transfer and innovation service officials as well as institutional leaders observe that the first phase of achieving such successes begins slowly, and requires researchers to be persuaded one at a time. In the beginning, innovation services have to actively seek out the researchers and build up "customer relationships" with them. The time required, and investment by the personnel

involved, is considerable and often goes beyond the university's resources. But after a few years more patentable inventions start to emerge and entrepreneurial activity is regarded in a more favourable light.

Researchers, innovation directors and university leaders alike felt that more **incentives** are needed in order to stimulate researchers to think about opportunities for industrial innovation, resulting from their research, and to develop stronger partnerships with industry, despite their natural professional inclination to focus on basic science. Most often it is the lack of incentives related to the national career structures that impedes this process rather than the institution's actions. National budget allocation, salary incentives and career advancement mechanisms do not yet support innovation activities.

However, it should be noted that there were divergent views as to how far such incentives and the shift of priority between research and innovation functions should extend. Regarding most aspects of technology transfer, patenting and other IP services, it was felt that industry offers and should offer more know-how and resources. The distribution of roles, labour, and resources to be invested in innovation services between universities and industry seemed to be a highly disputed and unresolved issue. Many university representatives and some innovation service representatives also expressed scepticism regarding the extent of possible support from industry, even in the long term. Industry's readiness to invest in university research and innovation was described as being rather more hesitant in Europe than many had hoped (although there seems to be considerable variation of levels of private investment according to the different knowledge sectors). Some expressed doubts whether the US model of industrial involvement in university would really be transposable to the European context. To conclude, strategic attention needs to be focused not just on changing the mentality of university researchers, but also of those working in industry.

Finally, it should be noted that strategic attention given to building links with industry did not only concern innovation activities and the creation of a dynamic innovation environment. At three univer-

sities it was stressed that it was the big corporations who were acting as the most effective advocates for supporting basic research. "Industry will save us from the politicians with their taste for immediate returns. It will force the politicians to think more long term," a researcher commented in Denmark.

3.6 Building regional networks

An important element of most research strategies consisted of expanding the institution's contribution to the technological, economic and social development of its region. In particular, regional concerns, such as the disappearance of old industries and the need to find new ones with which to replace them, were mentioned at Barcelona, Bremen, and Latvia. Naturally, the focus was most often on technological research: for example, in engineering, production technology, IT, micro-systems technology, materials, solid state physics, biotechnologies. The idea of new or intensified **partnerships** with regional authorities or businesses was emphasised at all of the ten institutions visited. Despite their international research perspectives, universities stressed strongly the importance of being located in a research-friendly environment. Indeed, at half of the institutions, some important new strategic initiatives had been made possible by regional support. At the University of Bremen, the Rectorate's strategic reserves and new initiatives were largely made possible by the framework conditions, laws, financial and political support of the region.

In Catalonia, Ireland and more recently Latvia, the region had been supported significantly by EU Structural Funds, often with direct benefit to the universities by way of investment in costly scientific infrastructure (for example, support for the Barcelona Science Park, or scientific equipment at the University of Latvia).

Many university leaders and their innovation service directors mention attempts to establish **new regional networks** which bring together scientists, technological firms, hospitals, and public authorities, around common aims, problems and infrastructure. At times science parks aim to estab-

lish new levels of cooperation, while, at others, different networks or alliances are formed.

Although **Science Parks** are mentioned generally, different stages of maturity were reported: from Bremen where a technology park was founded 17 years ago with the support of the region, to the University of Latvia, where technology parks are a more recent phenomenon, established with the help of EU Structural Funds. A whole range of different experiences and approaches to science parks could be seen. However, all universities saw the funding of science parks as a strategic investment which should help to improve links with industry, which most felt was in some need of improvement. At some institutions it was stressed that, in order to be successful, such investment should be linked to the strengths of the institution. Thus, the University of Latvia, after a less successful attempt with a more general technology park, is now taking its most promising institutes as the basis for more focused technology parks (for example, in magneto-hydrodynamics and smart materials, biotechnology including functional foods). This new approach is proving a great success and generating considerable interest from business.

At most universities, the investment in science parks is regarded as strategically important for two reasons. Firstly, the investment in forming links with industry is regarded as contributing to efforts in building a new mentality among university researchers. Secondly, science parks are designed to facilitate a new form of partnership with industry, one which responds more closely to industrial needs, with the hope of constructing an environment where the requirements of science and industry grow together. Barcelona's Science Park may serve as a good example of how to use a science park as a key instrument to open up proactively the university to industry partners:

Connecting basic research with corporate research and development around common labs, services and infrastructures, Barcelona's Science Park was the first science park in Spain and served as the model for the twenty other parks which have been or are now being developed across the country. The starting point was

the realisation that technology transfer activities had reached a plateau and that they were too divergent to meet the real needs of firms. New forms of cooperation needed to be found. The former Vice Rector for Research (who has recently become the new Rector of the University of Barcelona) founded, directed and expanded the science park from 1997 onwards, with the help of EU structural funds (50% of the expenses were met by Zone Two funding) and regional support. The science park concentrates its efforts strongly on biomedicine and the development of Barcelona as a bioregion, an effort which has also been supported by the pharmaceutical industry (60% of Spain's pharmaceutical industry is in Catalonia), as well as on nano-bioengineering (with the strong engagement of the Politecnica of Barcelona's new Institute of Nano-bioengineering, and the network of excellence Nano to Life.) After years of mixed reactions ranging from great enthusiasm to scepticism, the science park now receives wide-spread admiration and interest. University researchers benefit from the state-of-the-art facilities and services and the fact that they can now apply for funding for which they would otherwise not be eligible (for example, loans from science park foundations). Companies, which have five year agreements with the science park, benefit from the access to the scientists' ideas, the recruitment possibilities, the use of state-of-the-art facilities, and the fact that they can attract investment in research. Joint units comprising companies and research units of the university are generally felt to be a considerable step forward from more traditional forms of collaboration. 250 jobs have already been created and the space is now being doubled to accommodate more commercial users. Discussions about merging the technology transfer unit with the science park's innovation services are being held. Generally, the science park is seen to serve as a "shop window" for industry outside to gain a relevant insight into the university.

In addition to the model of science parks, other examples of strategic regional networks were identified. One good example is the Catalan IDIPABS (Institut d'Investigacions Biomèdiques August Pi i Sunyer) which was founded in 1993 as

a research centre by the Generalitat de Catalonia's Ministry of Universities, Research and the Information Society, the University of Barcelona's Faculty of Medicine, the Hospital Clinic of Barcelona and the Institute of Biomedical Research of Barcelona of the Council for Scientific Research. IDIPABS aims to integrate quality clinical research and high level basic research in order to achieve a more effective transfer of scientific breakthroughs in the prevention and treatment of the most common health problems in Spain. It also seeks to turn Catalonia and Barcelona into an important international pole of biomedicine, an aim to which the Barcelona science park is also contributing to. Common infrastructures function as nodal points in the network (see 3.5.). Similarly, the University of Helsinki is also participating in a nationally funded centre of competence which combines excellent university research with other public and private research institutes and some corporations, using common infrastructure.

3.7 Common scientific infrastructure and infrastructure platforms

Following on from the previous point, **new links around common infrastructure** constitute another central strategic concern for most of the universities visited. With no end in sight to rising costs and an awareness that the planning, investment and use of scientific infrastructure may sometimes be too fragmented between different departments, the leadership of many institutions mentioned strategic actions to improve the support, coordinated investment and use of scientific infrastructure, not only inside the institution but also in cooperation with other interested users. In Barcelona, Bergen, Bremen, Dublin, Latvia, science parks or other platforms (like the previously mentioned IDIPABS) have been established and are being expanded to ensure greater cost efficiency and also foster new cooperation since researchers often come together around common infrastructure. At Bristol and Helsinki, the institutional leadership explicitly asked whether the positive experiences of CERN and the European Molecular Biology Laboratory in Heidelberg should not serve as models for establishing successful networking and cooperation structures around extremely costly common infrastructures?. It is increasingly becoming a financial necessity to

think beyond the borders of a single university in order to remain competitive in the costly experimental sciences.

In some regions or countries the coordination of infrastructural investments for science among several institutions is required by funding authorities (this was reported for example in Catalonia, Finland, Ireland, Netherlands and Norway). Forward-looking investment choices and transparent, user-friendly, cost-saving procedures for ensuring optimal investment and use of costly scientific infrastructure were a strategic concern at all institutions, since such major investments always implied less money for other investments, thus presupposing some prioritisation.

3.8 Recruitment of top scientists and the scope and quality of research training

The last major element of institutional research strategies relates to human resource development and in particular to the **recruitment of top scientists and the scope and quality of research training**.

As mentioned previously, the most important element of human resource development is considered to be the **recruitment plan** which presupposes some identification of new areas in which professorships should be advertised. The **recruitment of top scientists**, while not necessarily mentioned as such in the strategic plans, is regarded as the most important strategic investment in the future of their institutions. The strategic reserves of rectors or deans are often used to support particularly important and costly recruitments. Offering competitive packages to world-renowned professors or even young rising stars is observed to be an increasingly expensive task, so that such investments have to be prioritised and linked to areas of outstanding strengths. Otherwise, the institution has little chance to attract the most competitive individuals and risks spreading its investments too thinly to allow for sustainable development in the long run. At several institutions academic leaders wondered how the rising costs needed to attract top scientists can be met by the institution alone. Two institutions mentioned that they have been granted private support for topping up start up funds or even the sala-

ries of new professors. Two others mention additional support provided from public regional funds for topping up recruitment packages.

Two institutions explicitly mention the strategic goal of internationalising the composition of its professoriate: Barcelona and Helsinki want to attract more researchers from abroad, at junior researcher/lecturer as well as at professorial level. Attracting researchers from abroad is often made difficult by institutional or national recruitment procedures or the uncompetitive level of start-up funds. To this end Catalonia has established a programme (ICREA) to top-up the start-up investment funds for new professorships in order to make them competitive in attracting international scientists.

