Aarhus University: Reform Review

Final Report

Sachi Hatakenaka; Quentin Thompson

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1. Strategic intentions

1. Aarhus University sets the highest standards for itself; it has a very good reputation in Northern Europe and is increasingly visible internationally. Notwithstanding its past success, the University has an ambitious strategic plan to go further and become a global university. Our investigations confirmed AU's past successes as well as the strength of its aspirations. We also found a groundswell among the staff we met (over 100 of them) to create an even more productive and seamless environment for education and research. There is also no doubt that Aarhus is a very happy university, with everyone finding it a great place to work and study.

2. The recent mergers provide AU with the opportunity to undertake a series of reforms which, between them, should enable it to achieve its ambitions – and on its own terms. Our analysis suggests that the following would be a good summary of AU's strategic intentions:
    - AU will be a global, modern university, excellent in all it does; it will set a new reference point for European universities. It will have a clear and well-known 'brand image', different from that of Copenhagen University (as stressed by the International evaluation report), with sub-brands where helpful, eg for Aarhus School of Business.
    - AU will have excellence across a broad and diverse range of activities, accorded equal importance, which it uses to engage with society and with the future – similar to a 'Pasteur' approach which engages in both basic and applied research as well as in other related activities. It will operate as a 'responsive' university, recognising the need for dynamism and change by responding to robust and enduring external changes in its various 'markets'.
    - Research undertaken in AU will underpin its education and knowledge exchange activities, all of which will also pay attention to points of external 'relevance'
    - AU will have an organisation coherence which encourages working together across boundaries that are seamless, even when there are operational differences, to maximise the opportunities provided by the recent mergers
    - AU will have an ethos of an open and friendly academic environment for its students, for its staff and for its wide range of external partners.

3. All the above mean that AU aims to be the best on its own terms (rather than in the league tables of others – which tend to give undue weight to internal parameters, more visible to their peers than to their stakeholders). To enhance its visibility to its 'stakeholders', AU may need better PR to Government both about what it stands for and about its excellence; it may also need better provision of easily accessed information about its range of expertise.

Strategic policies

4. To achieve these strategic intentions, AU will need to have **clear, strategic, University-wide policies**, implemented at 'local' level; the University's strategic policies should:
    - ensure that resources are used in ways that are consistent with, and in pursuit of, the University's strategic aims; for example by thinking about future needs of society through reaching out to it (and to Government, where appropriate) – in fact, "screening for relevance" is a task defined for universities in the Law
    - encourage working across academic disciplines and across the basic/application-oriented divide, with good support arrangements to achieve real symbiosis from the mergers
    - build on successful pasts, but with an emphasis on looking forward and investing in the future, not harking back to the past (eg on funding decisions or on student places)
    - be clear, consistent and conveyed so that they actively influence 'local' decisions at operational level in the University
    - be developed and delivered by various central processes (and/or bodies), with appropriate 'carrots and sticks', together with ways to monitor their implementation and their results – taking action if the intended results fail to be delivered.

5. Policy development, even when based on the most noble intentions, is meaningless unless the resulting policies are conveyed to, and understood and accepted by, those working at the operational level, closer to the ground. This is primarily a matter of good management and consistency in decisions; some of the key processes that can help achieve this are discussed in Section 6.

6. For policies to be implemented at the operational level, the University may well need to provide support or even active encouragement. In the light of AU's current position, there are five main areas for which we would recommend strategic action by the University:
    - **Strategic steers by the University**, by which the distribution of public funds within the University takes account of forward looking strategic priorities; for education, with revisions to the internal taximeter system (see Section 2) and for basic research, with thought given to future growth areas (see Section 3)
    - **Central funding or facilitation**, which might be with 'seed grants' to set up or encourage strategic initiatives (eg for 'hybrids' to work across boundaries; for knowledge exchanges inside AU and out), but which might also be to facilitate initiatives (eg to help to set up a new Centre; to encourage interdisciplinary meetings and communication) (see Sections 2 and 3)
    - **University guidelines** for strategically related topics, with rules and priorities that set an AU-wide framework within which local rules, priorities and procedures must be consistent (eg to ensure that no local 'rules' inhibit cross-working; to provide guidance on university priorities for research ideas; to link the development of education programmes, and the spaces on them, to performance factors)
    - **The estate** of the University and decisions about its development and the use of space within it (eg the future of the campus in Copenhagen; target occupancy rates for space)
    - **The terms and conditions of employment** of academic staff, partly to define University-wide expectations, but also to facilitate joint appointments, working in teams, and flexible transfers.

7. At present, AU has four (rather different) University level groups/committees which could be used as the base from which to build policy mechanisms to develop and recommend strategic policies in their respective areas. Each would need to operate rather differently from now and would need to be more strategic and forward looking in providing its advice. The roles and composition of these are developed in the relevant Sections below, but in summary, examples of policies for each of the four would be:

- **Education** (Section 2): ways to encourage cross-disciplinary programmes; changes to the concept of the 'internal market'; the nature of market analysis for Bachelors and Masters graduates; the concept of 'responsiveness' in determining student places; the provision of advice to students; guidance to Study Boards
- **Talent development** (Section 2): post-doctoral development as well as for PhDs; how to balance the internal interests of the University with those of students; formation of a 'club' to bind PhDs and post-docs more closely to the University
- **Research** (Section 3): development of a University view on research priorities (taking account of the views of a range of constituencies); joint research groups and facilities for real synergy; ways to bridge the basic/application-oriented divide
- **Knowledge Exchange** (Section 4): ways to encourage greater engagement with the economy and community; how to get such activities valued as a natural extension of research; strategic policies about undertaking such activities as part of 'routine' work (and 'private' work).

8. The rest of this report develops our proposals for how AU might best achieve its strategic intentions through the development and implementation of appropriate policies.

2. Education

9. Aarhus University has a set of well established and respected education programmes. It also has a Humboltian tradition of offering choices to some students, for instance, to combine two subjects to prepare secondary teachers and in allowing science students to take modules outside their main subjects. AU now has strategic ambitions to offer programmes that make better use of the breadth of expertise in the University and to provide greater flexibility from the supply side. One example is to designate a proportion of all programmes which students can use to take electives from other departments or faculties – the intention behind the so-called 'internal market'.

10. Such a development is consistent with international trends, the main ones of which are:
    - development of broader, more multidisciplinary programmes (from Melbourne's bid to consolidate undergraduate education into six specializations, to Chinese universities' experiments with liberal arts courses, to structured interdisciplinary PhD programmes in Max Plank Institutes)
    - use of structures such as a core with 'options'
    - increased levels of flexibility for students – albeit within an articulated framework
    - increasing emphasis on the development of students' 'basic skills' – such as the ability to work in teams, to be creative etc

11. Many of these developments are in recognition of the future being uncertain and changing ever more rapidly: graduates must be able to adapt by learning to learn, rather than only learning a defined corpus of knowledge.

12. The overall impression of the current position in AU is that education programmes still look largely traditional. New efforts to create interdisciplinary and inter-faculty programmes are emerging, but many are blocked by external regulatory constraints from ACE (see Section 7), and many also encounter non trivial internal factors which inhibit, or even prevent, such developments. As a result, while there are significant differences across faculties, the programmes in AU tend:
    - to be silo-like (and supply driven) with limited cross-faculty (or even cross-

disciplinary) elements – often explained by the very old-fashioned approach that tends to be taken by ACE
    - to have a mechanism for regular review which seems rather weak in terms of its impact on change
    - to be delivered without a clear view about their intended learning outcomes or what is a reasonable use of resources.

13. We suggest that education provision in AU should be given more strategic focus than it currently has, particularly given that academics tend to give more thought to their research activities. To take its full place as a leading university in Europe, AU should aim for its education provision to:
    - be high quality, modern and up to date – in terms of its taught content and also in the methods of teaching and learning
    - recognise and respond to those external changes which are resilient and enduring (eg long term trends in student demand, projected skills requirements of future labour markets and society)
    - be coherent in programmes and course offerings across faculties,
    - be offered by the best expertise within the university, wherever that is located.

Education policies

14. We suggest that there are four main areas for which AU should have **University-wide policies for its education provision.** We develop these below.

15. First, in line with global trends, we suggest that AU should **develop cross-disciplinary programmes** more as the norm, for example as joint degrees, as fixed major/minor combinations, or as a core plus options (where the options are taken from a defined list or left open, but either way with guided student choice). Examples might include: management with agriculture; biology and environment; physics with management. Offering such programmes should go well beyond simply providing flexibility and leaving it to students to fill the gap; for example, some courses should be explicitly designed to be taken by students from other specializations.

16. Such combinations are often attractive to students (and to employers), so can lead to an increase in student numbers and/or in student quality. Of course, any such

arrangements should always include the possibility of a student following a straight progression in a single subject, particularly for those subjects that lead to a defined profession, but for no subject should this be the *only* possible path - as it sometimes is now.

17. While the narrow-mindedness of ACE is clearly the most serious constraint on broader provision (and AU should make every effort to change that, not only for the benefit of AU's students, but for Denmark), there is often also a reluctance within AU to develop, or even consider such greater breadth. We found several reasons.
    - It can arise from a concern from some academics that such options might result in their best students forsaking the more traditional 'progression' path and so not going on to their PhD programmes. It may be that this concern stems from a lingering perception of programmes being a straight five years without deviation, rather than the 3+2 arrangement (with the +2 being able to be more specialised than the original '3') now required under Bologna.
    - Where there are already enough applicants for the more traditional progression, there can be an attitude that there is no need to go to the trouble of developing anything cross-disciplinary.
    - At the opposite end, in circumstances where it is difficult to obtain sufficient students of good quality, there can be a reluctance to develop something that might be more attractive for fear of further reducing applicants to the traditional programmes.

18. In all three circumstances, the continuing convenience of academic staff is being put ahead of the interests of students; this is not satisfactory in any university, and certainly not in one that aspires to be a leader.

19. As well as these attitudinal inhibitors, there are also more practical barriers to developing a programme with cross-disciplinary dimensions. One of these is simply the time and hassle required to develop such programmes: we understand that programme design is not considered a high status activity and there would seem to be no support or 'rewards' provided for undertaking it; this may need revising. A second difficulty arises for any programme that extends across more than one Study Board: some Study Boards tend to be conservative and protective of their subject's 'purity' –

in some, the concern arises from the academic members, in others, from the students. This is one reason for moving to fewer Study Boards (and so fewer boundaries); it also shows how important it is that all Study Boards should be provided with clear policy guidance about the University's policies on programme development (see below).

20. A third reluctance stems from the perceived financial implications of running programmes across Faculties – the implications of the current internal 'taxi-meter' system. There is no doubt at all that this is a major inhibitor to designing or running programmes with cross-disciplinary components; we came across numerous examples. It makes no sense at all for the academic profile of AU to be influenced by its own internal financing mechanism: this is a negation of the concept of academic policy. AU should have academic policies for education and then ensure that its internal financing arrangements encourage their adoption. This is not difficult to do, but it runs counter to the history of the last few decades in AU; we outline below what is involved.

21. The second University-wide education policy should concern the **importance to be attached to the two external markets for education** (students and employers) in the development of new courses and programmes (and the review of existing ones - see below). We note that the Law requires universities to 'screen for relevance' and AU has programme related employer panels, but the way 'screening' takes place and how employer views are reflected is very variable across Faculties. It would be valuable for the University to have a view about best practice – and then to develop University-level expectations based on policy guidance. The guidance should be about how signals from these two 'markets' should be detected and then how they should be used.
    - For current students, monitored levels of satisfaction should be built into programme and course review; if students see that happening, they tend to provide more serious feed-back.
    - For prospective students, there are clear signals from patterns of applications, although these can be unduly influenced by fashion in the short term; it is better to consider such trends over several years rather than to react to what could be a one or two year wonder; trends from other countries can also be

useful longer term indicators.

- For employers, the position is usually more subtle: international experience suggests that many future labour markets will tend to look for graduates with transferable skills – such as 'problem solving', 'thinking for themselves' and 'working in teams and to deadlines'. Other markets, of course, will still need solid subject specialisation (eg for careers in medicine, law, or even banking). Hence, in addition to the 'classical' discipline programmes, and for the relative few who will pursue an academic career, there will be a more general labour market need for programmes that are multi-disciplinary.

22. However, for both 'markets', it is important that the University does not seek to respond to every hare that appears to be running, but to ensure that any trend is robust and enduring before responding to it.

23. AU should thus have an education policy about how such information should be gathered and analysed, especially 'softer' information, and also how it should be used in decisions about setting up a new course or programme and/or about the review of an existing one. Under the current arrangements, this would be a task for Study Boards; this requires the University to provide clear guidance about its policies to the Study Boards (see below).

24. As a leading university, the third University-wide education policy concerns **the quality of education provision**. In a course/programme review process, to ensure high quality provision needs inputs from monitoring the quality of student results, student satisfaction, students' employment successes and peer review judgements. As important for planning purposes, is to know about the *perceived* quality of the AU offering. For employers, this can only be gathered through surveys and/or discussion groups – both of which we would recommend. For the perceptions of students, note can be taken of the numbers and standards of students that AU programmes are able to attract.

25. Robust negative information from any of these sources should be enough to ask serious questions about a course/programme, to examine options for changing it (or at least its marketing) including merging it, or, if the numbers and/or the quality are too

low, perhaps even closing it. Again AU needs to develop and provide policy guidance about these matters, both for how the information should be collected, but also in terms of, for example, thresholds below which a course/programme would normally be closed – with exceptions in rare cases for strategic reasons. Such guidelines would be provided to, and taken into account by, Study Boards, but with the Dean taking the final decisions.

26. The fourth University-wide education policy concerns the **unit costs of a programme**; this is an indicator that can be used as a warning light about a programme (or course) – it is also a useful measure of efficiency. If the unit costs start to be unduly high, this should prompt questions about the course or programme, similar to those above, with relevant consequential actions. What is an 'unduly high' unit cost needs to be defined by the University, although we are not sure whether AU yet has its financial information in a form that can produce such unit cost data; if it does not, then it should develop it quickly. Meanwhile a proxy for unit cost, such as the average Staff/Student Ratio (SSR) over a course or programme, or the numbers of attending students, could be used instead to trigger the questions. We found a wide range of beliefs as to how many students comprise a 'break-even' position on a course; it would be highly desirable for there to be some basis for these beliefs.

27. Of course, none of this should imply that, just because a course/programme exceeded a unit cost (or SSR) threshold, it should automatically be stopped. What it should mean is that questions should be asked with a view either to improving it (eg by developing it, by sharing some of its teaching with other courses, or by merging it), or deciding that the on-going implied subsidy is a proper use of University funds, or failing any of those options, then to consider closing it down.

28. Each of the above four policy topics needs to be developed into AU policies and then into guidelines for implementation. We suggest that such **policy development should be the primary role of the 'Education Committee'**, while continuing its Quality Control role, but perhaps dropping some of its less strategic concerns. To perform this role well, the Committee needs analytical support – not just a secretariat (see Section 6). The Committee would propose the policies and guidelines to the Rector and the Senior Management Team (see Section 6). These would be important

components of the Education Strategy, so the membership of the Education Committee should be at the highest academic level below the Dean; we suggest that this should be, ex officio, the Vice Dean (Education) from each Faculty (or College – see Section 5). The revised Education Committee will need a Chair who would also be a member of the Senior Management Team. We suggest that one of the Deans (or Heads of College) should be appointed to chair the Committee – but not on rotation as continuity is important. (Another possibility would have been to create a new Pro-Rector post, but we do not think that would be right for AU at present.)

Implementation

29. Having policies about education is one thing, implementing them is another. AU needs to decide both how and by whom the policies and guidelines are to be implemented. As well as the process to develop new courses/programmes, the University needs to decide the frequency and method for reviewing existing programmes/courses, the data and criteria to be used and the actions to follow under various circumstances – not least to decide to stop a course that appears to be reaching the end of its useful life. Responsibility for implementing the University policies at Faculty level must rest with the Deans – who would have been instrumental in approving them (see Section 6). Deans would need a body at Faculty level to advise them about such decisions – as Study Boards do now on related matters. The best arrangement would be to revise the roles of Study Boards so that they could undertake this more strategic role at Faculty level.

30. Assuming that Study Boards can be adapted for this role, the University should determine:
    - the numbers of Study Boards; there would be advantage in reducing the number of Study Boards, perhaps to no more than one or two for each of the (new) main academic units after the re-organisation (Colleges), perhaps with one additional single Study Board responsible for cross-College development
    - revised roles for the Study Boards – the most important of which would be to implement the University policies and guidelines discussed above, including continuing their concern about the quality of teaching and that curriculum content should be fully up-to-date. This extended role would mean that Study Boards would be more strategic, more forward looking and more flexible (but

less detailed) than many of them have tended to be in the past

- the 'reporting line' by which Study Boards provided their advice to the Dean, for his/her final decisions on programmes and student numbers; in his/her decisions, the Dean would need to take into account any relevant performance factors, such as those discussed above
- within the limits of the current Law, the composition of the Study Boards – and with the Chair being the relevant Director of Studies
- how the operations of each Study Board should itself be monitored.

31. If Danish Law were to preclude the Study Boards from acting in this way (although we think that NAT already operates in a way similar to this), then, apart from exerting pressure on Government to change the Law, AU would need to invent a new set of Faculty/College bodies, perhaps one per College, which would undertake this role, while reducing the role of the Study Boards to a minimum. The Dean would then need to consider two sets of advice in his/her decisions. It would, of course, be far better to adapt Study Boards to the role for several reasons, not least the severe danger of overlap, not to say conflict.

32. Assuming that the role of Study Boards could be extended in this way, within a cycle set by the University, their **operational tasks** would be:
    - to undertake (or at least to review the results of) the analyses of the external markets, longer term trends and the views of the employer panels – as well as the analysis of student satisfaction – all as discussed above
    - to use this information, and the University criteria to
        - help develop ideas about new programmes (Vet medicine for farms?)
        - undertake reviews of existing programmes (eg those that had difficulty recruiting to a high enough standard or whose graduates had difficulty in finding employment) – including the scope for rationalising those that had significant overlaps
    - as now, to consider the composition of programmes to ensure that the content provided sufficient credits for the qualification – and that any option which a student wished to take which was not already covered, should be quickly evaluated before the student took it – and with a view to encouraging, rather than inhibiting, flexibility and choice

- to continue to contribute to other aspects of the quality control of programmes (including the more academic ones)
- to make recommendations to their relevant Dean, who would make decisions about, for example, increasing or reducing student places on programmes, taking account of University-wide guidance about numbers, efficiencies etc.

33. The University also needs policies about how the **finance should flow** around the provision of education, together with the operation of the so-called 'internal market'. It is essential to ensure that the way finance flows is at least consistent with AU's education policies – and preferably actually encourages them. At present it is neither:
    - the current (internal) taximeter arrangements tend to follow the national system in an unthinking way and with no reference to AU priorities or education policies
    - in attempting to develop an 'internal market' to help with cross-faculty provision, the current taximeter funding makes 'buying' not only difficult, but also unattractive from the point of view both of the 'importer' and of the 'exporter'! This is some achievement – and is highly unsatisfactory
    - in fact the term 'internal market' is not helpful as it is not really a 'market'; but the concept is valuable as it is intended positively to encourage the development of cross-discipline programmes – in order to obtain the best synergy across the University

34. We propose that the University should revise the taximeter system, with the new system continuing to provide an incentive for increasing student numbers (and so be unit based), but also designed to encourage strategic behaviour and the implementation of AU's policies, for example by means of premiums which:
    - reflected the provision and take-up of course 'options' and/or major-minor combinations
    - reflected teaching outside one's 'home' department, eg for service teaching
    - removed the financial reason for hiring from outside, rather than 'buying' internally (although there may still be content reasons to do so)
    - may be different for different policy behaviours
    - would need to be known up front and be paid to Faculties along with 'normal' taximeter funds

35. Such a taximeter system, which may take a year to design and implement, would not follow the national system, nor even use national values for its parameters; it would be designed by and for AU, not for the whole of Denmark.

36. In addition, we propose that the University should take a (modest) 'top-slice' of the income from the Government's national taximeter funds to provide a pot of central funds to be used to encourage and/or reward specific strategic education developments. As at present, the Government's taximeter funds would still all end up in the Faculties, but there would be some differences in their distribution – which would be determined by AU's policies on priorities and development.

37. It is for consideration whether there should also be funding flows for PhD supervision; there are arguments both ways, but the new organizational structure discussed in Section 5 should solve many of the cross-faculty issues for PhD supervision, as the flows would now be generally be internal to a College.

38. The University also needs to ensure that there are no 'local' Faculty **administrative procedures** which inhibit cross-faculty working (eg on student administration or on the timings of terms and/or of lectures). Such administrative points need to be consistent across AU; this is not difficult to achieve.

Talent development

39. Talent development is a valuable strategic theme in AU, although there would seem to be advantage in extending the concept beyond PhDs to post-doc training – even though the focus will remain on identifying talent early and giving a high powered combined PhD education. The development of such talents would be both for industry and for academia, so there would seem to be advantage in securing some external and entrepreneurial inputs (eg from Mindlab) to help provide an external perspective for PhD students about future possible career directions.

40. We are aware of the idea of inviting a group of 'top researchers' to discuss activities to help 'Talent Development', not least to make PhDs and post-docs feel more part of the University community – especially those from outside Denmark. One suggestion

is for the group to create some form of ‘club’, the purpose of which would be to provide a forum in which PhDs, post-docs and other interested academics might gather together around an ‘event’ or theme – for example a seminar by a distinguished external speaker. We think this is an excellent idea, but we suggest that to bring any form of cohesion would require more ‘glue’ than holding occasional ‘events’.

41. A more effective approach might be to form a smaller, solid community drawn from the top researchers, to provide the backbone for providing interesting, productive and intellectual debate to which international visitors, other academics and select graduate students could be invited - a little like being invited to high table in Oxford/Cambridge Colleges, at which there are often unexpected academic encounters.

42. To identify what might bring such a group together, a first step could be to consider what a group of AU 'top researchers' might comprise and then what would be needed to induce them to form a community - and to build around that. One possible catalyst might be to arrange for a space, or even a building, in which some of the group would have a form of ‘residence’ or ‘rooms’, with a dining room or cafeteria or some such facility which was open not only to the ‘residents’, but also to the others of the ‘target’ Talent Development group.

43. There is currently a ‘Talent Development’ Committee which comprises the Heads of the PhD schools in each Faculty; in purely operational terms, there may be advantage in reducing the number of PhD Schools – although this would be a direct consequence of an academic reorganisation in any case (see Section 5). Talent Development is such an important strand in AU’s overall strategy that we suggest that the Committee should be considered to be a University level policy Committee on a par with the Education Committee. As for the Education Committee, it should be chaired by a member of the Senior Management Team; again we suggest that one of the Deans should be appointed to this task (and again, not on rotation).

44. Although not of such direct concern for Talent Development, Bachelors’ and Masters’ graduates are ‘talents’ in their own right and for most of them, such qualifications mark their end goal. It would thus seem reasonable for AU to have a similar level of

concern for these levels. This responsibility might best be part of the responsibility of the Education Committee, which should include advising the University on the provision of good advice to students about career prospects - in *their* interests – at each stage in their university career, and especially for those who wished to leave AU after completing a Bachelors or Masters qualification

3. Research

Diversity and excellence

45. Research excellence will continue to be a key theme for AU's future development. Research underpins everything that the University does, not least its education and its knowledge exchange activities. This universal underpinning is what makes AU a 'research based' university and is what will help it to be a leader in its own terms. The mergers have meant that the content of AU's research base is now more diverse, covering not only traditional basic science and humanities research but also a wide range of applied sciences from business, education, engineering, environment and agriculture. All these newer fields are not only more application oriented, they also tend to be more interdisciplinary.

46. In the new AU, excellence in research should be equally valued, whether it is basic research or application oriented – which has implications for the distribution of basic research funding (see below). The wider range of types of excellence means that there is greater potential for developing interdisciplinary research themes of relevance to society, such as climate change, food production, and health – not just sickness.

47. This extension of research breadth is consistent with emerging expectations about what research universities should do, not only in Denmark, but globally. Research universities are now expected to be key players not only in propelling and supporting the global knowledge economy but also in helping to solve global problems.

48. In response to such expectations from society, progressive universities around the world are adopting an institutional priority to step up their efforts to develop research in thematic fields of potential impact, which usually also require the research to be interdisciplinary. 'Movers and shakers' in such universities also tend to have a good range of research collaborations, such as strategic partnerships or industrial affiliate programmes; these help to ensure the involvement of research-active industries, as they provide valuable information about the problems which they see as important. In other words, active researchers create research environments that cross boundaries, both between disciplines and between basic and application orientation research.

49. For the purposes of this Section, we draw a conceptual distinction between, on the one hand, knowledge exchange activities, which include public advice and consultancy activities, services to the community, collaboration and contracts with industry on research and training, technology transfer and commercialization (all discussed in Section 4), and, on the other hand, research activities within the University, covering both basic and applied work. In reality, the distinction between these types of activities is not clear cut, particularly in 'research collaboration' activities, the content of which can be very similar to research conducted under Government research grants. The main difference is often in the genesis of the topic, in that the former is normally undertaken to a brief initially provided by a 'client' (although in DMU and DJF such work comprises less of their income than is commonly thought – perhaps about 40%), whereas the latter more normally starts from bottom-up ideas for which a 'client' or source of (usually grant) funding is then sought. The actual content of the research may well be undertaken on a very similar basis.

50. The rest of this section focuses on research and collaboration *within* AU, not least as this has a bearing on the internal organization and mechanisms of the university. The important issue of research collaboration with external entities such as industry is discussed in the next section. This report does not discuss research collaborations with other universities or basic research institutions, not because these are not important, but because they do not usually have any associated organizational issues - unless they need specialized facilities such as an 'institute of advanced studies' or support for international relations.