Most of the institutions stress the importance of paying attention to the needs and creative development of the young scientists by offering them opportunities for kick-off funds, attractive infrastructure support. The University of Bremen is seeking to strengthen the intermediate scientist/lecturer level ("Mittelbau") which in the past, for historical reasons, did not exist at the institution. The situation of young scientists seems to be influenced not only by the availability of funding to kick-start new research activities, but also by governance structures. At three institutions young scientists at assistant professor level complained that they find it difficult to build up their new activities when faced with the dominance and territories of established institutes, departments or chairs, since funds are not easily redirected from these established channels.

Ambitious young rising scientists seem highly aware of other opportunities at other institutions. The more international their outlook, the less they seemed to accept being held up by sluggish institutional support and limited national funding possibilities. As a female assistant professor engaged in biomedical research comments representatively: "If they don't give me the scientific support and infrastructure I need to set up my activities at full speed within the next two years, I will reorient myself and go back to the States" (she had completed a post doctorate at Harvard Medical School).

Institutions mention wanting to increase the number of PhD students (Bergen, Bremen, Helsinki, Latvia, Padua, Trinity), the number of post doctoral researchers (Bremen, Helsinki, Trinity) or the proportion of international PhD students (Bergen, Bremen, Copenhagen, Padua, Trinity). In Latvia and Ireland this institutional goal is associated with the national government's policy to increase research capacity. In Ireland a recent OECD report has even recommended that Ireland double its PhD capacity. In Latvia, 70% of doctoral students have to pay tuition fees and most have to work full time during their PhD in order pay their living expenses. Access to grants is not easy, nor are they high enough to pay living expenses (unless it is a grant from structural funds). State scholarships, although being small, preclude the holder from working. Thus the institution is working under difficult conditions and needs to increase PhD funding from the institutional budget as well as ensuring that those who receive funding also get excellent PhD training with optimal mentoring.

Regarding graduate training, the strategic goals concerned:

- **The link between doctoral and master level teaching**, in order to ensure the best transition which takes into account different entry qualification profiles, as well as the need to increase cost efficiency (for example, by including more common provision);
- **The link between top research areas and graduate programmes/schools**, to enhance international competitiveness;
- **The integration of graduate training into larger, more structured environments, such as graduate or doctoral schools**, providing better social and interdisciplinary integration as well as complementary taught modules (for example, teaching research methods or related skills, such as project management, IPR, communication and presentation skills, academic writing in English, science popularisation, or other transferable skills). In Padua, an elite graduate school (Scuola Superiore Galileo) was founded a year ago with 75% of funding from the Cassa di Risparmio di

Rovigo and 25% from the university. The school offers special support courses and excellent student/staff ratios for twenty-four «high flyers» who can be students from both cycles (Bachelor or Master). They have to be particularly good to be admitted to the school where they follow interdisciplinary and research-oriented courses, many of which are offered in English. Students also have to learn another language (German, Spanish, French). In Helsinki and Bremen, the positive experience with the nationally funded graduate programmes and the support they offer to individual graduate students should now be extended to the whole institution. However, there were also institutions where such provision and structures existed in some faculties, without it being part of an institutional policy to extend these programmes or support structures to the whole institution or to define institutional standards of support or structure. At these institutions, these decisions were entirely left to the faculties, departments or graduate deans (as was the case in Amsterdam, Bergen, Copenhagen). In the UK and Ireland, a national code of good practice provided an overarching guideline, while the nature or structure of the programmes was left entirely to the individual departments or schools.

In several countries (Denmark, Finland, Ireland, the Netherlands), graduate schools have also been established between several institutions, to ensure sufficient critical mass in a given area. This raises some questions regarding strategic positioning of the institutional research profile.

- The quality of **supervision and mentoring**, including the responsibility for overseeing these questions.
- The internationalisation of the **graduate experience, in particular through the creation of joint programmes or joint degrees** (Helsinki, Copenhagen, and Trinity). For example, Copenhagen has the strategic goal that every programme must have at least one English track, which should also benefit the internationalisation of research through the availability of potential PhD students. Trinity and Bergen aim to foster outgoing mobility

using incentives. Bergen is also working to gain approval for joint PhD degrees in order to increase mobility. Bremen wishes to review its traditional teaching exchanges from the point of view of their research cooperation potential and also in view of international exchange at doctorate level.

4. INDIVIDUALISM AND INSTITUTIONAL STEERING: PROCESS AND METHODS OF UNIVERSITY STRATEGY DEVELOPMENT

4.1 European research universities conduct strategic management rather than strategic planning

The image of a university or any other institution developing a strategy, may bring to mind a process that resembles a rational plan largely initiated, orchestrated and directed from above, with goals defined at the top level which are then negotiated and fine-tuned at the next level. The reality in European universities appears quite different. Strategic development is clearly an iterative process, characterised more by continuous dialogue and constant revisions, by identification and adoption of new opportunities, rather than by a rational design decided on high and handed down for implementation. Indeed, it can be said that strategic development at universities resembles much more what recent theoretical studies on strategy call "strategic management". In contrast to the earlier school of "strategic planning", followers of strategic management emphasise the management of an organisation through strategic visions, with careful attention to soft issues of internal organisation and environment, such as style, structure, climate of the organisation (Hussey 1998). They regard the focus on creativity, and thus on behavioural aspects of management and the flexible implementation of strategic visions, as more important than the rational analysis of strategic opportunities in relation to institutional strengths and the design of an institution-wide strategic plan, although the latter is often still considered a necessary first step. At the universities visited in this study, strategic development revealed great attention to these soft issues of management, in particular regarding the promotion of individual initiative and innovation. Strategic development at universities seemed to focus most strongly on mobilising ideas and strategic thinking by individual experts – a very modern version of strategic management which has little to do with the centralist planning which some people may fear is associated with "university strategies".

Indeed the definition of a fixed document called the "strategic plan" for the whole institution constituted a relatively minor part of the strategic process, although such a document was produced at all of the institutions visited (see section 4.3).

The quality of strategic development at universities was most often seen to depend on the quality of dialogue on the future which leaders and individuals of the various levels were able to conduct with each other. While university researchers are quite attuned to thinking about the future of their scientific fields, university leaders regarded it as a considerable challenge to direct such strategic thinking beyond the boundaries of these fields into an institutional dialogue. After all, as many noted, the institution itself is not a natural point of reference for most researchers, even though they may be quite proud to be a member of it. Their fields, disciplinary or interdisciplinary, form a community of experts all over the world and constitute a more immediately meaningful environment for researchers than the institutional setting around them. To convert what is often described as a rather nebulous sense of affiliation to a given institution into an understanding of their university as a forum where researchers could and would want to construct a scientific future together, rather than just existing side by side, seemed to be one of the key concerns of institutional and faculty leaders.

4.2 Developing a university strategy: a highly distributed process

As mentioned previously, strategic development at universities comprises a whole set of strategic actions which are beyond the contours of any written plan or explicit design. Nevertheless, before we look at the whole range of methods of strategic development (section 4.4) we should focus on the development of the strategic plan itself, since it is the most visible part of the process of strategic development at European universities. It may well even be the most developed and disseminated process within the wider scope of strategic development methods. At all of the institutions visited, the definition of a strategic plan involves the input from, and negotiation with, several institutional levels, usually repeated several times, in a dialogue which is not only limited to the institution itself but, as mentioned in chapter 2, often includes regional or national partners.

To describe the process, it should be noted first of all that the process unfolds differently, and the weight of the role of different level actors (central

leadership, faculty deans, department heads, institute heads or whatever the unit definitions may be) is distributed differently, according to the strategic issue tackled. At some institutions, for example, the central leadership does not want to select or prioritise scientific areas, but feels quite comfortable with the idea of setting strategic aims with respect to quality procedures, targets regarding the number of doctoral positions or external research grant income, or overarching guidelines regarding the contours of graduate training. Clearly, the most consciously and carefully distributed process relates to the identification and selection of scientific areas in which the institution should prioritise investment. Here leadership at institutional or faculty level seem acutely aware that they have to make difficult and carefully weighed decisions since expertise is horizontally distributed to such a degree that comparison has to be drawn between widely different elements.

Of course the most visible strategic tool and process, which is usually seen as being the definitive element of strategic management, consists of drafting and adopting a **strategic plan**. This plan is supposed to be widely regarded as a reference document for medium term development. The definition of this strategic plan therefore reflects most clearly the diverse nature of strategy development at European universities. This process does not just involve a few forward-looking members of the executive board, but also boards of institutes (or whatever the lowest organisational unit may be), in many cases the faculty councils and at most places the senate and its relevant committee, as well as a wide array of vocal individuals.

If we look at the different levels within the universities we should note that strategic concepts are most often developed and collected first at the level of institutes or departments and then collated and often prioritised at the next level (usually faculties). At two institutions, most groups felt that this remained the most decisive level of strategic development and that little channelling and prioritising actually occurred above institute level. (It should be noted that this was seen sometimes to prevent the emergence of new initiatives, as mentioned especially by younger researchers, since it would require some willingness to redistribute resources at faculty level.) At a third institu-

tion, some formerly independent institutes associated with the university were about to regain their independence thus rendering their integration into a process of institutional strategic priority setting practically impossible. In most cases, however, the institutes' or departments' strategic proposals were considerably revised and prioritised at the next institutional level.

At four institutions, faculties seemed to play an important role in the strategic prioritisation not just as a relay between the institutional and more disciplinary perspectives, but also as a first filter for the multitude of proposals. At the University of Copenhagen, faculties played the most important strategic role, with the faculty of health sciences and the faculty of sciences either having developed or being in the process of developing their own research strategy. The strategies relate their strengths to external opportunities and seek ways to make use of external relations and partnerships with industry in order to expand. (It should be noted that these faculties are very large institutional units: for example, if counted as a separate institution the faculty of sciences would be the third largest higher education institution in Denmark in terms of research budget)

One institution was in the process of restructuring with the explicit aim of empowering the de-centralised level to think and act more strategically, with the help of its own budget autonomy. Moving away from a dual de-centralised structure with sixty-one departments and six rather weak overarching faculties, the fifteen larger new schools were designed to achieve more coherent strategic action.

At all institutions, an institutional committee or commission, usually connected with the Senate or Scientific Council, plays a central role in strategy definition. This committee uses the input from departments and/or faculties as a basis for its work. At the universities of Bergen, Bremen, Bristol, Helsinki, Latvia, Padua and at Trinity College Dublin the first draft of the strategy is prepared by the **Research Council or Commission with the help of professional staff**. This draft is then circulated again for comment and, after final revisions, adopted by the senate or board. This process usually takes over a year to complete. The

following description of the process from Bergen may be seen as typical:

“After initial brain-storming discussions, the proposals are then put forward to the Faculty Council, after which they are submitted to the Senate. Based on departmental reports, each of the seven faculties is expected to develop a priority list of proposals. Major priority areas could be defined quite easily since they coincide with the basic profile and tradition of the institution. However the prioritised research areas with a shorter time perspective (five to ten years) are more controversial and have to be constantly reviewed and renewed on the basis of priorities within the faculties. These faculty proposals are then forwarded to the Research Council where a first overall strategy is devised and submitted for comment back to the institution.”

The level of detail which was required in the medium term strategy differed widely from institution to institution, as did the explicit links to financial allocation.

The most detailed strategic prioritisation could be found at the University of Latvia where the strategy’s research innovation lines are defined with indicators on the basis of a data template which had been designed recently in a PHARE project for prioritisation in the process of establishing a technology park. This template compiles indicators of grant income, students, international visibility, originality (i.e. research should not be in saturated fields), relation to the needs of Latvian society, and the capability to encourage the development of new technologies and services. Once these areas are identified by the Senate Strategy Group which is headed by the Vice-Rector for research, they then go to Senate which accepts the strategy by voting (not an easy process in itself). For each year, the larger areas are broken down into sub-headings (this process is preceded by regular lobbying for these annual definitions) for which prioritised funding was made available. The Senate (called University Council) has the final decision and priorities are then implemented by internal research fund allocation. In spite of this level of detail and strict priority setting, professors did not express any sense of feeling restricted by these priorities, but seemed to feel there was enough space to contribute to the definition of the sub-headings.

Institutions which have seen several rounds of strategy development, report that at first such plans were not taken very seriously by the academic community. However, **after several rounds the strategic plans were accepted as serious guidelines for action. They lost some of their original vagueness and clearer priorities were set so that they were no longer a mere wish list.** Nevertheless, it should be noted that, no matter how clear the priorities and how mature the process of strategy development was felt to be, there was no institution which felt that the strategic plans, once drafted and adopted, should be used as a binding contractual document. The aims were regarded as guidelines and reference points which should still allow enough flexibility to respond to unforeseen opportunities.

It should also be noted that at the eight institutions where thematic prioritisation occurred, such priority setting attached itself not so much to ex ante strategic concepts, but rather to strategic narratives associated with individual research initiatives and projects and the wider contexts of excellence from which they were seen to emerge.

At several institutions, it was **emphasised how important leadership of the strategy development process was to the sustainability of the decisions.** Apart from the rector or vice-chancellor and any other centrally appointed head of the strategy development process, it was often stressed that deans also had a crucial role to play in the institutional strategy development, since they formed the relay between the perspective of the institution and the perspectives of the disciplines. Indeed the strategic role of deans and/or department heads had made three institutions change their procedures for selecting individuals for these offices. In the past, these were elected for shorter term offices (in the spirit of a primus inter pares among colleagues). It was now the rector or institutional executive board who appointed deans or department heads on the basis of proposals from the faculty. In Bergen, the new procedure of appointing department heads was first introduced in one pilot faculty. After some positive experiences, the institution is now moving to introducing appointed department heads in all faculties.

Overview of the different institutional approaches to strategy definition

Approach to Strategic management	A	B	C	D	E	F	G	H	I	L
Central institutional level plays the most important role in strategic development		x		x	x	x	x		x	x
Central institutional strategy/ strategic action prioritises particular areas	(x)	x	x	x	x	x	x		x	x
Central institutional strategic action focuses mainly on new initiatives	x	x	x	x	x	x		x	x	x
Central institutional level changes previous resource allocation		x	x	x	x	x	x	x		x
A central academic body (the Senate/Research Council / Research Committee) has a central role to play in the strategy definition	(x)	x		x	x	x	x	x	x	x
Faculties and Schools play the most important role in defining research strategies			x	(x)	(x)					x
Research institutes below the level of faculties play the most important role in defining research strategies	x							x		

4.3 Underlying assumptions about the nature and current processes of scientific innovation at universities

All of the research universities visited shared some assumptions on the nature of scientific innovation. These should be kept in mind when considering the approaches to strategic development taken by each. At the same time, however, there are also diverging assumptions regarding the possible impact and expected success which central or faculty incentives or other steering methods are felt to play in the institutional development. Lastly, there are different assumptions about the external environment, its stability or otherwise, which contribute to the institution’s acceptance or rejection of steering at central level, as well as to judgments as to which level should appropriate which function in the institutional environment. Thus, to understand the strategic development process at universities, we first have to take a closer look at these assumptions.

There is a large degree of consensus among the research universities visited about the nature and contemporary process of scientific innovation at universities. This is based on the following three core beliefs:

- 1. The individualistic motor of scientific innovation:** *The most innovative ideas are always born in the mind of individuals who have always been and will always be the most important motors of innovation. Thus, university leaders should never presume that they are able to prescribe which areas lend themselves to institutional prioritisation. Such priorities should be generated bottom-up and should be defined very flexibly in order to not suffocate the innovative life of the institution.*

2. The increasing group factor of scientific innovation: *An increasing number of scientific questions can only be tackled by research groups, which are often interdisciplinary. The composition of these groups cannot be imposed since the right “chemistry” between people is one of the most important factors in the success of a group’s innovative research potential. The only thing that can be done to foster group formation by those who manage institutions or funding agencies is to provide opportunities and incentives for individuals to meet around common scientific interests.*

3. The balance to be struck between long term perspectives and relevance for society: *Universities derive their institutional uniqueness from their long term perspective on all areas which they could and should explore. At the same time universities should produce research results and viewpoints which help society tackle its biggest and most pressing problems. Since one of the most pressing problems is the sustainability of economic and social welfare in Europe, universities have to produce relevant research in order to contribute to creating conditions in which the ambient economy and society can thrive.*

Given this consensus, there are different degrees and shades attached to these beliefs which contribute to the understanding and design of the strategic process.

Ad 1: Regarding the first belief, there is a wide range of different beliefs regarding the degree to which individuals can or should be moved to improve their performance, their internal cooperation and/or engagement with institutional priorities. Two types may be distinguished:

1A: The University should give maximum freedom to individuals so that they can realise their ideas, without any attempt to steer them in predefined directions. Since some individuals are brighter and more innovative than others,

these should be given greater room for action, i.e. better financial and physical resource. Therefore, good recruitment procedures and a reliable review of project ideas by peers with enough expertise are needed. Rather than steering individuals, one should provide the means which allow them to come forward with new ideas as easily as possible and which allow the institution to take note of these ideas in order to be able to promote them if they are judged worthy.

1B: The University should give maximum freedom to individuals so that they can realise their ideas, but only if they have been proven to be among the best. Peer review of proposals is not enough to ensure quality. The institution should provide rewards and performance-related resource allocation to allow the highest performers and best ideas to gain more resources/possibilities and motivate the less well performing to improve. Furthermore, it is reasonable to create opportunities to foster internal cooperation among members of the institution, or to motivate them to pursue overarching aims which seek to increase institutional visibility.

Ad 2: There is a range of beliefs regarding the necessity to steer the formation of groups, from allowing groups to self-assemble, to trying to do as much as possible to help the formation of new research cooperation.

2A: Groups assemble by themselves. If the institution tries to suggest the topics, there is a distinct danger that artificial project proposals will be suggested and people will still follow their own interests. The only thing research environments need is sufficient financial resources and a good flexible international quality review of proposals.

2B: While researchers naturally find others to collaborate with all over the world, they have no particular reason to seek collaboration within a given institution. Indeed, more often than not, they may not even be aware of potential exciting partners there, even though it is within the institution itself that interdisciplinary cooperation may actually be easiest. It is the role of in-

stitutional leadership to provide meaningful opportunities and incentives for people to meet in cognate areas which will be useful for the institution’s positioning and visibility.

Ad 3: There is a range of beliefs regarding the weight attributed to developing an independent long term perspective versus that attributed to the institution responding to societal needs. Two types can be distinguished:

3A: It is the university’s role to provide long term research and identify future problems and perspectives. Research relevance follows from this. While it is useful to optimise the dialogue between such long term research and other actors who could make use of such research, the contents of the research itself should not be moved in the direction of assumed relevance since the most ground-breaking solutions may actually come from unexpected sources anyway.

3B: While the university should be responsible for developing long term perspectives, it also has an obligation to conduct research that feeds into areas which have already been recognised as being of particular importance for the future development of the country (or region/continent). University researchers should not just

pursue their own research interests, but should look for as much overlap as possible between their own sense of what are exciting research areas and those which society sees as particularly relevant for its future well-being. If only for pragmatic reasons, for example, to ensure the financial competitiveness of the university, researchers have to make sure that their research is regarded as relevant by the tax payer or other financial supporters. Thus, the university should give a large degree of freedom to individuals so that they can realise their ideas, but should also push them to pay more attention to certain issues if these are deemed to be particularly pressing for the institution (for example, as part of its profile of strengths) or for the wider community.