51. In AU, while there are several high profile examples of research groups which combine interdisciplinarity with working across the basic/application oriented spectrum, this is by no means the norm. Many, less visible, interdisciplinary collaborations exist, although most of these were in place before the mergers. There is a strong sense amongst academics themselves that a lot more could be done, particularly with the more diverse composition of the University. The impression is that the mergers have not yet led to new, expanded or deeper collaborations that many researchers had been expecting.

52. The addition of application oriented research groups on a themed basis can enrich the scientific base of the AU in at least three distinct ways – all of which have already been observed by those AU researchers who have worked across boundaries:
    - The related basic research activities can be undertaken with a greater awareness about their possible impact. This does NOT mean that such research would become applied or top-down, but that productive discussions between basic and application-oriented researchers should help enable more researchers to take into account strategic insights about possible later impacts of their work (this is the Stanford culture and approach). Indeed, 'real' problems can, and often do, provide the basis for interesting and truly cutting edge basic research – much of which is now 'issue driven' anyway and so tends to be inter-disciplinary. Real problems can thus provide an excellent context for researchers from different disciplines to work together.
    - When basic research ideas are developed in such a strategic context, researchers may well find that there are broader options for funding - including strategic grants or industry sponsorship.
    - Application oriented research work can have access to a broader range of disciplinary expertise from within the University, which can help them to engage in longer-term, experimental research that is truly strategic, but which is not possible for them to undertake on their own.

53. However, productive interaction between basic and application oriented research is easier described than done, not least as both 'sides' are busy and sometimes there are real cultural differences in their perceptions, in their 'language' and in the way they do things:
    - basic researchers see critical elements of their work as having autonomy as individual researchers, with their research agenda set from the bottom up
    - many application oriented research groups see team work as essential and collective research agenda setting as inevitable
    - both parties rightly feel proud about what they do, but such pride is often seen as 'arrogance' by the other, making collaboration harder
    - in AU, there is an unevenness in the distribution of basic research funds - to the detriment of DMU and DJF; this is more as a result of their history rather than because they are application oriented, as some other applied sciences,

such as in SUN, have basic research funding in much the same way as NAT.

54. The critical issue is to draw a conceptual distinction between, on the one hand, applied research which should be funded by external clients, not least to maintain relevance and linkages to users, and on the other hand, basic research being done in an application oriented field.

55. The challenges faced by the new AU are thus two-fold:
    - to ensure that there is an institutional environment for excellence for the diverse set of research activities and groups – ranging from pure basic research to application oriented research. While these activities will certainly be different, they must all be excellent, not least to engender and foster mutual respect
    - to ensure that there are sufficient mechanisms for productive communication and collaboration both across different disciplinary communities and also between basic and application–oriented researchers.

56. Some reorganisation, such as is developed in Section 5, will help with these challenges, but it will not be enough on its own

57. The previous 8000C AU has some experience in linking application oriented work with more basic research, for example in medical research related to hospitals, or in IT research involving the Alexandra Institute. In the new AU, such organizational innovations need to go further. First, AU must explicitly recognize cultural differences such as those mentioned above, and must enable each to operate in the most viable way for its research orientation and agenda. Second, and equally important, there must be ways to enable, or even encourage, working together across these cultural boundaries. This will mean the AU will need to embrace different organizational arrangements – discussed in section 5.

University role in fostering collaboration across boundaries

58. The most dramatic way to foster cross-boundary dialogue would be to establish a small number (perhaps three or four) large, thematic Centres of Excellence in fields in which AU has a good combination of expertise. These might be in fields such as:

- food production
- climate change and the environment
- health developments
- future energy.

We refer to these as University Research Centres; they could be 'real' or 'virtual', but each would be led by an internationally respected scientist, who would organically bring together researchers from different units to undertake research which would be intended to be externally funded.

59. Each Centre might have a small core of permanent academic staff, but most of the researchers 'in' the Centre would also keep their 'home' base, partly to retain flexibility into an unknown future, but also, more positively, because it would enable them to bring interdisciplinary thinking back to their home base for others to see how it worked. Different 'flavours' of the same discipline, working in different groups, can be complementary in addressing larger issues (eg agricultural and environmental ecologists are different from generic ones in the balance of their knowledge and research focus). This way of working can also help to initiate cross boundary dialogues between basic and application-oriented research groups, and can provide a starting point for broader interdisciplinary collaborations.

60. We propose that AU should consider setting up between two and four such University Research Centres as part of the reorganisation changes (see Section 5) which might include one or two internationally respected scientists who also value application oriented research.. However, any such new Centre should not be set up just because it seemed a good idea (or to provide a 'home' for staff). We suggest that a small task force should be used to examine the case for any new Centre and to develop initial ideas into a (costed) proposal - including identifying possible sources of external funding. The costs of the work of such task forces might be met from a central research 'pot' (see Section 6). Any such Centre might also need some initial subsidy (pump priming) while it becomes established, not least if it were operating in relatively uncharted territory; estimates of such costs (which would also have to be met from the central pot) should be included in the development of the case.

61. A second, less dramatic, way to encourage the development of cross boundary ideas is

through encouraging informal contacts between academics from different fields. This can be difficult to arrange in AU due to the geography, but we suggest that the University should actively encourage such synergy and, in physical terms, help facilitate forms of 'proximity', for example:

- in the short term, 'rooms' and admin help could be offered by those parts of the University in Aarhus to help those from outside Aarhus
- rationalizing 'locations' which are not associated with a 'research facility' of key importance
- state of the art cross distance meeting facilities – to which AU researchers will increasingly need to resort in any case to communicate globally
- space for interdisciplinary work, cafeteria or /'common rooms'.

62. In addition, structured meeting opportunities might be provided, for example:
    - by being orchestrated in key areas of new thematic challenges – as was done for climate change
    - by actively encouraging groups to target external funding
    - by seminars and lecture series being advertised to a broader audience, certainly including *all* relevant members of the discipline, no matter where based
    - through special lecture series involving internationally renowned scientists invited to the campus, which should be open all the AU community, but hosted by some AU forum of 'top researchers' (see below)

    Such events might be made to dovetail with the themed meetings around the Talent Development ideas.

63. The above points suggest a number of research policy areas for which some form of central funding would be appropriate, either as pump priming or to fund specific initiatives that 'bubble up' from the bottom. The areas and topics seeking a grant from a central 'pot' would be judged both on the strength of the case, but also on the degree of consistency with a wider University strategy for research – see below. We are aware of the need to be wary about establishing 'Research Councils inside AU'; but in our view, internal funding for research initiatives should do no more than provide seed funding to complement external funding. It should be forward looking and experimental, and should not be demanding procedurally as is Research Council

funding. We suggest that the source of these funds should be from a (limited) top slicing of the funds for basic research provided by the Government; we do not propose a tax on income earned directly earned as for AU this would risk having a negative impact on incentives.

The distribution of funds for basic research

64. The current distribution of basic research funds is partly steeped in history, dating back over a decade or more and mainly comprising Government decisions, and partly based on parameters chosen and set by Government; neither part makes any reference to AU's future or priorities. In the same way as for the funding of education, AU should decide its own basis for distributing the basic research funds which it receives from Government – if it simply transfers them in exactly the same way as it receives them from Government, there would be no need to have the University at all!

65. Any reorganisation of AU, such as we propose in Section 5, would change the boundaries between 8000C and the other units, which would mean that the basis of research funding distribution would need to be reviewed in any case. Such a review should be informed by a strategy for research within AU, not based on history or on Government funding methods, and should include any other research funds that AU is in a position to spend.

66. Of course, the vast bulk of funds for basic research will need to be allocated by reference to the past year or two to the extent that there is a need for continuity (of staff and/or of research projects). But even within that, there is scope both to 'reward' research that satisfies University determined performance criteria and to help steer research at the margins according to the University's research strategy.

67. The Government has recently decided that it wishes to 'reward' universities for different types of research, with weightings of 0, 1 and 2 according to the level of refereed publications. There is no reason for AU, as an independent institution, to follow the same weightings; in fact there are good reasons for it not to do so (which partly reflect shortcomings in the Government's approach) because such measures:
    - necessarily look backwards, whereas encouragement for research should be forward looking;

- fail to appreciate that many research outputs of great value do not necessarily lead to internationally refereed publications; examples include: research that leads to a major change in agricultural practice (perhaps written up in a professional journal); research that may take several years to produce the definitive book on, say, Danish art; research that produces new materials for teachers. All of these are of no less value than the 15th published article on a very detailed aspect of, say, chemistry;
- can only be rewards not incentives as they are 'deadweight' in the sense that the behaviour they reward would have happened in any case, without the rewards, so they add nothing in terms of incentives.

68. The point is that AU should have its own policy about any weightings it wishes to ascribe to different types of research outputs. These would be determined as part of its Research Strategy. Looking forward, there may well be directions of research which AU considers to have potential for the future and wishes to encourage, even if there were not, yet, external funds available – we have mentioned inter-disciplinary work as an example. Such directions would also form part of a Research Strategy which would identify ideas and keep them under constant review.

69. This raises the issue of how AU might best develop a Research Strategy. There are three components.
    - Policies about types of research that AU would like to encourage, such as cross-disciplinary and/or research across the basic/application oriented divide
    - Relative 'rewards' that might be made through weightings of various output parameters (of importance to AU, not just those of Government)
    - Policies about the encouragement of new areas or topics of basic research (blue skies) not currently being undertaken.

70. To develop the strategy needs a combination of 'top down' inputs and inputs that come 'up' from individual researchers.

71. For a 'top down' component, AU is considering a forum of top researchers with the purpose, inter alia, of developing ideas for talent recruitment and also of having a voice on directions for strategic research. Their deliberations should certainly be a

valuable and high powered advisory input from a top down perspective. Depending on the composition of the group, they are likely to be more interested in, and have more ideas about 'blue skies' basic research – rather than, say, the development of research that crosses the basic-application oriented divide.

72. New ideas for research are also likely to come from newer, younger researchers and not only from those with an established reputation. In developing a Research Strategy, it will be valuable to tap ideas from the younger researchers. This could be done through an 'upwards cascade' process, in which discussions of ideas were encouraged between groups of individual researchers, for example, at Departmental level. These would then be filtered and the ones remaining would be discussed at the next level, where again they would be again discussed and filtered to a final list. In this process, ideas might equally well be for research that crosses the basic-application oriented divide as for 'blue skies' research.

73. The ideas surviving to the end of the process would then be considered alongside the 'top down' ones arising from the 'top researchers' group (who perhaps might be excluded from the bottom up process). The final stage would be to make judgements about both sets of remaining ideas as the basis for the development of the University Research Strategy. This last stage would require judgement, objectivity and balance – and some administrative tasks. We suggest that this should be the main role of the Research Committee, which, by parallels with the Education Committee discussed above, might comprise the Vice Deans for Research from each Faculty/College. The Committee would make its recommendations for the Research Strategy to the Rector and the SMT for their final decision.

74. In the same way as for the Education Committee, the Research Committee should be chaired by a member of the SMT, who would also be appointed from one of the Heads of Colleges, also not on rotation. Once the University Research Strategy had been agreed, the Research Committee would keep it under review.

75. As mentioned above, the bulk of the Government funds for basic research would go automatically to existing research for reasons of continuity; the funds available for allocation for new ideas would be top sliced from the Government funds for basic

research and go into the central research ‘pot’. SMT would determine the size of this central ‘pot’, as part of its overall budget process; the SMT may also wish to determine a policy about the balance of funds to be allocated from the ‘pot’ as between:

- encouraging new interdisciplinary or basic-application oriented projects and ideas
- rewarding research outputs consistent with the Strategy
- encouraging new ‘blue skies’ ideas.

76. Finally, and again as for Education, the Research Committee should also have the operational role of deciding on the allocation of funds from the ‘pot’ to specific applications and initiatives, judged on the basis to which they were in line with the University’s Research Strategy. The Research Committee would also be responsible for ensuring that research work was effectively monitored for quality control (probably at Departmental level), to ensure that good research received its fair recognition and reward, and that unproductive research was stopped.

4. Knowledge Exchange

Defining the challenges

77. It is increasingly common for global research universities to include making a contribution to social and economic development as their third role along with research and education. Universities are increasingly making themselves critical players in knowledge exchange and are having a growing social impact. From Melbourne to Manchester, research universities are including knowledge exchange as one of the performance criteria for their staff, alongside research and education. There is also a wide recognition that universities cannot work in isolation if they are to make a contribution to social and economic development. For research to have any impact on society, it is important that the academics doing *basic* research work together with those undertaking more application oriented work with industry and Government. The knowledge flow also needs to be two-way: universities must be effective as 'recipients' of knowledge inflows as well as sources of knowledge.

78. Embracing knowledge exchange as a central role for AU would require a change of mindset on the part of the University community; there has to be a *desire* not just to do research, but also to have impact on society. Within such an environment, engagement with industry (including technology transfer and commercialization) become natural extensions of even basic research. Of course, not all academics should engage in such extensions, but those who do, should receive respect from the whole University community.