Looking at the sample of our institutions, we find that their institutional beliefs, which influence their readiness or reluctance to accept institutional steering (as will be discussed later), are distributed in the following manner:

	Beliefs	A (individualist beliefs)	B (steering beliefs)
Institution A	1A/B, 2A/ B, 3A	2.5	0.5
Institution B	1A/B, 2B, 3B	0.5	2.5
Institution C	1A/B, 2A, 3A	2.5	0.5
Institution D	1B, 2A, 3A/B	1.5	1.5
Institution E	1B, 2A, 3A	2.0	1.0
Institution F	1B, 2B, 3A/B	0.5	2.5
Institution G	1B, 2B, 3A/B	0.5	2.5
Institution H	1A, 2A, 3A	3.0	0.0
Institution I	1B, 2B, 3A	1.0	2.0
Institution L	1B, 2A, 3B	1.0	2.0

Thus, we have institutions A, C and most strongly H, with a predominantly individualistic set up, while institutions B, F and G show stronger trust in institutional steering. Institutions E, I and L are more in the middle range, with E leaning more to the individualist side and I and L more to the steering side of the spectrum.

Interestingly, we can see a relationship between the beliefs that are predominant in the institutions visited and the ways in which the process of strategic development is organised. At those institutions at which the A beliefs are dominant, namely institutions A, C and most strongly H, there is also greater reluctance to attribute steering power to the central level leadership, apart from quality management which is regarded in all institutions as an accepted steering task of institutional leaders (though not confined to them solely). With their predominantly individualistic set up, these institutions try to minimise the number of steering interventions and tend to limit these to a few guidelines and uncontroversial consensual goals, such as the increase of graduate students or the enhancement of graduate training structures and mentoring. Even in relation to quality, the redistribution of resources is exercised to a limited degree. In contrast, institutions which show a dominance of B beliefs, namely institutions B, F and G, find reasons to justify institutional intervention and have more trust in institutional steering, and are thus also more likely to attribute more power to central leadership functions with respect to other overarching strategic aims.

Of course, it should be repeated that individualism is a strong foundation of all research universities, these, perhaps, being the only environment in which researchers can flourish. But institutions with predominant A beliefs take such individualism so far as to find most limiting institutional actions, apart from ethical standards and quality assurance, as undesirable and pernicious to the life of a research university.

However it should also be stressed, that even at institutions where considerable steering functions are felt to be necessary or at least accepted without major resistance at institutional level, there

can still be a significant amount of attention paid to individual researchers, greatly improving the conditions under which they work. When such attention to mobilising the potential of the individual researchers is complemented by other steering methods, this may lead to some individuals and groups being supported far more than others.

Interestingly, it should be noted that there are also institutions which feel very strongly about creating the optimal research conditions for individuals, while allowing at the same time significant intervention and prioritising on the part of the institutional leadership (see 4.5).

4.4 Methods of Strategic Management

These beliefs find their expression in a variety of strategic management methods.

4.4.1 Strategic methods to support conditions of individuals

To support the belief in the individual as the prime motor of intellectual development, institutions provide:

1. **Attention to competitive conditions of individual professorships in terms of resources and infrastructure.** Such attention may include the use of strategic reserves for particularly desirable new appointments. The more internationally competitive the market in a given scientific area and claim of the institution to be well positioned in the area, the more urgently was the need to have strategic reserves for recruitment negotiations emphasised. Naturally, competitive conditions are not just determined by the institution itself, but also strongly defined by the national and regional funding conditions. Indeed, in those countries in which the research funding agencies are regarded as providing sufficient possibilities for research project and infrastructure grants, the dependence of the individual researchers on institutional provision was noticeably less pronounced (for example, in Amsterdam, Bergen, Copenhagen). Conversely, deficiencies in national funding provision, such as

insufficient sources for the acquisition of scientific infrastructure, were immediately considered by researchers as restrictions to their individual innovation space. Younger academics, especially those who had not yet built up their personal networks of contacts that could provide flexible solutions to funding shortages, felt these constraints strongly.

2. **Internal research funds for emerging projects and areas.** This was regarded as an important method for enlarging individual innovation space since early stages in project development were generally not easily funded through external sources. Wherever such internal research grants existed, namely at the universities of Amsterdam, Bergen, Bremen, Copenhagen, Helsinki, Padua, Riga, Trinity College Dublin, they were distributed on a competitive basis and allocated after peer review, which was organised internally but often included international peers. Some institutions also used these research funds to strengthen institutional consortia or centres of excellence. All institutions which had internal research funds made sure that these did not duplicate but were complementary to national or regional research funding opportunities.
3. **Attention and responsiveness to emerging and promising initiatives of individuals by academic leaders at departmental, faculty or institutional level.** An important but often overlooked method of supporting individuals consists of the identification, communication and financial support of individual initiatives. This created a strong sense of possibilities being open in several institutions, which led to a general awareness of researchers that "a good idea can travel far in this place". This perception seemed to play a remarkably large role in the emotional identification of researchers with their institutions and should not be underestimated in defining the attractiveness of an institution in the eyes of particularly active and innovative researchers. The author found strong evidence of this at the universities of Bergen, Bremen, Bristol, Copenhagen, Latvia, Padua and Trinity College Dublin (which does not mean to suggest

that it does not exist at the others, given the author's limited exposure to the institutions). Once again it should be stressed that a sense of responsiveness could also be supported by easy access to regional actors, which may also contribute to the flexibility of research support in everyday life.

4.4.2 Strategic methods of institutional steering

The following methods are based on the belief that institutional steering can create competitive advantages and contribute to positive institutional development (concurrent with beliefs 1B, 2B, and 3B):

1. All institutions stressed that it was very important to have resources attached to new activities, for which flexible strategic reserves were allocated at institutional or faculty level (Amsterdam, Copenhagen, Helsinki, Latvia, Bremen, and Trinity). Most often strategic funds were used to create new structures (centres or institutes) around proven centres of excellence. This was seen to add new momentum and provide additional visibility to the outside world. In Bremen, Helsinki, and Riga, this seemed to be the favoured way of helping push a major new initiative forward.

A second possible use consisted of supporting projects in their quest for external funding, sometimes called matching funds. It was often mentioned that a small amount of money can be enough to enable projects to obtain more significant outside funding. It was also observed frequently (among all groups) that such reserves are becoming more and more important because external funding sources increasingly see institutional support as a sign of commitment and the internal appreciation of a project's worth. In the Netherlands this attitude has evolved into a strict principle of matching payments by the funding authorities which demand a 40-50% institutional overhead contribution to each research project. This adds to the problems which are usually listed in discussions on the draining effect of externally funded research projects which are not fully costed by the institution (David Westbury 2005).

Thirdly, strategic reserves were also used to create attractive recruitment conditions for highly sought-after professors. Two institutions managed to top up such internal funds with extra money from foundations to increase salary levels in order to be able to attract junior and senior researchers from abroad (Barcelona, Trinity).

2. While the previously mentioned flexible funds were most often used to establish new institutes and big centres, the creation of new structures around areas which had already proven their excellence was not seen to be the only instrument needed to remain competitive. At institutional level strategic funds were also performing a kick-start function to help embryonic areas emerge and consolidate. Such **support for risky research or emerging areas** was seen to be necessary since outside funding authorities may be too traditional in their outlook and priorities or too slow in reacting to fund such research (as noted at Bergen, Copenhagen, Helsinki, Trinity). It was also seen to be important as a counterpoint to the previously described “consortialisation” trend by which bigger groups are supported to the detriment of small groups or individuals. These funds were always distributed competitively with the help of a research council and a peer review process, in most cases including national experts, in some also international ones.

The extent and modalities of strategic funds differed significantly from one institution to the other:

At Copenhagen there was little money at central level, but more at faculty level (the university only consists of a few faculties). At Copenhagen’s Faculty of Health Sciences, 10% of internal research money goes to such a fund, so that €3 million per annum can be distributed on the basis of internal competition. Following an international review conducted by two to three reviewers, applicants have an opportunity to comment. The final selection is then made by a panel of senior researchers who can also exercise considerable organisational influence to ensure that the projects have a high potential for institutional sustainability. The selected

priority projects each receive about €100 000 per annum over a five-year period. Another part of the reserve may be freed up for strategically defined professorships, often those which explicitly go against the tradition of only recruiting new professors when old ones are retiring (and most often continuing or only slightly redirecting the direction of that professorship) or used to identify new areas in which professorships should be advertised. (Thus Copenhagen had recently advertised seven such professorships in biomedicine, bio-signalling and related areas at the Faculty of Health Sciences).

At other institutions reserves were mainly located at central level. This is the case at Helsinki where the central reserve, derived from a private pharmaceutical company, which had been in the hands of the university for 100 years and which has produced revenues for several decades, was used for graduate training quality initiatives and professorships in new areas proposed through new initiatives from the faculties. At Trinity the strategic fund is used to support bright new ideas and growth areas amounted to €7-8 million.

Some institutions have mixed models with strategic reserves at central and faculty level. This was the case at Bergen which has over €6.5 million available at central level for centres of excellence and other special initiatives, with additional strategic money (the greater part) at faculty level. While it is up to the faculty to prioritise areas, these decisions have to be defended at central level.

At Bremen, the strategic reserve was available at central level but the central strategic money also included amounts gathered from the regional authority on a more ad hoc basis (often resulting from researchers’ initiatives) which added up to around twenty million euro in total. Here the strategic funds, which were decreasing with repeated debt reduction programmes, were distributed on a competitive basis for 120 doctoral positions in particularly strong research areas, kick-start funding to prepare applications for larger third party funding, to distribute small third party fund-

ing bonuses and to support research priority areas in other ways.

At the University of Latvia strategic reserves also existed at central level, after subtraction from the faculty funds, but also included considerable sums from EU Structural Funds.

At all institutions, it was stressed repeatedly that strategic funds are essential to allow them to respond flexibly to new initiatives. Sometimes the allocation of such funds is accompanied by negotiating extra money with other (often regional) funding authorities. It was also observed that the redistribution of internal funds was more easily carried out at central level rather than at faculty or especially departmental level since collegiality, which was observed to be an important element in an inspiring research environment, often prevented such unequal treatment. Of course, in cases like Copenhagen, the few faculties were so big that they functioned almost as individual institutions. Moreover, the funds allocated to the faculties was often calculated predominantly on the basis of teaching tasks and in many cases left little leeway for the redistribution to or among other functions.