79. In Aarhus, the concept of knowledge transfer and exchange is not yet widely acknowledged. The University makes excellent use of its research for the benefit of the society in some areas, for example, its People's University is a thriving activity with wide support from staff across campus. As a result of the mergers with DMU and DJF, AU now has a sophisticated capability for research-based public advice and consultancy work. AU's contribution to establishing the Alexandra Institute, which is today a centre of an emerging IT hub, is also well known. However, AU as an institution has been much less active in other areas and, with a few notable exceptions, it has fewer visible links with industry than would be expected for a

research based university at the cutting edge. AU could make a step improvement in its areas of engagement with industry as well as those of technology transfer and commercialisation.

80. There are three types of concerns that universities can have in taking on responsibilities in knowledge exchange – particularly insofar as it involves working closely with industry. First, there is concern that industry demands too much from universities, without the willingness to pay - this may be particularly true in Denmark where public research is seen as tax funded and so industry can be unwilling to pay more. Second, there is concern that university science may be compromised by commercial interests or external influence. Third, there is concern about costs – particularly as some of these activities require 'professional staff' of a kind which is not usual in university settings. While all these are valid concerns that need to be addressed, international experience shows that is perfectly possible to address them. There is much experience of doing this in many, strongly research based universities around the world; they benefit from the results. AU can learn from them.

81. **Instilling interest in industry.** Not all companies can be good partners for universities. However, even a quick look in AU shows that it is certainly possible to work with many Danish companies. DJF has one of the most established and productive relationships with agricultural industries – particularly in animal production – and there is no question that such relationships have enriched DJF's science by providing access to industrial knowledge, as well as to its resources. There are many other companies that are potential partners, large and small, many of which are increasingly research-oriented – some, such as Vestas, sit virtually on AU's doorstep. Developing good working relationships with research-active industry can help to make AU's science distinct from that of other Danish universities.

82. It is also clear that it takes readiness on both sides to work together; industry must have an interest in research and the university must be credible and convincing. If a university is ready, it is also increasingly possible to work with global companies, as well as with local and national ones. Britain, like many of its European peers, now has the problem of not having many significant industrial sectors with high research intensity, so some research based British universities now work with foreign

companies. Japan has long had globally competitive companies with a significant research capacity, but for many years, these companies looked across the Pacific to work with American universities as they saw Japanese universities as not being responsive. In an environment of global R&D, it should be possible for AU also to find global partners, even when there are few domestic ones.

83. There is also now a much better understanding about how best to work with industry on terms that suit universities. Stanford has a range of industrial affiliate programmes, in each of which, multiple industrial companies are invited to sponsor and participate in key events around the research. MIT has arrays of collaborating partners in many of its large interdisciplinary research activities. Both universities have developed a framework for collaboration which has been interesting enough for participating industry not to feel the need to demand secrecy or look for short-term problem solving (which would not appeal to most university academics). Instead, several research active companies come together at the university in order to have access to cutting edge science in diverse academic disciplines on themes of their interest.

84. Having multiple global companies as part of a 'club' is usually an additional attraction for other companies to join; universities thus provide a special forum in which companies can have a dialogue with each other as well as with the university. A critical part of what universities 'offer' to industry is access to students who could become future employees; this can also enrich students' experiences. Such frameworks usually require a level of institutional backing and typically involve several academics, often from different disciplines, working together on a theme. For large scale partnerships, such as those found at MIT, it also requires the university to approach potential industrial partners *as an institution* – rather than through individual academics. Our suggestion is not that AU should mimic such specific frameworks; indeed, it would not be possible as AU does not have a Silicon Valley in its 'backyard', nor (yet) a well established brand among global industries. Rather, we think that AU should build its own way of working with industry – built on its emerging strengths in a few key interdisciplinary areas.

85. Equally, many top university researchers value the consultancy work and other

advisory roles that they play with industry, as they provide excellent sources of insight about what is happening within industry. The academics undertake consultancy and other corporate activities as private individuals, within university rules about what are acceptable outside activities, and bring their knowledge back to the university.

86. **Avoiding compromises, controversies and conflict.** Working with industry can still be tough, as it can give rise to perceived dilemmas of principle – dilemmas that were scarcely visible in AU before, due to the limited amount of such work. The dilemmas are reflected in several potential concerns.
    - The possible limitation that the presence of such activities might have on academic freedoms – be it the need for secrecy, delay in publications or the need for speedy responses.
    - Contracted work, by its nature, is also limited by what the 'client' wishes to pay for. There can be concern that such 'external' influences on academic activities could be counter to the idea of academic autonomy.
    - Unless it is made very clear, there is a risk that the results of contract work could be interpreted as reflecting the view of the University as a whole and thus restrict the academic freedom of others within the university to disagree with it.
    - Close relationships with external agencies raises the concern that they could have undue influence on the results of university research. For instance, public advice or reports may be thought to be tailored to be acceptable to the 'client.' While this may occasionally have been the case previously, when DMU or DJF were parts of the Government, the fact that they were explicitly moved to a university must mean that this will not be done in the future.

87. The resolution of these concerns is not to avoid such activities, but to clarify the terms upon which AU expects its researchers to engage in them, through its policies, guidelines and institutional support. Universities of the highest repute routinely undertake a range of knowledge exchange activities, but they do not do so in a vacuum. They have developed policies and guidelines that define what is acceptable in their university, and then developed ways to attract industrial interest in those terms. For instance, they would have clear policies about any conflicts of interest,

which would describe the extent and nature of external activities in which their academics were free to engage. They would have norms in their industrial research contracts to provide 'reasonable' protection for the ability to publish. AU has already taken such steps with respect to public advice: policies and guidelines have been established to describe the manner in which public advice is expected to be conducted in AU, so as to avoid controversies and, more broadly, to legitimate such activities as part of normal university life at AU.

88. This does not mean that AU should try to develop all the rules up front; some arbitrarily set rules could be inhibiting rather than enabling. We suggest that 'rules' should be developed as and when the need arises, for example in response to controversies, rather than in advance to try to prevent all controversies.

89. **The costs of such activities.** In the medium to long term, it is important for the relevance and excellence of many of these activities to be measured by their 'market value'. Hence, it should be possible to expect revenues from most of them – which would also help AU diversify its funding base. Some such funds will come from industry, others from different parts of Government or charities in recognition of the public services provided by the University.

90. The most serious concern is usually about the level of funding needed from the university for technology transfer and commercialisation – particularly for spinoffs. It is true that AU cannot expect to break even quickly in technology transfer: it will take time before the requisite size and quality of professional expertise and of the patent portfolio have been developed sufficiently to expect reasonable returns. However, it is also a mistake to think that such activities will be a net drain on University resources into the foreseeable future – indeed if that was the case, the University should not be undertaking them.

91. Most universities, when starting up such activities, start small and build up gradually, along with the concomitant professional capacity. Many universities also make use of professional expertise in an entrepreneurial way so that they do not have to pay its full market costs: 'proof of concept' funding centres in MIT or UCSD rely upon a group of mentoring entrepreneurs who 'volunteer' their services without being paid full fees.

While it is not feasible to recruit licensing professionals on a voluntary basis, there do come with a range of salaries. Internationally, some are paid the market rate, but many are paid less (though usually still more than administrative salaries); and lower pay does not necessarily mean worse performance. In the UK, for instance, the pay depends more on the style of such units; some operate like companies, others are more like university support offices.

92. It is also possible for universities to look to regional and central governments to provide support funding for such activities. It is important that building the various support capabilities is done by means of thoughtful experimentation with sufficient funding to enable action, but while retaining the benefits of entrepreneurialism and a certain frugality. It should not be designed as a massive single shot investment.

University policies on knowledge exchange

93. We suggest not only that AU could engage more actively in knowledge exchange, but that it should do so as a matter of institutional priority – for three reasons.
    - To be active in broadly defined knowledge exchange activities is a natural extension of its new profile; it would also serve to set it apart within the Danish system – and would certainly differentiate it in a positive way from Copenhagen University. This would address one of the issues raised by the recent International Review about the lack of distinct characteristics of the universities emerging from the mergers in Denmark. If AU succeeds in fostering application-inspired basic research as discussed in Section 3 above, working with industry and developing technology transfer support capacity would be a natural extension to deliver an impact from the results of research.
    - Many people inside and outside the University observe that Aarhus researchers are distinguished by a down-to-earth culture. For example, the readiness of staff to work in the People's University and the readiness of the University to help establish the Alexandra Institute, both show that AU academics do not hide in ivory towers, but are ready to engage with a wider public. With such a culture, AU could become an excellent player in knowledge exchange.
    - The current political climate expects all universities to participate in this way, not only domestically in Denmark, but in Europe and more widely across the world. AU would need to have a very good reason to buck such national and global

expectations. Not focussing on this issue would also mean forgoing many of the potential benefits of the mergers and of public investments being made to strengthen capabilities related to knowledge exchange and transfer functions.

94. In the light of the above, we are clear that AU should take on this challenge. The first step would be to make a conscious and strategic decision to do so. This is because one of the most critical actions needed would be for the University clearly and consistently to articulate its commitment to forming better links to the wider society and the economy. We suggest AU should define its knowledge exchange role as a broad set of activities, ranging from the People's University and cultural activities (including public speaking), to service activities such as teacher training, public advice, consultancy, short training courses, research contracts and collaboration, as well as technology transfer and commercialisation (including spinoffs).

95. The primary objective of all these activities would be to contribute to society, rather than to make money for individuals or for the University. This is not to say that AU should regard these activities as charity, because excellence in many of them can only be judged by their marketability – and their externally generated income is a critical measure of their relevance and excellence. The emphasis on the breadth of activities should help clarify the underlying value of AU contributing to society, and also help ensure that knowledge exchange is meaningful for all academics at AU - and not just an activity for some scientists.

96. AU should pay particular attention to areas where it is currently relatively weak, such as its relationships with industry and technology transfer. There is considerable synergy in these activities. Developing good collaborative relationships with industry is a pre-requisite for success in technology transfer and commercialisation because, in today's world, it is not easy for isolated academics to contribute to industrial innovation on their own or by chance. Inventor academics can help identify licensing market possibilities, but they can do so only if they themselves are well networked industrially; without this, technology transfer would be an uphill battle.

Actions needed for knowledge exchange

97. **Leadership**. There must be clear, consistent and visible messages about such a

commitment from the University leadership - the Rector, the Rectorate and the Deans (see Section 6). The Rector, the Rectorate, the Deans, Heads of Department and the professional leadership in each knowledge exchange activity must speak with one voice and give a single, clear policy commitment across the University.

98. **Policies, guidelines and incentives**. It is important for AU to articulate policies, guidelines and incentives, as the need arises, designed to secure the legitimacy of knowledge exchange work in the eyes of the academic community and also deal with issues such as potential conflicts of interest.

99. As recent AU experience of public advice has shown, it is important to have a set of policies and guidelines that define the 'comfort zone' for such activities before the wider university community will see them as 'legitimate'. In the case of public advice, it was helpful to clarify that it is individual scientists, or a group of scientists, who sign off the content of any specific policy advice – and not the University as a whole.

100. Rules of thumb, as well as university policies, can help academics understand the position on issues such as the acceptable level of outside work, potential conflicts of interest, confidentiality when working with industry, and how to deal with any 'delay' in publications when commercialising.

101. In management terms, the scale and intensity of some knowledge exchange activities, such as the public advice and contract research done in DMU and DJF, require a different management culture from conventional academic units. For such work, there needs to be:

- fairly tight working in multi-disciplinary teams
- a high level of networking
- a culture of working to external deadlines
- a conscious awareness of time and its cost - with approximate timesheets
- a broad base of competence retained at the ready

The organisational arrangements needed for such activities are discussed in Section 5.

102. It is also important for AU to develop operational practices that ensure quality

standards in knowledge exchange activities. While the market discipline arising from external funding provides some assurance about the quality and relevance of the activities, large specialized units, for instance for public advice (see Section 5), may need additional quality assurance mechanisms. Indeed, part of the Government's rationale for the mergers was to improve the quality of advice it received - implying that all the relevant parts of AU should contribute to the advice and that those providing the advice should try to secure the best relevant assistance from within AU.

103. There are several ways in which this could be done, any or all of which could be built into the working process, with the costs being included in the contract price:

- form a team that includes all the relevant expertise within AU
- solicit help while the advice or work was being undertaken
- arrange for some form of peer review towards the end for work – though this will require time discipline on the part of reviewers
- on the occasions when it had not been possible to gather wider contributions, explicitly note this in the advice, so that if there were any later disagreement, it would not come as a surprise and cause unexpected upset
- conduct periodic quality reviews of units/activities by an international panel.

104. It is also important for the university to ensure that there are sufficient incentives for academics to undertake such activities in terms of monetary reward and/or professional recognition. For instance, if the perception in the University was that only well-respected academics were invited to provide public advice, the desirability of being solicited for advice would be raised.

105. **Better relationships with industry** It is important that more AU researchers come into contact with industry through consultancies, research contracts and institutionally supported collaborative frameworks such as strategic partnerships and industrial affiliates programs. Institutional frameworks can provide large numbers of researchers with possibilities for encountering industry, without they themselves having to make concerted efforts. It is important that AU makes every effort to facilitate researcher encounters with industry. There are several ways to do this.

- Improving the AU web presentation to represent the full range of expertise is an obvious way to advertise university expertise, but it is the minimum step needed.

- Most universities go well beyond that and have designated professionals who can channel industrial enquiries to the right researchers, or actively approach companies to seek collaboration.
- Such professionals can also help make better use of existing institutional dialogues with industry, for instance between the University leadership and corporate representatives, or make systematic efforts to invite industry to AU sites to meet relevant academics.
- AU should seek to develop special partnerships – as new ways of including industrial participation in campus research activities and in thinking about future research areas.

106. **A professional technology transfer support unit** with significant expertise in technology markets is clearly important – and has recently been debated actively inside the University. The debate has tended to focus on the need to establish such a unit as a separate company outside the AU administrative boundary – mainly as a way to provide sufficiently high salaries to attract good staff. However, it is important to recognize that the organizational form is not a panacea for effectiveness. As examples, many successful TTOs in the US (including Stanford or MIT) operate as integral units within their university administrations.

107. The choice of organizational form is ultimately a question of culture and style of operation. Establishing a company needs clear performance goals, often on the 'bottom line', with the company expected to operate as a business - and pay accordingly. The main advantage of this approach is to be able to create a type of business oriented culture that is not usual in universities. But there are examples in which such a company, while aiming to maximise its profits, ran counter to the university priority of delivering impact. In contrast, TTOs which are distinctly part of the university tend to adopt a strong ethos of public contribution; they often manage to attract professionals at less than market rates – although probably still at higher rates than for more traditional university administrative positions. These professionals come not for the money but are attracted by the different ethos in a university (e.g. the public nature of the job, a more family friendly work environment). It is wrong to assume that high salaries necessarily ensure good people – look at the banking sector!

108. Some universities have gone further and built TTOs as part of a broader support office for all research and enterprise activities (eg in Glasgow); it is then provided as an integral part of the support service to the academic community. The main disadvantage of this approach is that it is harder for the operations to be on a 'commercial' basis.

109. There is a strong push for a professionalised TTO within AU today; this is a welcome mood that AU can ill-afford to dampen. However, we have not yet heard an overriding case being made in terms of any one choice of organizational form. The final decision needs to be made on an analysis of costs and benefits, as well as of the prospects for attracting professional staff. But for all this discussion about TTOs and their organisational form, it is important to recognize that TTO development is only one aspect of broader support structures that are needed for research and knowledge exchange activities. Our experience clearly suggests that it is far more important to identify the right people and to manage them well, rather than to worry about organizational forms.

110. The professional support provided by any form of TTO must not feel 'distant' to its 'client' academics, especially in the early days of winning their confidence and establishing working relationships. Staff location, as well as their reporting lines should be explicitly determined, particularly in AU where there are multiple campuses and where some academic units have much higher volumes of technology transfer activity than others. We think that all such professionals should report to a central professional leader to ensure synergy and consistency, but some individuals should be designated as being responsible for specific academic units, particularly for units that are very active; they might also have a form of dotted reporting line to the academic unit concerned.

111. **A local innovation ecosystem for spin-offs.** To develop a (fairly narrowly defined) technology transfer capacity, in terms of patenting and licensing, is not the same thing as trying to develop University spinoffs. Universities are increasingly trying to develop spinoffs, mainly because they represent a mechanism through which the university can contribute directly to economic development. Images of successful

spinoffs elsewhere have raised expectations in AU; they have also raised the level of effort that is being made for them.

112. However, for a university to develop spinoffs requires it to have a much more diverse – and in many cases, riskier - set of activities than are required for technology transfer activities. Success for spin-offs requires an appropriate 'environment' – an innovation ecosystem. Such an 'ecosystem' typically includes a networked pool of managerial talents, financiers (including angels and venture capitalists), professional service providers and some mechanism for 'venture mentoring' to help develop the 'businesses'. It is normally referred to as an 'ecosystem' because it is not a *support* system to provide incubation, but a *selection* system in which only the fittest emerge and survive.

113. Many universities are contributing to the development of their local eco-systems. For instance, many have an 'in-house' proof of concept funding, support for business plan development and/or for building management teams, and networking events. The problem is that it is easy to set up arrangements with the right names and functions, but it is far more difficult to set them up based on real expertise that will lead to a real impact.

114. In our view, AU should get involved with the business of spin-offs and contribute to the development of a local eco-system, not least because there is no other body which can in Aarhus and Jutland, and otherwise the region would have no mechanism to be better linked to the global knowledge economy.

115. At the same time, looking for spin-offs is a topic on which a lot of money can be wasted – and the higher education world is full of failed efforts. There is no simple recipe for success, but we highlight two important lessons. First, it is important to bring in first-hand experience of what such an eco-system should look and feel like. Taiwan and Israel developed dynamics similar to that of Silicon Valley by making use of first hand experts – for instance, in developing proper venture capital industry; regions too (eg Cambridge and Leuven) developed tangible capacity by using the 'return' of entrepreneurs who had had global exposure. Second, it is not feasible for universities to provide the grand design alone, nor to fund everything. The critical

aspect of the eco-system is that it has to be entrepreneurial and market-oriented in a way that universities are not; universities cannot hope to do more than 'contribute' at the margin.

116. **An effective Entrepreneurship Centre**. One aspect of the eco-system in which universities can play a key role is to create an environment for entrepreneurial networking: establishing an entrepreneurship 'centre' can be an important step to this end. However, if an entrepreneurship centre is set up as a peripheral entity with the prime aim to provide education and support for enterprising students, the activities would be too low-profile to attract the necessary pool of entrepreneurial talents around the university. A more ambitious approach would be to develop a higher profile with an academically embedded entrepreneurship centre, for example, affiliated with ASB. The centre could invite entrepreneurs to give lectures and could also invite them to become members of the AU academic community – a far more attractive proposition for globally active entrepreneurs.

117. Some universities successfully exploit the fact that many successful industrialists and entrepreneurs are interested in doing new things as part of their personal portfolio or as a second (or third) career – including contributing to a university or developing the younger generation. Centres that can welcome members of the entrepreneurial community straight into the academic heartland, to work with dynamic academics who are undertaking research on entrepreneurship, for instance, will be a much more attractive proposition than simply offering contact with students at the periphery. With such a centre, some high profile entrepreneurs might even be happy to work part time and/or attend networking meetings, with staff as well as students being target participants for the networking activities.

118. **A Knowledge Exchange Committee.** Different parts of the University will have different profiles within knowledge exchange – some will engage more in the People's University, others will undertake executive education, yet others will provide valuable assistance to small companies. If, as we suggest, AU is to raise the profile of knowledge exchange within the University, there needs to be a forum within which strategic directions, priorities, policies and guidelines are discussed. It is important that such a forum should be one in which all these activities were valued as being

‘equivalent’ – and with an emphasis on what more the University might contribute.

119. We propose that there should be a University Committee on Knowledge Exchange, of which the present Committee on public advice would be a sub-committee. This would be a University level policy committee, equivalent to those discussed above for Education, for Talent Development and for Research. Like those committees, it would be chaired by one of the College Deans and, like those, it would make policy recommendations to the Senior Management Team (see Section 6).

120. We suggest a dedicated committee on Knowledge Exchange as there is a critical need for dedicated institutional level attention to it, but knowledge exchange activities should be, and be seen as, natural extensions of research and education. It is important that AU does not treat them as isolated activities. Administratively, some of the support activities, such as research collaboration with industry, may be best put together with support services for research. Similarly, the lifelong learning agenda may make ‘education’ knowledge exchange activities more central in the Education Committee. Over time, as the knowledge exchange agenda becomes better articulated, with initial ‘infrastructure’ developed, and as the Education and Research Committees complete their initial reform agenda, it may well be possible to have knowledge exchange as embedded responsibilities in these two Committees.

5. Organisation structure

121. The previous three sections on Education, Research and Knowledge Exchange outlined the issues and the reforms we suggest; many of these have financing and management implications which are discussed in Section 6. The remaining question is whether the current structure contributes to some of these issues and if so, whether some form of reorganisation would help with the reform process. In fact, we consider that quite a few issues are exacerbated by the current structure.

- It is difficult to provide education programmes across different disciplines, especially across different Faculties; for example, there are few programmes that comprise a 'core' with options drawn from various disciplines. Not only are there no University incentives to develop such cross working, but the current internal funding arrangements act as a disincentive
- There has been limited progress in generating research collaborations across the current boundaries on the one hand and in working across the boundaries on knowledge exchange activities (such as policy advice), on the other; each of these would help develop unique strengths in AU. Building thematic "University Research Centres" is one way forward, but for that to work effectively, the new parts of AU need to be brought closer to the previous 8000C parts. The critical organizational challenge is for AU to find ways to reap the full benefits of the mergers by building synergy and coherence across the University, but while maintaining diversity in research.
- There is also uneven access to AU's basic funding in research and education by the new parts of the University. 'Basic funding' should not be expected to support much applied research as this is more appropriately funded by external contracts, but the 'basic research' elements of application oriented work should be supported in a consistent way across the University. There is a critical need to find a way to move to reach consistency.
- The current boundaries inhibit information exchanges about the expertise and interests of different groups who are working in related areas.
- In some areas there is duplication and/or overlap, which implies there may be scope for rationalisation; in others, there is complementarity and/or potential synergy which is not being fully tapped (eg in some environmental sciences; in pedagogy; in languages; in economics). In many of these cases, the actual

position on overlap, complementarity or the need for staffing rationalization is far from clear (eg the designations may not be appropriate for the different types of, say, molecular biologists or economists); the position needs to be examined across the University as a whole in order to reach sensible arrangements.

- The extent of pro-active coordination that is needed for the University to work effectively across so many different units requires a level of central intervention that is alien to the Danish culture of a decentralized university; it would normally be better for a smaller number of larger units to be responsible for such coordination internally.
- Some inefficiencies and duplications arise from having so many administrative arrangements, for example with differing administrative rules (eg semester structure, hours, time sheets, allowances for preparation time); there is also some duplication of administrative functions.
- The two large single contracts (with the Ministry of Environment and the Ministry of Food) present risks to AU which require arrangements to 'manage' and minimise them.

122. The merger of the 8000C University with the other institutions makes AU a different university; simply keeping all the units as they were before the mergers does not show any recognition of this. So, in addition to helping to address the reforms, some form of reorganisation is valuable in its own right - as a signal (both internally and externally) that the future Aarhus University will be different from the past.

123. For the new AU to achieve its potential, the principles for reorganisation are that the new structure must:

- help address the above points and the reforms outlined in the previous three sections, recognising that it is more difficult to secure the reforms across a fairly large number of heterogeneous units
- positively encourage the coherence which AU is looking for (rather than inhibit it), with better cross working in education programmes, in research across boundaries and in knowledge exchange; again a smaller number of larger units would make this both easier to achieve – and more likely
- improve integration across the University, not only in terms of substance, but also, and as critically, in terms of culture and attitudes

    - this means change for ALL parts of the University, the academic parts of the previous 8000C will need to develop changes in culture as much as will the new parts with their more application and professional orientations
  - recognise that the management and 'sub-structure' within any new (larger) units will also be critical to success – and may require further aggregation of smaller units or departments (to be based on further analysis)

124. But, at the same time, any reorganisation MUST NOT:
  - damage any real current strengths (for example, the brands of Economics, ASB and the reputation of DMU)
  - simply add another layer of management and so increase the distance between the top and the bottom.

125. With these principles in mind, we discussed at length possible restructurings within the present Aarhus University (in over 100 interviews and a number of seminars); we also considered arrangements in other universities which had recently thought actively about their structures.

126. Our overall conclusion is that the best way forward for AU in 2010 is to regroup into a smaller number of larger units, each of which can better capture the diverse spirit of the new Aarhus University. In practical terms, the most appropriate number would seem to be either 4 or 5, with our preference being for four as long as some resulting administrative difficulties are resolved. We suggest that new names should be used to help reinforce the change, both as a general title for the new units (without prejudging a decision, we refer to the new 'units' as 'Colleges') and also for each one individually.

127. In pursuit of agreed and consistent University policies, each new 'College' would:
  - be responsible for developing a new profile and organisational coherence, both in terms of its substance and of its culture; this would be designed to
    - bring together basic and application-oriented research
    - ensure that education programmes were developed and run seamlessly across the College

        - show a clear commitment to knowledge exchange and the organizational arrangements to facilitate it
    - be charged to create an environment which 'felt' seamless to its members and which operated in a borderless way, both within the College and between Colleges
    - review its (new) sub-structure with a view to making organic changes, rationalisations and simplifications
    - ensure coherence, rationalisation and articulation of education programmes and courses, both within the College and between Colleges - thereby also securing better clarity and choices for students
    - remove operational inconsistencies which make it difficult for exchanges between Colleges of students and/or of staff
    - the 'Head' of the College (under whatever title – perhaps 'Director' or maybe retain the title of 'Dean'), would appoint three Vice-Deans, one each responsible for education, for research and for knowledge exchange

128. We discuss below the arrangements proposed.

NAT + DMU + DJF

129. These three entities are strongly science based with the scope for considerable coherence and symbiosis between them. We suggest that they should be brought together in a new College which might be called, for example, **"The College of Science and Technology".** We explore the implications for each below

DMU

130. The objective of the reorganisation for DMU within AU would be to create a position in which DMU's environmental policy advice would continue to be provided for the nation, would continue to be based on excellent research, but with the basic research now benefitting from being able to call on the broader and deeper science base across the whole University. From the perspective of AU more widely, a slightly longer term objective might be to build on the DMU expertise to develop a University Research Centre for global environmental studies. The question is how to get there from here.