3. **Cluster formation (consortialisation).** At all but one of the institutions visited different groups agreed (with varying degrees of enthusiasm) that it was necessary to form larger clusters across disciplinary and departmental, and often even faculty boundaries, in order to gain critical mass and visibility. Only with larger, more visible groups and centres of excellence is it possible to survive European and especially international competition. This attitude was sometimes an explicit element of the research strategy and sometimes seen and used as a supportive method to enhance internal cross-fertilisation and external visibility. The perception was expressed by all groups within the institutions, but seemed to be strongest among rectors/vice-chancellors and deans, as represented by the following comment from the University of Bergen:

“Single researchers will not be able to compete in an international arena. The institutional leadership has asked the deans and the deans have asked the department heads to cluster researchers and candidates around fewer areas and bigger groups in order to strengthen them and the whole institution for international competition but also to push and fertilise ideas.”

Following on from this point, it should be stressed that such consortialisation was not regarded merely as a marketing device, but also as a genuine effort to enhance cross-fertilisation and innovation through new combinations of perspectives and through an increased “bumping factor”. The themes around which such cluster formation or consortialisation occurred were not defined from above, but identified on the basis of previous input (often through projects, existing centres of excellence or the plans of outstandingly successful individuals). The institutional trend is sometimes strongly reinforced by national funding authorities shifting some of their resources to research undertaken by bigger consortia and centres of excellence.

This trend is sometimes very critically viewed by social scientists and scholars in the Humanities whose research is traditionally more individualistic and does not easily lend itself to being grouped. While some such grouping activities are appreciated, the fear is often voiced that very successful individual research and scholarship will lose out in the long run. At most institutions, a mix of pragmatism, excitement at discovering new opportunities (usually among the younger researchers), but also a considerable degree of frustration (Amsterdam, Bergen, Bremen, Bristol, Helsinki, Riga, Trinity) could be found. In the Sciences there was less criticism, although some researchers noted that genuine innovation and the most important breakthroughs usually occur in smaller groups, which did not imply that there is no function for larger groupings but that it has a more complementary role.

The problem of the “small orchid subjects” was also mentioned. Some universities mentioned being caught between their relative lack of cost efficiency and the duty to protect these subjects in the interest of academic diversity which is a precondition for a creative environment. Sometimes solutions involved the coordination of cognate scientific areas within the same institution or with other institutions in close proximity. Some national measures included the concentration of a subject at one place in the country, which involved the relocation of the researchers affected.

4. Related to the previous trend towards supporting larger groups, there is a wider concern that attention should be paid to **internal horizontal communication and collaboration between faculties or other units.**

In this context it should be noted that decentralised structures can be (but are not necessarily) an obstacle. The most important success factor for internal communication across organisational boundaries seems to be the quality of informal communication channels, especially between professors and deans, but also between the institutional leadership and professors. Some Rectorates and deans were particularly attentive to these informal channels, which were judged to be better for the transfer of ideas than the official lines of communication which exist within the institution, by organising meetings around common scientific goals. An example of this can be seen in the idea-based lunches with junior and senior researchers from different faculties organised by the rector of the University of Copenhagen. Thus at the University of Copenhagen, which is a strongly decentralised institution, cross-faculty initiatives and the pooling of resources for new initiatives were not regarded as particularly difficult, either by deans or by researchers themselves. Appointments across faculty boundaries, a recent Biocampus initiative or the establishment of a centre of nanoscience, as a joint venture between the natural sciences and health sciences, were

seen to be cases in point. When asked how individuals explained this relative ease of cooperation, non-hierarchical and informal communication was regarded as a decisive factor.

At another institution it was regarded as particularly helpful for intra-institutional communication to have only small chairs and no institutes, which could cause them to be reluctant to enter into cooperation for fear of losing territory.

Flexible fund allocation and readiness to redistribute funds on the basis of excellence and interdisciplinarity, was seen as another way of ensuring some cross-unit communication and institutional coherence. In institutional contexts where these methods were followed, researchers reported considerable efforts to seek cooperation across units to bring forward projects that were more likely to gain institutional support.

However, it should also be noted that the two strongly decentralised institutions which did not emphasise the creation and fostering of cross-unit links and instruments in order to promote cooperation within the institution, also admitted to difficulties in defining and implementing strategic goals at institutional level in the face of obstacles at faculty level. Initiatives which required resources from faculty budgets had especially low chances of success according to most of the groups interviewed. Faculty borders were seen as standing in the way of common professorship and the common attribution of space or the relinquishing of space for a common cause, although of course a few successful cross-faculty initiatives could also be found.

In order to be able to prioritise, all institutions emphasised the importance of finding reliable ways of **identifying excellence.** Even institutions which are relatively reluctant to introduce institutional steering, feel that the “normal” leadership decisions on negotiating recruitment packages and supporting larger initiatives presumes a judge-

ment on the quality of the project or individual research qualifications. Academic leadership cannot avoid making judgements on academic excellence.

Given the difficulty of judging such a wide area of highly specialised expertise, any judgement needed a solid basis which was established, wherever feasible, through external evaluations by peers and often supported by quantitative data. **External evaluations by peers were said to help provide an accepted basis on which problems could be addressed and strengths prioritised,** as was mentioned in Denmark, Finland, Ireland, the Netherlands, Norway, and the UK. The University of Helsinki was even willing to invest its own institutional money in peer evaluations of research performance in order to establish a solid foundation on which strategic choices and priorities could be based. At several institutions, such as Bergen, Bristol, Copenhagen, it was emphasised that one of the primary functions (and *raison d'être*) of academic leadership consisted in the ability and responsibility to identify and address weaknesses and promote strengths. This was seen to be the main reason why department heads and deans should not only have managerial and leadership skills, but should also be respected in terms of their own research excellence. Under such conditions, researchers felt that they could have confidence in the fairness of financial redistribution. As long as research quality was viewed as the decisive factor in any strategic decision and the criteria were found to be fair and transparent, the consequent decision was seen as more acceptable to the academic community than by using any other justification. Of course, for all these decisions, no matter how transparent the criteria, intellectual judgements have had to be made, which again emphasises the importance of academic leadership and the overall process (for example, if a research commission is used). For example, in Copenhagen the criteria for the selection of prioritised funding in the Faculty of Health Sciences included the quality of

the actual research idea, the merits of the researchers, as well as the educational benefit which it would potentially bring, all of which required peer judgements.

However, more informal types of expert advice were also mentioned, such as conducting interviews with key players who lead bigger, successful institutes or initiatives. Generally, such identification was felt to be difficult but not impossible, though always in need of improved differentiation. It should also be noted that many institutional groups mentioned that evaluating the Social Sciences and Humanities presents an even greater challenge, given that reference points are often less international.

At institutions which allocate an internal fund for competitive peer-reviewed research grants, this was also regarded as a helpful channel for identifying emerging areas in which larger strategic projects or structures may be worth creating. The internal review of research proposals creates a process for observing and testing for the first time new ideas emerging bottom-up. As members of the Research Council in Bremen emphasise:

“To identify and justify strategic thematic priorities one has to identify strong areas or emerging initiatives internally with the support of competitive, externally reviewed mechanisms. This ensures that quality remains the guiding principle for selecting initiatives for institutional support. Otherwise you lose the trust of the scientists.” (Vice rector and a member of the Research Council at the University of Bremen)

Quantitative measures were said to be quite helpful as a first step but to be insufficient as a tool for identifying emerging quality. As mentioned previously, the quality of academic leadership tended to be seen as consisting in the ability to exercise sound judgement in the identification and promotion of good initiatives.

Many institutions rely on **data management units** inside or outside of the institution, such as the University of Barcelona which established an Agency for Research Management with IT applications and data on all research groups. This work complements the “map of excellence” which the Ministry of Catalonia uses to identify “consolidated” and “emerging” research groups (both of which are prioritised for fellowships and grants). The University of Barcelona’s research institutes are only formed if high productivity, critical mass and public interest come together. The University tries to complement and correct some of the incomplete and thus potentially distorting identification of strengths by incorporating other groups which deserve additional support.

While Trinity and Bergen can rely on a well trusted nationally organised review of research units which has identified strengths and weaknesses for a follow-up strategy, Helsinki has organised its own external review of all research units and thereby investing considerably so as to have a basis by which to judge quality.

At the University of Latvia only areas which have performed well, with publications and third party funds, get prioritised for institutional funding. At central level, the most important fields of research were identified with the help of this data and using the fields proposed by the research institutes.

In Bergen, the Committee for the Improvement of Quality of the University asks each department to report annually on activities and perspectives, including strategic considerations, as a basis for strategic prioritisation. At most institutions, the methods and mechanisms mentioned were being continually reviewed and refined.

4.5 Financial allocation

Whether dominated by individualist or steering beliefs, all institutions show some strategic awareness of and pay attention to their internal financial allocation. Ranging from the previously mentioned support of major projects to a redistribution of funds according to perceived excellence and relevance of the different units, different degrees of strategic application can be found. Accordingly, stronger beliefs in institutional steering were also reflected in a stronger redistribution of funds between different units on the basis of performance or other criteria.

The most consistent application of the explicit strategic aims and priorities could be seen at the University of Latvia. Here, the institutional leadership explained there was too little money to waste on anything but the most competitive and promising areas. Thus the strategic priorities defined in the strategic plan on the basis of their research strengths and relevance (see previous comments) as well as the more concrete sub-headings which were defined for each year, were matched with resources for infrastructure (deriving from the EU Structural Funds to be invested in areas in which universities are strong) and for doctoral positions as well as other human resources. Local centres of excellence were consistently linked to prioritised common infrastructure and human resource funding.