131. In very broad terms, DMU has two categories of work:

- provision of public policy advice, consultancy and contract research
- more academic research work to underpin the above (supported by some basic funds from their main contract and by grants and sponsorships in which DMU defines the work content).

132. We think that the two different types of work can be used to define two organically-linked groups. It would be essential for them to be organically linked and separated only by a permeable boundary, so that the staff and the research issues could move in both directions (eg problems might be identified in one unit, but investigated by the other). The current configuration of tasks within DMU means that many staff currently straddle both types of work; such synergy needs to be maintained.

133. **Group 1: Applied Research and Policy Unit.** This would primarily be concerned with knowledge exchange: providing policy advice and conducting contract research and consultancy, all still underpinned by high quality research. The group would have a 'business oriented' culture for its service delivery, professional support and management, rather similar to that in DMU at present. There might be advantage in this Unit retaining the name of 'DMU', not least for external reasons (to maintain what is a respected brand and to give comfort to the Ministry). Internally it would be recognised as being an Applied Research and Policy Unit, focussing on the environment. This Unit would form the 'home' to the bulk of the present DMU staff.

134. The Unit would be managed as a 'business unit' by a 'Director', with its work programme of applied research being largely determined top-down by the contracts which it secured with external clients; it would naturally seek to diversify its client base. The work of the Unit would be subject to the same quality standards as the rest of the University, with quality assurance in the ways discussed in Section 5.

135. The Unit would grow and decline as determined by its success in winning external contracts, consistent with its need to stay relevant to external needs; this would help to limit the risks to AU as a whole. In effect, it would be like a well defined externally funded research group, although it should have more permanence

than that, more like a university hospital, as it should be able to secure a more permanent stream of funding from Government.

136. In addition to the knowledge exchange activities in this Unit, the staff could also be asked to contribute to specific research projects and to teaching, as identified by their academic counterparts; for such activities, the academic unit would be expected to pay for their time – at an internal rate determined by policy reasons, which may not be the same as their market rates. The Unit could also provide valuable opportunities for students for research or for internship - at all levels (e.g. in wild life, ecology); as a self sustaining Unit, it would expect to receive full cost funding for the provision of such facilities – if necessary, subsidised by the University.

137. The Unit would be relatively 'autonomous' in terms of its operations by comparison with other parts of the University; not least, it would require a culture that worked with a fairly tight management discipline – much as DMU does now. For such work, there would need to be:

- fairly tight working in multi-disciplinary teams
- a high level of networking
- a culture of working to external deadlines
- a conscious awareness of time and its cost - with a control on inputs, using some form of time recording
- a broad base of competence retained at the ready

138. As a self-supporting Unit, any overheads it received should remain in the Unit and not be top-sliced by the College. The Unit would be price 'competitive' with private consultancies, as part of its 'link' to University science will be covered by AU.

139. There is no pressing reason for seeking to relocate large numbers of the staff nor the field stations which would be an integral part of the work of the Unit; but it should have a small, high level presence in Copenhagen.

140. **Group 2: Department of Environmental Studies.** This would be an academic Department, responsible for research and teaching, with a focus on

environmental science - initially in fields largely overlapping those of the Applied Research and Policy Unit; in effect, it would be a Department of Environmental Studies with a Head of Department, as any other Department of the new College. Its scientists would conduct 'bottom up', curiosity driven research, usually straddling strategic and basic research; they would also act as intermediaries between the knowledge exchange work done by the Applied Research and Policy Unit and related basic science done either by themselves and/or by other parts of the College.

141. The Department would work on the same academic basis as other departments of the College. Its size would be determined by the academically realistic extent of its education and research activities, which would initially be fairly limited, but with the express intention of growing. The Department would be expected to be as productive in academic publications as any other academic group. Its members would also participate in thematic research centres and interdisciplinary research grant activities on the same basis as any other academic staff.

142. Its base funding, via the College, would comprise a share of the basic research funding from the distribution by the University, on the same basis as any other academic department, together with any funding from its teaching activities (via the (reformed) taximeter system). We would also expect the bulk of the basic research funding that is currently provided to the existing DMU under its Ministry contracts to be 'spent' in supporting research undertaken by the Department.

143. In addition to their research, the staff of the Department would help develop and offer education courses and programmes, both in support of other parts of AU and as the lead. (For this reason, it would be strongly preferable for most of the staff in the Department to be located in or near Åarhus – although this may take a little while to achieve.) At least some of the staff would also have a defined proportion of their time made available to be 'on-call' to help with the knowledge exchange work of the Applied Research and Policy Unit; this work would be paid for either from the contracted funds or might be deemed to be in return for an appropriate level of 'basic research funds' from the contract. The arrangement would be similar to having 'joint appointments' between the two units.

144. The Department would include a small number of social scientists, such as environmental economists – as currently in the previous DMU. There is a significant diaspora of environment related social scientists in various places in AU and we think that such emerging specialisms are worth retaining where they are, but the various groups should be invigorated through teaching and through collaborative research, at the initiative of the Department of Environmental Studies.

145. **Transitional considerations**. The initial staff of the Applied Research and Policy Unit (the 'new' DMU) would be drawn almost entirely from the staff of the current DMU. In contrast, the (much smaller number of) staff for the Department of Environmental Studies would be drawn from three sources. First from those staff within the (current) DMU who would be willing, and also able, to develop an academic research career, pursuing bottom up research and including the concomitant commitment to teaching. Second, from any environmental research staff in DJF who are less tied to a specific agricultural agenda but more interested in (and similarly capable of) pursuing a general academic career in environmental studies. Third, environmental related researchers from within NAT Departments (or indeed elsewhere) whose research interests were defined more by environmental concerns than by their disciplinary interest; some such staff might be considered as 'joint appointments' with their relevant disciplinary department.

146. The skills needed in the two units would be different, with those in the Applied Research and Policy Unit being more 'client facing' and able to work in a more 'business-like' environment, whereas those in the Department of Environmental Studies would need to have responsibilities for teaching as well as expectations about self generated research and academic publications. The tasks in the Department of Environmental Studies would not appeal to everyone in the current DMU – nor would they be suitable for them. During the transition, the current DMU management would need to work closely with the Dean of NAT (or the Dean of the new College once appointed) to establish the academic expectations of staff seeking to transfer to the Department of Environmental Studies.

147. At the same time, the transfer processes must be undertaken with the utmost sensitivity so as to avoid members of either group feeling like 'second class citizens'

compared with the other. On the one hand, AU has a high academic record, which should match the expectations of those transferring to the academic Department; similarly, AU is now attaching a high priority to building its contribution to society, so the (new) DMU will be at the forefront of the University's development. In fact, selectivity works both ways: the strengths and skills required are simply different for the two units and the 'sorting' process is just that: 'sorting.'

148. It would be essential for the Director of the Applied Research and Policy Unit to work closely with the Head of the Department of Environmental Studies. The most immediate task will be to ensure that the transition (of work and of staff) between the present DMU and the two new units is as smooth as possible. On an on-going basis, the two will need to ensure that the scientific expertise of those in the Department was made adequately available for the work of the Unit. Although there would be an agreement to this effect, it would still need good management to make sure it happened. Conflict might also arise if there was a potential contract for which both Units might be interested in bidding. Any conflict would need to be resolved by the Head of the College – but see below.

149. **University Research Centre for global environmental studies.** The University is considering establishing a number of University Research Centres of international distinction, with the aim of bringing academics together on a thematic basis from across the University. We would suggest that the general field of global environmental studies might provide one such theme. The shape and size of such a University Research Centre would depend on grants won externally, but the idea would be to conduct interdisciplinary basic and strategic research related to environmental issues. The leader for such a Centre would need international academic standing to lead its development.

150. Both the Department of Environmental Studies and the Applied Research and Public Advice Unit, as fairly permanent features of the University, would have a role to play in the development of such a University Research Centre – although the Centre would have interests and a scientific basis which ranged wider than either of them. If the timing were right, it could be that the leader of the University Research Centre might also take responsibility for the Department and for the Unit too – which

might even mean that the post of Head of Department was not needed (although there would still need to be a Deputy responsible for the more 'commercial' 'new' DMU). In the short term, we doubt this arrangement would be right and we think it would be better to start with a Director of the Applied Research and Public Unit and a separate Head of the Department of Environmental Studies. The remit of the Head of Department would include working with the Dean of the College to develop ideas towards establishing the University Research Centre in a few years' time.

DJF

151. The starting point for DJF is a little different from that of DMU, not least as the result of the greater flexibility it has had in its contract with its Ministry and the higher proportion of funds that it has had available for basic research. As a result, DJF has started down the path to become an academic unit. However, there are similar needs for it to be better integrated with the rest of University.

- For education programmes, its scientific expertise can add valuable additional dimensions, both by adding options to existing programmes, particularly those in NAT, but also by developing its own; it has started to do this, perhaps a little hastily as its education efforts have not been as well articulated with the rest of the sciences as they should have been and so failed to maximise synergy and risked duplication.
- For research, DJF also provides an additional range of expertise which can add to that of NAT and of SUN, through joint projects and other forms of joint working. DJF does well in competitive bids for strategic research funds, a skill which can also add strength to the new College.
- For both education and academic research, the basis for a DJF claim to basic funds needs to be determined – to provide DJF a more sustainable base. However, the shape and size of DJF is clearly not that of a normal academic department and AU cannot and should not subsidize the applied work that DJF does. At the same time, the 'academic research' elements of DJF deserve support on a par with that of other academic units. In its need to determine the 'academic base', the issues are similar to those for DMU.
- For knowledge exchange activities, DJF is a powerful force in its field and the rest of the sciences should be able to learn lessons from its success. On the other hand, DJF can develop further strengths in knowledge exchange, not least in the

provision of policy advice, by making greater use of other parts of AU.

152. Although there are the same two types of activities in DJF as in DMU, by the way that DJF has developed, we understand that the two are more tightly inter-woven, making it more difficult for them to accept a separation in the same way as we outlined above for DMU. Nevertheless, in its recent 'Vision' discussion note, DJF itself envisaged having a "cross-cutting Advisory Unit to process and provide advice gathered from the best research". The document suggested that this Unit would be staffed by "experts in counselling, communication and the processing of complex problems". We think DJF's own vision forms a good basis for a separate unit; without its own research capacity, the unit would be more limited than the Applied Research and Policy Unit discussed above for DMU. Clearly such a Unit should also have a presence in Copenhagen, shared with that from DMU.

153. We understand that the other staff of DJF, the vast majority, currently undertake a combination of basic and applied research work, often wrapped up in the same individual; this is similar to the position in DMU. This mix, and the way they work, means that they would not form an academic 'Department' in the usual sense of the others in NAT. Furthermore, the DJF numbers are huge by comparison with any one NAT department.

154. A further complication for DJF is that the role of Government in funding agriculture research is changing. In contrast to the past, when Government saw it as a prerogative to fund and conduct research on behalf of individual farmers, agribusinesses are now only one of many industrial sectors with an uncertain claim for special 'subsidies.' There will be expectations for applied-end agricultural research to be funded and/or conducted by the industry itself – whether that is realistic in the current domestic industrial climate or not. 'Government-funded research' can be expected to be more upstream - more 'basic' - to complement the applied research supposedly being done by industry; DJF is in the midst of such complicated transitions. In the end, DJF could develop to be more like a conventional academic unit with a large amount of external funding and a focus on application oriented basic research.

155. In the long term, it is in the interest of the University for DJF to sustain application oriented research – with the capacity to fund itself through even better relationships with domestic and global agribusinesses as well as with foreign governments (particularly in emerging economies). It is also in the interest of all for DJF to develop an even stronger capacity at the more basic end of agricultural research – which should form the core of its academic research.

156. However, such a dual strength may not be able to be achieved if DJF continues to operate as a single unit, managing all its staff with the same performance expectations and incentives. For these reasons, and despite the complications, our preferred solution would be for DJF to develop a variation of the arrangement we have proposed above for DMU, with two 'groups'. One of these would be more explicitly oriented to applied research and the policy advice of what DJF currently does (directly feeding the above 'cross cutting Advisory Unit' – and perhaps still being called DJF for external purposes) – and with every reason to seek to expand further its client base. The other would be akin to an academic department with staff who look to having academic careers, focussing on basic science (the Department of Agricultural Science). The other points about management arrangements and funding would be as above for the equivalent entities formed from DMU.

157. We understand that there are those who will argue that it is simply not possible to 'split' the staff in this way, and we have had this point vigorously presented to us. We are not in a position to judge the strength of this case for ourselves, but we suspect that the majority of DJF staff would be able to think of themselves falling more naturally on one side of the line than the other, albeit with some who though that they fitted equally well on either side. We also understand that the balance between the two 'groups' would be different from the balance in DMU, with perhaps a higher proportion being suitable for the more basic science unit. The first transition step (and to test the feasibility of the split) would be to ask DJF staff which side they saw as most suitable for their skills and ambitions, with NAT and DJF senior management making an input about each individual's relative suitability (as for DMU).

158. Again as for DMU, the expertise of DJF staff, particularly those on the more basic science side, would contribute to the organic development of one or more of the

thematic University Research Centres which AU is considering. The four most relevant themes for DJF would seem to be: food science and production; biomass energy; bioengineering and health sciences; environmental and ecological issues (as part of the University Research Centre on the Global Environment mentioned above). Some of these might be developed in tandem with other NAT departments, some with relevant parts of SUN and some, especially the last one, with DMU. At the same time, the staff should actively contribute to the development of well articulated education programmes – mainly in conjunction with other departments of NAT and perhaps with SUN too.

159. In time, many of the current staff in DJF may become members of one or more of these thematic Research Centres – along with other scientists from NAT, SUN and DMU. We do not think it would be right to set up any of these Research Centres without prior analysis, simply in order to provide 'homes' for DJF researchers; the Centres should develop organically, with internationally renowned leadership to conduct interdisciplinary basic science in their fields. Even in the field of food science, the expectations should not be automatic that DJF would be the principal party to set up the Centre.

160. While many of the staff might become part of one or more thematic research centres, those remaining should be expected to move gradually to a basis similar to that of other academic departments, although with considerably greater income from knowledge exchange activities. It would need to make sure that its large knowledge exchange activities are understood and evaluated as such – not least to explain its large size compared with the volume of its academic outputs in basic research and education. There would be difficulties in establishing the basis for allocating university basic research funding in this model which would need to be addressed.

161. Meanwhile, and also if we are wrong about splitting DJF staff in any meaningful way, we would suggest that all DJF the staff (apart from those in the Advisory Unit), should operate as a 'special category' of academic unit – but with a clear understanding that it is not a 'department' in the usual sense. It would also have operational autonomy, eg. retaining earned overheads within the College.

NAT (and the Engineering School)

162. The ‘mergers’ with the two large units of DMU and DJF will not leave the NAT Faculty unchanged. The two key changes are that:

- NAT staff would be expected to develop a healthy respect for application oriented science – as major units in these fields will be joining them in the new College
- there will be increasing expectations for more NAT staff to engage in knowledge exchange work, particularly working with industry, technology transfer and commercialisation.

163. In practical terms, there will also be some rationalisation in education programmes, adjustments in staff locales to match their specialisation, and tighter budgets for some traditional activities insofar as AU would wish to undertake some redistribution for re-investment.

164. One of the major managerial tasks of the new ‘College’ will be to ensure that there are effective and efficient ways in which the scientific expertise of the whole College (and wider University where needed) can be brought to bear on the work that provides policy advice (from either of the Policy Advisory units – which might, over time, be brought together in some way). At the very least, there needs to be the opportunity for any suitably qualified scientist to comment on the advice to be proffered; better still if he/she can be involved in its production. As discussed in Section 5, there might be some form of peer review of advice, if it can be done quickly, although perhaps be simpler just to have the policy advice activities reviewed internationally from time to time. It would be a task for the management of the College to ensure that all this happens smoothly.

165. In the same vein, part of the benefit of the mergers within the College will be to enable ideas to flow back and forth between the applied oriented and policy work on the one hand and the basic research work on the other. These flows should be in both directions: new applied problems (even of policy) can provide a valuable source of issues leading to basic science questions, just as much as basic science can be helpful in addressing ‘real world’ issues. A second important managerial task for the College is to ensure that there are arrangements by which such flows genuinely take place, and with maximum advantage taken in both directions.

166. There is likely to be a need for 'internal' reorganisation within the new College too, not least to rationalise the areas of science in which there is overlap and/or potential for greater symbiosis. This should be an early task for the new College. One example that kept occurring in our discussions was that of molecular biology, for which the provision within SUN should also be brought into consideration (although, having different application 'flavours' of the same discipline such as medicine and agriculture could be important).

167. The development of University Research Centres is something that should always be subject to analysis before any decision is made – there are far too many examples in other universities where such a Centre has been set up on the whim of a powerful individual, only to be closed a few years later at considerable cost and having delivered very little benefit. It is important that such Centres should provide a base (real or virtual) for a cross-disciplinary team, rather than simply for a team with large research grant. Central grants from the College (and/or from the University) should, we argue, be available to help establish (but not to maintain) such multi-disciplinary, theme-based Centres as part of the implementation of University policy. Such a grant might be available to pay for a senior researcher who has an idea for a cross boundary research theme, to enable her/him to spend time thinking about the potential constituent research areas, including examining the case, and possible funding, for such a Research Centre.

168. Finally for the College of Science and Technology, the absorption of the Engineering School represents a different kind of challenge, as the latter is a teaching institution with little research capacity. Its arrival, however, is a logical extension of the on-going collaboration with NAT in developing postgraduate programmes, and also much easier, given the enhanced application orientation of the College as a result of the mergers with DMU and DJF.

HUM + DPU + TEO

DPU

169. DPU currently works as a self standing academic entity, with a focus on postgraduate training, mainly for primary school teachers. Not least to increase the

coherence of training for Primary School teachers, it would seem wise for DPU to form better linkages with University Colleges; this would also help to ensure its continued credibility and enhanced effectiveness in its role in primary education.

170. Within AU, we think it would be a reasonable policy aim for DPU, over time, to develop two new roles, each of which would raise its national profile in education and would also help it to integrate with the rest of AU – and bring the benefit of DPU's expertise to the wider University.

- To move to leading and coordinating the high school teacher training activities currently undertaken in the separate Faculties. This would need to start modestly, for example, by offering advice on pedagogical matters to those within Faculties currently providing teacher training; the next step might be to coordinate and oversee this work. The final step, needing DPU to have sufficient internal credibility, would be to take a leading role, perhaps with responsibility for all such provision (including the staff involved).
- To participate in staff development in academic pedagogy across the University. Again this would need to start modestly, perhaps by providing advice to the University about the forms of pedagogical development that might be made available to academic staff (and in what circumstances) and how to obtain it. Again, with sufficient credibility, DPU might provide some of the training itself.

171. To develop these roles, DPU would need to increase its internal 'visibility' as well as its credibility; these would be developmental objectives for DPU.

172. To this end, it would be helpful for DPU to join with an established Faculty, which would help it in other ways too: to be better recognised as an integral part of the academic community; to broaden its research base; to increase cross-faculty working (eg with Psychologists from SAM) and to reduce its relative 'isolation' arising from its geography. The Humanities Faculty would seem the best partner for DPU, not least as a significant part of HUM's graduate output is destined for teaching, but also because the injection of DPU's applied orientation should help HUM to develop its own applied research. Perhaps the new 'College' might be termed the 'College of Humanities, Education and Theology' – but see below.

173. As far as AU was concerned, the DPU would, in effect, become the 'Department of Education' within the College, albeit with an unusually large amount of externally funded research activities. As such, it might play a major role in developing a new 'University Research Centre for Pedagogy' as its credibility grew and as it developed the two roles outlined above; the members of such a Centre would not be restricted to members of the Department, but could be drawn from across the University.

174. But it is not quite as simple as that: DPU has some similarities with DMU and DJF in that the majority of its current work comprises externally funded public sector oriented applied research, often under Ministry contracts; we are informed that these comprise about three quarters of current DPU staff time. Given the nature of much of this work, and the fact that the DPU is already located in Copenhagen, there would need to be a good reason for moving any such activities to Aarhus. On the other hand, DPU also has well developed education programmes and some basic research which might be thought to be more suited to being relocated to Aarhus; but two thirds of the current students are Copenhagen based and not geographically mobile.

175. Thus the bulk of the activities need to remain in Copenhagen; nevertheless we think that the Department of Education itself should formally be located in Aarhus (the 'Headquarters', so to speak), along with as much of the education programme and basic research as could be sensibly moved. This would be partly to provide better integration with the rest of the University, but also to provide a better platform for the new Department to develop the two roles outlined above. Staff would expect to move between the two sites, but more on the basis of a career move rather than to give a lecture or two. There would need to be some form of 'site manager' in Copenhagen. (The physical space left by a (limited) move to Aarhus could be made available to the policy advisory staff from DMU and DJF – thereby creating, along with the remaining parts of DPU, a community of Government facing units for AU.)

176. We are not sure of the currency of the title 'DPU', but if it is worth retaining, for example, for continuity in Government relations, then it needs to refer to something. The first possibility is that it is simply another name for the Department of Education, used in circumstances when the DPU title would be a better fit. The other

options would be for it to refer to a 'part of' the Department of Education. One administratively neat option would be for it to refer to the externally funded applied research undertaken within the Department of Education – as opposed to its education and basic research activities. This might be a virtual grouping rather than a real one, in that the staff may well not be split like that; nevertheless, such a title might be valuable for marketing purposes. A more physical use of the title 'DPU' could be to refer to the 'Copenhagen campus' of the Department. Nothing will be very tidy, which does not really matter. And if the title is not important, then the debate becomes nugatory. We suggest that the decision should wait until the new College has been established and the arrangements within it can then be discussed.

TEO

177. The current Faculty of Theology has a good reputation in its own right and we understand that there are historical reasons why it exists as a separate Faculty, even though it is about the same size as many Departments in other Faculties. In the new AU it would be even more of an anomaly than it was before the Colleges, certainly the re-structuring we are suggesting would make it really stand out. As we mentioned above, the span of control for the Rector also needs reducing.

178. We think that a time of restructuring would be right to reconsider the position of the Faculty of Theology and put it together with the new College of Humanities and Education. There is potential for good synergy in research with humanities departments; there is also an opportunity to broaden theological education with options offered by the rest of the College, which could provide good differentiation to the theological training offered by Copenhagen University.

179. We think that TEO should remain as a single unit, at least for the time being, rather than be redistributed within the new College; in effect, it would become a Department of the College, at least until such time as the College developed a strategy for languages and cultural studies. It is also for consideration whether the new College should be called the 'College of Humanities and Education', accepting that Theology is one of the Humanities, or whether it would be preferable to call it the 'College of Arts, Education and Theology'. We have no views on this.

SAM + ASB + Herning

ASB

180. The relationship between ASB and SAM is complicated, given the fact that the two units have different cultures but overlapping expertise - at least in terms of the names of courses and programmes. Each offers degrees in various combinations of economics, management and law, but with distinct brands – the domestic markets, both of students and of employers, appear to have little trouble in distinguishing between the brands. Their research activities are generally different, but with some overlap – and they have research centres with similar research profiles which have collaborated with each other in the past. While staff profiles are generally different, there are some staff specialisms which do not appear to be based in the most 'rational' location, given the staff research interest and the teaching opportunities.

181. It would thus make sense for AU to ensure that there was a full and proper examination of the scope for better articulation, better synergy, more joint courses - and better differentiation between the two. In practice, such synergies and initiatives are best developed from the bottom up, but at this point, there needs to be an objective analysis of the potential for such working. We have not been able to do this within this study – it would have required us to look at more detail than is appropriate for this review (including information on student and labour markets). However, our interviews have shown that it is not simple to get the best synergy between SAM and ASB, either in terms of 'rationalising' their educational programmes or rationalising the deployment of staff.

182. For example, a seemingly obvious possibility for rationalising programmes would be for ASB to focus on 'management' and for the Economics Department in SAM to focus on 'economics', with each developing relevant staff profiles and with each supplying courses in their field to the other. Any ASB need for general economics courses would then be supplied by the Economics Department, but for business oriented economics courses that could not be supplied by the Economics Department, it would need its own staff. But economics in SAM currently places an emphasis on technical econometrics which may not be directly relevant for ASB students; and we understand that ASB has more general economists than SAM does. So, unless there was an academic need to adjust SAM's orientation to economics

more generally, the above 'rationalization' would not make sense - and we have heard a strong defence of the technical orientation of SAM's economics programmes as being important for its 'brand'. (We have also heard that an argument against rationalising education programmes is that the current education portfolios offered both by SAM and by ASB rest on historical efforts to differentiate themselves from Copenhagen University, and any changes would require that to be reconsidered.)

183. Similarly, there would seem to be possibilities for rationalising academic staff between SAM and ASB. One might expect economists in ASB to be more business based than those in SAM, whereas the SAM economists should spread across a broader spectrum of economics. One possible rationalisation would be for those economists in ASB who were either generic or had specialisms in anything other than business (eg in poverty), to move to SAM. This would increase the breadth of SAM's economists, but SAM might then end up with too many economists and there would also be a risk of leaving ASB short of economists who could teach business economics.

184. On the other hand, transferring to ASB the management specialists who are currently in SAM would seem to have no equivalent disadvantages: they would continue to offer management courses to SAM students, but would do so from a base in ASB where they would be working with their management peers. This case seems reasonably strong, but it would be necessary to go into more detail for any of the other possible rationalisations before any decision was made.

185. In these circumstances, the best approach would normally be to put the two 'units' concerned into a single 'College of Social and Business Studies' and charge its management with the task of streamlining them. This would have the added advantage of reducing the number of 'Colleges' in the new structure, thereby reducing the span of control at the top and also making the new Colleges more similar in size.