At most institutions it was stressed that institutional block grants and budgetary flexibility were a necessary precondition for strategy development. At one institution it was mentioned that only since the late 1990s had the institution been able to set aside a part of the institutional budget for these prioritised areas, thanks to the central budget flexibility which the university was given at this time and which included the possibility of using vacant positions at faculty and central level. Previously, the institution faced detailed rigid budget lines for each professorship which made any redistribution of funds practically impossible.

Indicator-based performance funding had been introduced at most institutions to help “incentivise” performance levels and as a means to attribute funding on what was seen to be a fairer and more transparent basis. Such performance-based funding was usually associated with the overall strategic aim of increasing performance culture. However, it should be noted, that the relevance, fairness and effectiveness of this procedure was sometimes criticised by researchers at several institutions.

At one institution indicator-based financing was applied to the entire budgets of decentralised units using indicators which were supposed to give sufficient attention to the research dimension of the institution (taking as a basis the number of graduate students and external research grant expenditure weighted according to subject groups). While the intention was appreciated, this mechanism was viewed quite critically, especially by departments who considered these quantitative measures bore no correlation to qualitative research performance in any way.

At two other institutions, the extent to which performance funding was applied to faculty and departmental budgets had been reduced or capped since the budgets had not provided leeway beyond minimal funding to sustain operations. Helsinki presents a good example of such adjustments: 70% of the budget for faculties was distributed on the basis of previous years, 30% on

the basis of results. Of the latter, 35% (which is 10% of the total) is calculated on the basis of research performance, another 50% on the basis of master degrees awarded, and 15% on the basis of the number of doctoral degrees. Previously, 35% of the total budget had been allocated for research on the basis of evaluation results. However, the University’s Senate, in which the faculties are all represented, then decided that the budget variations went too far and caused too many problems to the sustainability of faculty functions. The Senate then introduced capping so that no more than 4% increase or decrease was possible. Later, the previously described 10% rule was introduced without capping.

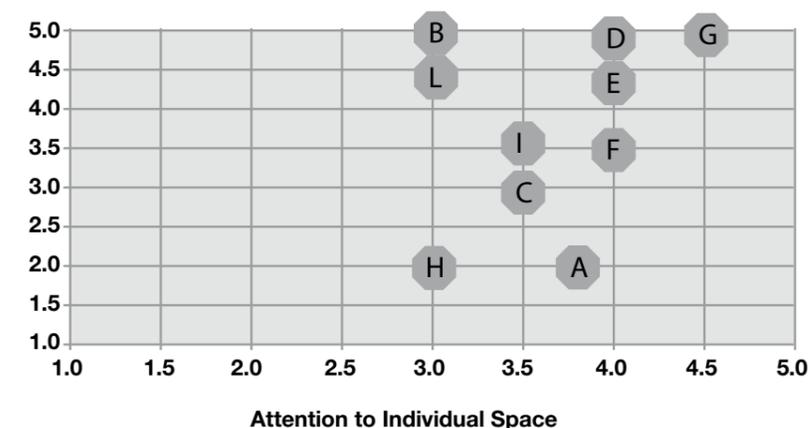
At the University of Bergen, the percentage of result-based funding, which was part of the strategy to increase research performance culture, was to be increased in subsequent years.

4.5. Mapping individualist and steering methods of strategic management

Taking into account the mix of institutional strategy methods chosen at the institutions, it is now possible to try to map the institutions’ attention to individual researchers against its attention to overall institutional steering. As could be expected, the resulting distribution of institutional approaches bears a strong correlation to the sets of institutional beliefs which was highlighted previously (4.3).

Institutional attention to individuals and to institutional steering methods of strategic development

Individual Space vs. Institutional Steering



5. PUTTING STRATEGY INTO CONTEXT

5.1 The importance of a supportive national and regional context

After having described a wide array of strategic management methods at universities, it should be emphasised that these attempts to impact on institutional research performance are only a small part of the whole range of influencing factors to which researchers are subject. While the institutional context significantly influences the researchers' sense of the possibilities available as well as the kinds of initiatives that they feel motivated to pursue, these institutional measures, sanctions or incentives, have to be seen in the larger context of the national and regional conditions which determine research opportunities.

The opportunities and constraints at national level start with the methods for allocating research money to the institution and end with the funding opportunities for research projects.

Regarding the first set of conditions, site visits revealed considerable constraints regarding the institutional funding flows which were often much more strongly determined by student numbers than by research outputs. Where research outputs determined funding streams, they were most often measured through indicators. The British model of using elaborate peer review procedures to determine institutional research grants was the exception rather than the rule, even though the research evaluation of institutional units by peers existed in several countries.

Furthermore, the influence which national or regional authorities exert on the rationale underpinning the development of a research strategy in the first place has already been highlighted. One of outstanding examples of decisive external influencing factors already described is the important increases in R&D funding opportunities in Ireland ("quantum leap") which created pressures to have an institutional development rationale for research activity expansion. Thus, the Programme for Third Level Education in Ireland (PRTL) asked universities to prioritise and submit institutional bids with strategic components (from 1997 onwards), and prioritise bids for infrastructural development support in areas in which they are particularly strong.

Given the extent to which research projects are funded by external sources, it should be stressed that an individual researcher's **sense of research opportunities is much more strongly determined by the external third party funding opportunities and constraints than by the institutional conditions**, unless his or her actual employment is at stake. Again, Ireland and Trinity offer a good case in point: the Science Foundation Ireland's Principal Investigator scheme which allocates a period of time with generous and secure funds for highly qualified individuals, who can choose where to be affiliated provided that the university guarantees their chair after five years. In the last three years, Trinity has seen a 200% increase of research activity funded through external grants. Thus, the research strategy has managed to go beyond a response of individuals to these newly available funds, by making the most of these external opportunities for longer term institutional development. In Padua, the university's strategic development is also strongly pushed by competitive bids which are available at European, national and regional level.

Of the universities visited, the University of Amsterdam was the only one at which research money available through the institutional grant exceeded the research grant money acquired externally. However, even at that university, a considerable part of the institutional money for research was dedicated to matching external grants, so that it could be said that external factors were at least as important as internal strategic choices in influencing research activities.

Clearly the scope and priorities of the national funding agencies are the single most important influencing factor on research activities, more significant than any strategic attempt to steer and incentivise researchers' performance. Researchers go where the money is, especially in the costly subjects, and look for an overlap between their own interests and the funding authorities' priorities. Even in the context of commissioned research, it is reported that researchers deliver more than just the intended results of the commissioned project. They develop in addition a genuine research interest which extends beyond the company's interest. Indeed,

as repeatedly highlighted at the universities visited in this study, a good part of institutional strategic actions themselves involve positioning the institution optimally toward the national funding schemes and priorities.

Hence, in as much as the degree of support generated by external funds outweighs any internal support, the initiatives and output of individual researchers and research groups are more strongly affected, motivated or hindered by national funding scope, mechanisms and criteria, than by any efforts of institutional strategic management, as the arrows of funding proposals and granted support in Figure 2 illustrate.

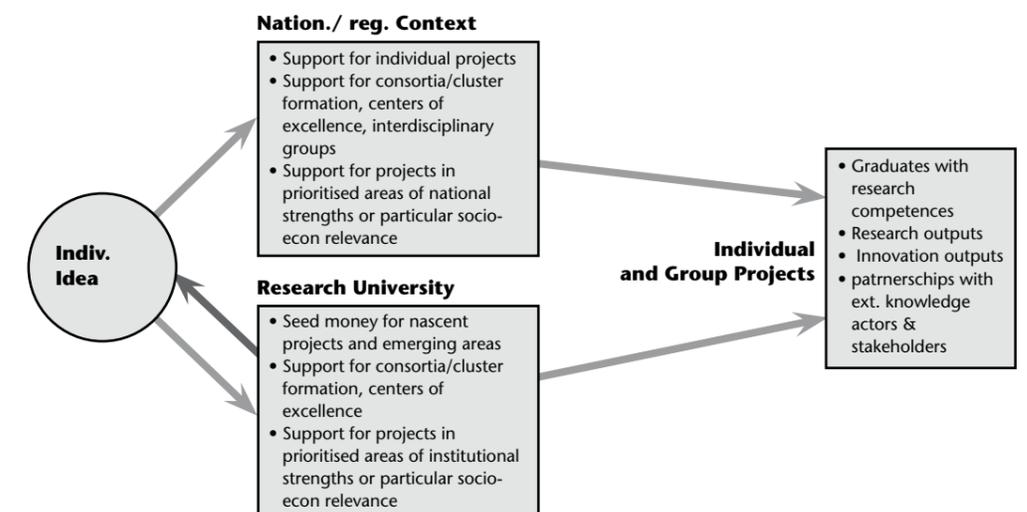
From the point of view of researchers, the second most important supporting or constraining condition of their research environment is the extent to which funding authorities use **excellence as the governing principle in selecting projects** for funding. If the excellence principle was limited by other political factors, this seemed to decrease greatly the motivation and outlook of the researchers. To give the most extreme example, the University of Latvia highlighted the limited scope and impact of any institutional research strategy, due to the fact that most of the research money comes from external funds distributed by the Latvian Research Council (LRC) which tends to allocate funds strongly on the basis of past distribution. The LRC is constrained by the fact that research

fellows depend on these grants for their livelihoods (LRC grants fund entire institutes and so if a professor fails to get funding all of his or her subordinates are also in trouble). Thus, there is little room left to prioritise on the basis of quality or other criteria. Hence, the biggest hope for future development comes from trying to influence the national government policy in order to encourage more substantial investment in research. However, the Higher Education Ministry has always been part of one of the weaker ministries in terms of competing for public interests. The net effect is that there is insufficient funding and no external incentive for qualitative enhancement. Taking into account these constraints, the university is highly imaginative and resourceful in trying to motivate its researchers and reward initiative and good performance.

In addition to national constraints and opportunities, the regional dimension of research contexts deserves to be noted. Of the ten institutions visited in this study, a majority revealed a remarkably **strong affiliation to (and degree of support from) their regions**. The international outlook of the university made the institution all the more important to the attractiveness of the regional knowledge economy and its competitiveness. A responsive regional environment was perceived to be very important by researchers and university leaders alike in Barcelona, Bergen, Bremen, Dublin, and Riga.

Figure 2

The life cycle of a research initiative: from idea to support to output



The supportiveness of the region was not just associated with additional financial resources, but also with political support, favourable regulatory conditions, the flexibility and responsiveness of the regional authorities to university initiatives, as well as networking opportunities. The sense of being part of a dynamic region with abundant evidence of creative initiatives and entrepreneurial spirit in a wide array of areas seems to be regarded as an important contributor to the general attractiveness of the research environment or "climate". Naturally, there were different positions between and among the different institutions regarding the degree of responsiveness with which researchers felt their institution should engage with its region. Indeed, some researchers feared that the institution might become too much of a service institution for the region. However, in those regions which were generally perceived to be creative, entrepreneurial and knowledge-friendly environments, the dialogue with private and public regional partners did not seem to raise fears.

Of course, regions also define research priorities which are strongly related to their industrial heritage and development, and so some positioning on the part of the affected universities is required. However, in those regions which actively fostered the knowledge economy, the influence which universities could exert on the definition of these priorities tended to be considerably greater. Examples include, Bremen's strategic funds ("Investitionssonderprogramm"), Helsinki's co-funding of university professorships, Catalonia's foundation (Fundacion CYD) for research innovation and development, the Catalan Government's ICREA programme to offer attractive conditions for young professors from abroad, and its recent innovation plan which was jointly drawn up by the ministries of industry, economics, health and research. These initiatives are all signs of regional awareness of the importance of the knowledge economy for future competitiveness and of universities' central role in the knowledge sector. It may well be that the regions will become an increasingly decisive factor for the competitiveness of research intensive universities in Europe.

5.2 Beyond strategy: addressing organisational culture

As we have seen, a closer examination of the whole range of European universities' methods of strategic development reveals that these institutions put communication and cultural concerns at the centre of their strategic attention. This attention focuses on both internal and external communication. Concern with internal communication is reflected, for example, by taking great care to generate widespread input for strategy definition and thematic priority setting from experts in different units. However, the more recent focus on trying to create new channels of communication and common goal setting across disciplinary and organisational boundaries also reflects attention paid to internal communication. Even though institutions often create structures to serve these aims, it should be stressed that the chief concern is not one of structure but of communication. In this context, our observations coincide with Lueddeke's findings, which state that "functional communication in departments and faculties is vital for adaptation to changing conditions and proactive positioning of higher education institutions." As shown by evidence during the site visits, he also reports that "the role of dean or department chair has been highlighted in recent research as being crucial in creating and sustaining a departmental culture that supports and encourages excellence." (Lueddeke 1997) Indeed, most of the university leaders interviewed in this study were not just looking for new forms of communicating horizontally but also vertically, namely between decentralised units and the institutional level leadership, with an expanded role of the deans being part of the proposed solutions.

Of course, the strategic attention paid to communication also involved external relations and partnership, though again with strong internal consequences. In particular, the strategic goal of expanding innovation activities was often linked to a search for new forms of more continuous partnerships with regular exchange, including intersectoral mobility in order to enhance mutual understanding and responsiveness to each others' needs. Internally, the strategic aim of increasing innovation activities, as found at the ten universities across Europe, explicitly involves changes to

the mentality of the universities' researchers. These shifts should be facilitated by the university leadership and supporting technology transfer and innovation services.

If we follow the conventional definition of an organisation's culture as "a system of shared values (what is important) and beliefs (how things work) that interact with the organisation's people, organisational structures, and systems to produce behavioural norms (the way we do things around here)" (Afuah 2003), it can be said that all ten universities are engaged, with varying intensity, in trying to change their organisational cultures. They are expanding, and to some extent also shifting, the dominant values of what is important at a research-intensive university in the political and economic contexts in which they want to thrive. Such values are multifaceted and are naturally received with mixed reactions.

Some examples include the negative response on the part of academics in one university to their leadership's attempts to push for more aggressive acquisition of external funds by the institution's researchers. The latter voiced their concern that there was too much of a focus on income generation: "More and more, income is no longer seen as a means to help research but the other way round. We have the sense of losing academia and becoming part of a research income-generating machine. You are not measured by the quality of your research but by how many euros you have brought in."

At another institution there were concerns about the leadership's attempts to move towards greater responsiveness to industrial and economic concerns. Some academics in the business department protested: "We left our better incomes in the business sector to be able to pursue interesting issues in a freer and more idea-driven environment. Here we are, having to respond to market needs again." Several academics stressed that they became academics because they like creative freedom and thrive best if they feel they have the freedom to develop and fulfil their ideas.

At several institutions, another cultural change noted was a new quest for visibility, for both individuals and institutions. This was seen as a devel-

opment of the national and international science culture but which was also pushed by the institutional leadership and often criticised by academics:

"Visibility may be overrated to the detriment of truly innovative ground-breaking research. Real creativity needs critical distance, thinking against the grain. To enable such critical reflective distance one needs calm spaces and some free time, unallocated to an ever-increasing run of duties. In Europe, this may be the competitive advantage we have vis-à-vis the US: we may still have better conditions for being able to develop such critical distance, whereas we could never compete with the speed of a Silicon Valley."

As these examples as well as the strategic methods chosen by the universities illustrate, European universities are very aware that issues of institutional culture may be at the core of current medium and long-term institutional research development and should form a crucial part of strategic aims and actions. Thus, if Fullan and Miles (1992) and Weil (1994) caution against using rational planning models for complex change and postulate that reforms must concentrate "on the development and interrelationships of all the main components of the system simultaneously [and] address deeper issues of the culture", or if Bolman and Deal underline that the effectiveness of a new policy or strategy will depend "on control mostly through values and culture rather than relying on procedures and systems" (1991, p. 334), it should be added that the universities visited in this study share this scepticism toward rationalist linear planning models and emphasise the importance of focussing on institutional culture to strengthen positions. Hence the methods chosen to develop strategy and enhance institutional positions by the universities visited rely strongly on some shared values and cultural attitudes. Recalling the core beliefs which were encountered at all the universities (See section 4.2), the following two chief cultural approaches should be highlighted as common to all these research-oriented universities, regardless of which methods and priorities they choose in their strategic development:

1. Firstly, **the inclusion of scientists in the generation of new research directions and definition of priorities** is regarded as vital in order to access the most forward-looking ideas. As noted by many researchers, political and even institutional priorities are usually reactive. Indeed, the more removed from scientific practice the actors setting the priorities are, the more reactive the priorities tend to be. Hence, the better the communication flow in an institution where the scientific base is, the shorter the reactive time-lag. Secondly, including scientists in the definition of research directions contributes to creating a climate in which academics feel at ease since their ideas have importance. It is widely regarded as essential that the university environment be a science-led culture. While most institutional leaders expressed an urgent desire to foster researchers' readiness to develop institutional thinking (beyond the progress and recognition of their research in individual fields), they were aware of the fact that such institutional thinking could only be fostered through a genuine engagement with researchers' ideas. Repeated communication efforts, including informal communication, participation in discussions across departmental boundaries and meaningful responses to proposed initiatives were regarded as essential conditions for allowing common institutional goals, priorities and strategic thinking to emerge.

At several institutions, institutional leaders and professors highlighted "friendly non-hierarchical communication and collaborative attitude" as a vital asset of the institutional science-led culture (Bergen, Bremen, Copenhagen, Helsinki). At three institutions, it was stressed that the low degree of territorialism, the propensity to seek opportunities for collaboration, and the readiness to share infrastructure and equipment, are linked to a sense that everyone had something to gain. This was because there were few funds or positions, which were permanently attached to a given chair (or institute), and most of the resources were distributed on the basis of internal competition or performance.

2. **A second shared value which is seen to define the essence and quality of a university's research culture relates to the space allowed for, and the response to, initiative.** While the space allowed for initiative in an institution is obviously predicated by the availability and flexibility of institutional or external funds and other resources, the responsiveness to initiative is a quality related to academic leadership. One of the characteristics of an attractive university environment was said by many to be the potential for success of any given new initiative which can withstand rigorous quality review. Two institutions regarded the widespread readiness to develop and push new initiatives as one of their strongest assets. At all institutions visited, "the spirit of initiative" was regarded as a vital success factor for institutional development and one that should be encouraged on the part of institutional leaders.

At the universities visited in the context of this study, easy access to the relevant academic leaders (deans and rectors/vice-rector) was mentioned as one necessary condition, with the ability of academic leaders to listen and judge the merit (with the help of peers) of forthcoming initiatives another. As mentioned previously, the response to initiative is also regarded as the definitive quality that justifies having academic (rather than business) leadership in the first place, whose tasks range from listening to arguments which defend a major new initiative to helping to push forward worthy ones. Some leaders and professors noted that even strong leadership which does not shy away from setting clear priorities can be widely accepted in the university community, provided that there is the possibility of ideas really being considered, and that individuals and their concerns are listened to. Some leaders observed that often it is the young and brilliant who are the ones to ask for more leadership and daring priorities. At all institutions, professors expressed their sense of identification with (or distance from) the institutional leadership strongly in terms of their leaders' perceived openness to new ideas and initiatives. In contrast, some new institutional procedures, for

example, performance indicator-based resource allocation, were viewed critically not just because of subject area biases, but also because of the risks such mechanisms bear for the recognition of individual initiative and decreasing attention to genuine quality culture.

Clearly, the ideals and the positive and negative experiences recounted regarding university leadership had little to do with the sort of control that an outside observer might aspire to, but rather resemble the roles which theorists of the complex responsive processes attribute to an institutional manager (Stacey (2003) and Streatfield (2001)). In so far as the institutional leadership displays a coherence of strategic approach, it is a "coherence, which emerges as continuity and potential transformation of identity in the perpetual construction of the future. The distinguishing feature of management is not control but courage to carry on creatively despite not knowing and not being in control, with all the anxiety that this brings." (Stacey, p.393)

Closely related to the importance of space and response to initiative, a last observation on institutional culture should not be omitted: A number of institutional representatives reported that they had seen a rise in a "sense of the possible", which was said to have a major effect on institutional performance by increasing the researchers' readiness to seize strategic opportunities. Such dramatic increases were noted at Trinity, Riga and Barcelona in the context of the establishment of the science park. In Ireland, it was attributed to the substantial increases of R&D money of 7.5% per annum since 1998. In Riga it was due to the dramatic changes with, and after, the fall of the iron curtain and Soviet rule, or at least this was the reason for researchers of the younger generation who felt that they could benefit from these changes. Thus in Riga, many younger academics reflected a belief that what may seem impossible now may soon become reality or at least be transformed into a reachable goal.

Generally, the evidence and observations gathered during the site visits show that the most important element of an attractive research environment concerns a cultural quality, namely the care taken by individuals at different levels to help good ideas travel far within the institution and the wider environment.

In conclusion, European research universities may have done well in omitting one phase of management theory and progressing straight to the more modern approaches to strategic development which have been adopted more recently in corporate environments and especially in knowledge intensive businesses. While there may still be considerable room for the improvement of management and leadership skills, universities demonstrate an acute awareness of the importance of institutional culture and the sort of communication methods required to maintain the values on which this culture is built. Even during times when changes of culture and values are being fostered in all of the universities which were visited in this study, such changes are being orchestrated with considerable attention to the deeper cultural values which have contributed to making universities creative environments. While strategic changes are obviously being conducted with varying degrees of professionalism and leadership competences (as observed and reflected by the affected groups), university leaders at all of the institutions visited displayed an acute sense of the complexity, fragility and potential of their university research environments and institutional cultures, as well as of the important communicative challenges which lie ahead if their full potential is to be realised.

6. SELECTED ANNOTATED BIBLIOGRAPHY

Afuah, Allan (2003). *Innovation management: strategies, implementation and profits.* New York: Oxford University Press.

As the title suggests, this book focuses on strategy from the perspective of innovation and does not address the particularities of universities. However, it is included here because it helps the reader form a better understanding of the issues involved in the innovation processes which many universities are only just beginning to face.

Allen, David K. (2003). Organisational climate and strategic change in higher education: organisational insecurity. *Higher Education* 46: 61-92.

Allan introduces the concept of organisational climate and contributes to an understanding of the recursive relationship between organisational climate and strategic change initiatives. Focusing on the development of information strategies in twelve UK Higher Education Institutions, the author highlights the influence of different styles of management on one of the dimensions of organisational climate: insecurity/security. Six issues are identified which affect the climate of insecurity or security within the different higher education institutions: perceptions of change management and its frequency, predictability, openness, degree of participation, discontinuous or incremental nature of change, and whether or not decisions are implemented by use of persuasive or coercive power. According to Allan, 'managerial' approaches are more likely to create highly insecure environments, reinforcing a vicious circle: staff becoming de-motivated, less willing to take risks or exercise discretion and more likely to resist change. In contrast, in environments where a more 'collegial' approach has been used, a virtuous cycle is created, which helps create consensus, the widespread understanding of decisions (acceptance of their legitimacy) and commitment to both strategic decisions and the university.

Cope, Robert G. (1987). Opportunity from strength: strategic planning clarified with case examples. *ASHE-ERIC higher education report* 1987 (8).

Debackere, Koenraad (2000). *Managing academic R&D as a business at K.U. Leuven: context, structure and process.* *R&D Management* 30 (4): 323-328.

Based on the case of K.U. Leuven, the study shows how an academic institution can develop the context, structure and processes conducive to managing academic R&D as a business. The institution's culture (context), which shapes attitudes towards combining "curiosity-driven" and market-driven research), organizational and incentive mechanisms (structure) and day-to-day operations of knowledge creation and innovation management (processes) guarantee that values of teaching and research are complemented rather than hampered by the university's engagement in industrial and entrepreneurial innovation. New technology ventures originating at universities are a bridging function between "curiosity-driven" academic research and strategy-driven corporate research. By creating the appropriate context, structure and processes, universities function as a breeding ground (incubator) for new venture creation.

Hussey, David E. (1998). *Strategic management: from theory to implementation.* Oxford: Butterworth Heineman.

A reflective and user-friendly overview of a whole range of strategic management issues. In particular, the introductory chapters give a good introduction to several decades of debates, successes and shortcomings of various approaches to strategic planning and management.

Jones-Evans, Dylan / Klofsten, Magnus / Andersson, Ewa / Pandya, Dipti (1999). Creating a bridge between university and industry in small European countries: the role of the Industrial Liaison Office. *R&D Management* 29 (1): 47-56.

This paper examines the role of universities in regional economic development in two contrasting small countries of Europe: Sweden and Ireland. Since economies at the periphery of Europe cannot sustain a development strategy based on relative factor costs, they must develop an advantage based on the exploitation of the national knowledge base. To this end, both Sweden and Ireland, have established Industrial Liaison Offices. Sweden has, however, a longer ILO-tradition compared to Ireland and its ILOs are more pro-active and in closer relationship with industry.

Keller, George (1983). *Academic strategy: the management revolution in American higher education.* Baltimore: The John Hopkins University Press.

After two decades, still the best introduction to strategic management at universities at its best. A very insightful adaptation of strategic thinking related to the particularities of universities in their institutional uniqueness. The contemporary problems which provide the context to Keller's discussions bear a striking resemblance to the current shifts in European higher education development, in particular regarding diversification of funding, the need to prioritise in times of budgetary restrictions as well as the increasing public accountability and demands on university relevance. Still a must read for newly elected/appointed university leaders in the US.

Loan-Clarke, John / Preston, Diane (2002). Tensions and Benefits in Collaborative Research Involving a University and Another Organization. *Studies in Higher Education* 27 (2): 169-185.

This article describes one form of collaboration between a Business School and a National Health Service Trust in the UK. The collaboration was designed to produce research which would be beneficial for both organisations. The specific form of the collaboration was the joint appointment of an organisational development

adviser/research assistant. The article analyses the tensions which arose for the academics and the joint appointment holder in respect of the research process: theory versus practice; 'generalisability' versus specificity of knowledge; research rigour versus research relevance; long(er) versus short timescales of work; 'outsider' and 'insider' perspectives. Despite these tensions, both organisations achieved benefits from the collaboration. However, this type of relationship requires careful management at institutional and individual levels for such benefits to be realised.

Lueddeke, George R. (1999). Toward a Constructivist Framework for Guiding Change and Innovation in Higher Education. *The Journal of Higher Education* 70 (3): 235-260.

Lueddeke provides a framework, the Adaptive-Generative Development Model (A-GDM), to help decision-makers in higher education to identify actual concerns in the process of introducing change. This approach is based on cyclical and generative learning, multidimensional thinking and participatory decision-making. It is argued that solutions following the course of least resistance, often resulting in only small changes, and centralist change management should be abandoned.

Rodríguez-Díaz, Jorge / Osorio-Acosta, Javier / Álamo-Vera, Francisca Rosa (1997). Strategic process in universities: methodology development and information systems support. *Education and Information Technologies* 2: 327-345.

The paper shows how specific software - executive support systems (ESS) - can be used in the formulation of university objectives and strategies and discusses some results obtained at the University of Las Palmas de Gran Canaria. The authors develop a methodology for corporate strategic planning, as well as a supporting computer application named SISTRAT. The methodology is based on the evaluation of institutional strengths and weaknesses, external opportunities and threats and the institution's mission.

Schein, E (1990). Organisational Culture and Leadership. San Francisco, CA: Jossey-Bass. The classic introduction to the notion of a learning organisation.

Siegel, Donald S. / Waldman, David A. / Atwater, Leanne E. / Link, Albert N. (2003). Commercial knowledge transfers from university to firms: improving the effectiveness of university-industry collaboration. *Journal of High Technology Management Research* 14: 111-133.

The purpose of this study is to analyse the UITT (university-industry technology transfer) process and its outcomes. Based on ninety-eight structured interviews of key UITT stakeholders (i.e., university administrators, academic and industry scientists, business managers, and entrepreneurs) at five research universities in two regions of the US, it concluded that these stakeholders have different perspectives on the desired outputs of UITT. More importantly, numerous barriers to effective UITT were identified, including culture clashes, bureaucratic inflexibility, poorly designed reward systems, and ineffective management of university technology transfer offices (TTOs). Based on this qualitative evidence, numerous recommendations for improving the UITT process are provided.

Singell, Larry D. / Lillydahl, Jane H. (1996). Will Changing Times Change the Allocation of Faculty Time? *The Journal of Human Resources* 31 (2): 429-449.

This paper examines faculty time allocation decisions that are fundamental to the functioning of a university. The empirical results for a random sample of U.S. arts and sciences faculty indicate that structural differences between universities with different research orientations account for most of the significant differences in faculty time allocations. Faculty characteristics reinforce institutional missions, however, and thus condition university policies for change (for example, attempts to mandate more time to teaching in research universities).

Soo, Mary / Carson, Cathryn (2004). Managing the Research University: Clark Kerr and the University of California. *Minerva* 42: 214-236.

In the 1950s and 1960s, Clark Kerr led the University of California's Berkeley campus, and then the University of California as a whole. Throughout these years, he developed a system of managerial strategies. This paper shows how Kerr's administrative views drew upon his background in industrial relations, his liberal theories of pluralistic industrial change, and contemporary understandings of American business organisation.

Stacey, Ralph D. (2003). *Strategic management and organizational dynamics*. London: Pitman.

After exposing the cognitivist bias of traditional strategic management approaches, Stacey applies a theory of complex responsive process to organisations. On the basis of a theory of interaction drawn from chaos and complexity theory, and expanded through the sociology of George Herbert Mead and his relationist notions of gesture and response, which does not take the individual as the central primary entity any longer, but bases its theory of responses on the central notion of social selves. Individuals and groups form and are formed by each other simultaneously