186. We note that this approach has a complication in that ASB has accreditation status from EQUIS – a European body, and is in mid-stream to gain another from a US accreditation body (AACSB). Any major changes in ASB programmes – and any major reorganization that would affect its programmes - could run the risk of ASB

having to go through one or both of the accreditation processes again.

187. We think that any such risk to accreditation would be minimised if both AU and ASB were to take a very positive attitude to the change, and explain to the Accreditation Bodies that the change would have limited impact on programmes and that it was being done to make ASB's programme offerings even more focussed on high quality business education. (An approach with a negative attitude would be sure to make the Accreditation bodies look askance at the changes.) We think this risk is worth taking in order not to miss out on important opportunities to strengthen the brands both of ASB and of SAM. Thus we propose that ASB should become part of a new College of Social and Business Studies, retaining the title of 'Dean' for its head; there are precedents elsewhere for this – and for accreditation for business schools in this position, which are further reasons why we think the risk may not be that great.

188. In terms of other 'overlaps' with ASB, other Faculties have a capacity (or a need) for management provision (eg NAT and DJF), or for languages (eg HUM and TEO). For these, the best approach might be for the University to set an explicit expectation about the location of such expertise in the medium to long term – and expect change to happen over time, built up from the bottom. One possible expectation might be that sector specific management expertise (eg agriculture) should reside in the relevant sector related units, unless ASB decided to develop specializations in such sectors.

189. For languages, there are considerable differences in the approach as well as the manner in which languages are taught in various places: ASB needs pragmatic courses on languages and cultural studies, supplemented by business communication specialisations. The University might aim to have linguistic and cultural studies based in the new College of Humanities, Education and Theology, but first their providers would need to develop applied courses suitable for non-specialists and not simply the more academic aspects of languages (an intention of the current Dean of HUM). Until this had been done, ASB would need to maintain its capacity for languages.

190. We would expect that demand for practical language instruction for non-

specialists to grow in various parts of the University – particularly for languages such as Chinese, where there are increasing academic and scientific ties, and where there are still only limited commercial language centres. It is not at all clear that any such basic language instruction for non-specialists needs to be undertaken by research active academics. AU should decide whether and how to cope with such demand.

SAM

191. Within SAM, and not related to ASB, there are issues around sector specialist applied economists such as in agriculture and environmental studies; there are similar issues around applied educational psychologists in DPU. These specialists normally emerged from their respective sector specific needs. Such sector application thinking is unlikely to survive if it were brought into generic disciplinary departments. As in the case of molecular biologists, our recommendation would be to leave them in the units where they are needed, but make efforts to create a wider disciplinary community across boundaries. We suspect that the creation of informal discipline communities may be more difficult in some fields than others: cursory discussions suggest that scientists generally have more flexible attitudes than social scientists, who tend to see their application oriented brethren as academically 'weak'.

192. Psychology and law also face less visible, but similar issues of potential duplication in the new University: DPU as well as ASB has specialized psychologists; Law may also have diverse application areas ranging from business to environment. It is important that both Psychology and Law operate as dynamic and open departments with up to date research and relevant professional education; but it is equally important that they both also stand ready to provide an open disciplinary base to a broader community of scholars, some of whom would reside in other application oriented units. We heard clear messages that these two Departments do not always behave like that.

Herning

193. We understand that it has already been decided that Herning College should be transferred to become a part of ASB. This seems reasonable, although we did not have sufficient time to examine options specific to Herning's development. We have one implicit fear: the assimilation of units such as Herning into a larger research oriented

unit such as ASB risks it losing its practical orientation and/or deep connections with local small and medium businesses, both of which are key legacies of its past – and should be of its future too.

194. It will be important to ensure, when thinking about the future development of Herning, that these practical strengths and local connections are kept, valued and preferably increased. We fear that there may be a temptation to put them to one side as not being 'academic' in an effort to boost Herning's efforts on research. This would be wrong for Herning and for AU's overall position.

195. (Exactly the same point applies to the absorption of the Engineering College into the erstwhile NAT.)

SUN

196. SUN will be the only unit which would be largely unaffected by the organizational changes outlined above. Nevertheless, it has two challenges of its own. First, SUN represents an obvious field to champion technology transfer and commercialisation. As such, it might be expected to lead changes in how AU works with industry and how AU enables and encourages its academics to work on technology transfer and commercialisation.

197. Second, SUN will be expected to continue its efforts to build a biomedical complex where boundaries are not noticeable to researchers, whether they come from basic research units within SUN, from elsewhere in the University, or from applied units such as hospitals and industry. Although we have only looked briefly at the internal workings of SUN, we heard several comments from researchers that AU's biomedical complex is not yet seamless in comparison with others in the world – particularly not when compared with those in the USA. Every university with global ambitions is currently working on this area, so AU will need SU to make significant efforts to create a productive environment for fully collaborative work without boundaries.

6. Management

198. Whatever the other changes and reorganisations, it is the way in which AU is managed that will make the reforms a reality. Good management will develop Aarhus University from being a good university to being a great one. This section considers four aspects of management and the developments we suggest for each; they need to form an integral part of the package of reforms developed in the rest of this report.

Decision making

199. At the heart of management is the need for decisions. Decision making involves listening to and fully understanding the arguments, weighing up alternatives and their consequences, making the decision considered to be in the best interests of the University as a whole, and then making sure that it is implemented (and monitored) – rarely do changes happen by osmosis. Of course, some decisions will be clear and popular; others may be unpopular, but still right for the University – that is the difference between good management informed by consultation and poor management that endlessly looks for consensus by compromises. In addition to understanding, good decision making requires a vision and a goal, strong leadership and confidence – especially to decide to decide in circumstances when there is no clear agreement.

200. Decisions must be: clear and unambiguous; made only once and recorded; communicated for action and implemented; monitored and reviewed. This does not seem like an onerous set of requirements, but each step requires conscious attention to make sure that it happens. We have seen too many universities fail on one or more of these requirements – and AU is no paragon either!

201. Any decision also needs to be well informed, both about the issues it is addressing, and about options and their consequences: an informal discussion group of 'wise men' can provide a valuable input into a decision, but that is rarely a sufficient basis to make the decision. Any major decision making forum (even if it comprises only one person) should have some form of analytical base. This is more than a capacity to record minutes and decisions - although that is important, it is the

capacity to think about and write (and/or ask others to write) a thoughtful (short) paper which analyses the issues and options; this then provides the starting point for the discussion that leads to a decision. Such analysis should avoid decisions being based solely on the recollections and opinions of those present. Unless there are reasons of confidentiality, there is no reason why such 'agenda papers' should not be made more widely available, along with the resulting decision.

202. An organisation as large as Aarhus University also needs to have a structure within which decisions are made; this is to provide legitimacy for them, to ensure visibility and transparency and to provide accountability. The provenance of any decision must be clear, it should not simply 'emerge'; we found examples where people were very unclear about where (or even whether) a particular decision had been made and with what legitimacy.

203. In the relevant sections above, we have discussed the four main University policy Committees: Education, Talent Development, Research and Knowledge Exchange. Although their roles are rather different (see the relevant section), they each need a Chair; we reflected on, but rejected the idea of suggesting between one and four new Pro (or Vice) Rector posts for these four tasks. Instead, we concluded that, at least for the time being, each of the four Deans of the four new Colleges should be appointed as the Chair of one of these policy committees – and not rotated. In that capacity, it will be even clearer that the Deans have a 'corporate' responsibility in the University – although of course, as the Dean of one of the Colleges, their role will already also be corporate. As Chairs of the policy committees, they would have no line management responsibilities for the policy area, but should have analytical support as mentioned above.

204. The four policy committees would report to the Rector, who should be assisted by a top level University policy group for final decisions - below the Board. This should comprise: the Rector (as Chair), the Pro-Rector, the Managing Director and the four Deans/Chairs of the four main policy committees. We refer to this seven person group as the Senior Management Team (SMT) of the University. The SMT would need (considerable) analytical support (not just *administrative* support) to prepare discussion papers for its meetings.

205. In addition to policy issues, the SMT would be just as much concerned with management issues, such as those concerned with planning, budgeting, finance and financial control and with performance management and monitoring. The boundary between policy and management issues is not always clear, but this does not matter as it would be the same group of seven people concerned in both cases.

Financial management and resource allocation

206. Aarhus University, as all others, needs a financial strategy, not least to ensure its continuing financial health and a reasonable level of 'reserves'. Reserves are needed both as funds that can be called upon for a major investment, but also to provide a safety net to cope with any sudden unforeseen circumstances. In AU's case, and with the current public funding arrangements in Denmark, AU's reserves do not need to be very high; we understand that they currently run to about 8% of turnover – which is certainly high by international standards.

207. AU also needs a finance and accounting system which can provide management accounts to show the costs of activities (eg the costs of a specific course or programme). Such course costing is one factor in considering whether a course should continue to be provided. There are various myths about the 'break-even' point for a course – these vary from 40 to 80 students and it would be good idea if there were some firm basis for knowing the true figure; hence the need for management accounts. We would hope that the work currently being done by PwC would enable the University to produce such management accounts; if not, some other help will be needed. (We would wish to stress that whether a course breaks even or not should be one, but only one, of the factors in the decision about whether to continue or stop it – see Section 2.)

208. The University also needs a management information system, some aspects of which are currently being developed as a 'Business Intelligence System'. Our concern is that this may not be being developed the right way round – although we have not looked at this in any detail. For any MIS, the first step should be to determine the management decisions that need information, then to define what information is needed and only then to design a system that can provide the

information needed to the managers who need it. It is highly unsatisfactory, but unfortunately not unusual, for this process to be done backwards - by starting with a design for the system. Because of the reorganisation, AU will have new management needs; this provides an opportunity to review the developments that have been made so far and to think about management needs from the right, user, end. There are, of course, several commercial MIS packages designed for universities which can be bought off the shelf and would only require minor adjustments for AU; this is invariably not only a much cheaper solution, but usually better than trying to design one specially. If this is not being considered, we strongly suggest that it should be.

209. Similarly, the Student Information System (SIS) that is currently under development may also need to be reviewed in the light of the new management requirements. We understand that one of the purposes of the SIS is to provide student information for the Government's student funding mechanism. This is fine, but from AU's point of view, it is also important that the same system should allow management to identify student based problems on the horizon (eg of declining student numbers or reducing class sizes), by tracking trends automatically and flagging possible issues. The SIS (and the MIS) also need to enable 'what if?' questions to be addressed, not least by linking seamlessly with each other (another advantage of a commercial package). We suggest that AU assesses whether the current development intentions (of SIS and the MIS) meet these needs and, if not, to ensure that changes are made so that they do.

210. Turning to resource allocation, policies on finance play an important role in helping AU achieve its goals. There is no doubt that the way in which funds are distributed internally has an effect on decisions within the University and thus on its overall direction. Even a relatively small amount of funds, judiciously used, can act as a 'rudder' to steer the University 'ship' – albeit slowly. It is important to be explicitly conscious of this and to ensure that any implicit 'steer' from the internal funding sends the intended signals to support and facilitate AU's strategic intentions, rather than constrain or inhibit them. This is not always the case at present.

211. We suggest the following principles for internal funding mechanisms in AU:

- the overall approach to funding should be designed to support the future aims of the University – and not be heavily based either on Government signals or on a historical position
- there should be no unreasonably sudden changes year on year and so the annual decisions on resource allocation should be mainly at the margin; these should include some pressure for efficiency gains
- there should be some funding available from the University at the centre used explicitly to support actions that further the University's aims; some of this should be 'triggered' by pre-defined actions; some should be available as 'grants' for costed bids that would be judged against policy criteria
- all major decisions on resource allocation should be transparent and made against known priorities

212. On the first point, we are quite clear that AU's policies should drive the design of the funding mechanisms inside the University and not vice-versa – as sometimes happens at present. Of course, the Government sends signals to universities by means of its own funding mechanisms, but as an autonomous university, it is for AU to decide how best to deploy those funds in the pursuit of its objectives. If a university were to slavishly follow the Government's funding regime, there would be no point in it having decision making powers on finance, it might as well be a Government department (as universities are in some countries, but not in Denmark).

213. We discussed the resource allocation processes for **Education** in section 2. We saw merit in continuing with the 'taximeter' principle for funding education, with the ratios between subject groups being (roughly) the same as those that the Government uses - but not necessarily the same absolute amounts due to the limited 'top slicing' of these funds which we suggest (see Section 2 and below). In addition, we suggested that there should be premiums for education activities that furthered AU's policy aims for education and that it would be for the Education Committee to suggest the education policy aims for which such central funds should be used – for final decision by the SMT. Drawing on international experience, we suggested in section 2 that these policies might include the development and delivery of more cross-disciplinary programmes, for example as a core plus options.

214. The ‘premiums’ to the taximeter rates would be added for students who attended courses (or even smaller units) that were outside their ‘base’ discipline (to be defined); these premiums would form part of the ‘STA’, would be known in advance to encourage programme design and would be ‘triggered’ automatically by student numbers (as part of the taximeter payments). Similarly, there would be premiums for ‘service’ teaching, to encourage it and to deter buying in expertise from outside the University when there was adequate internal expertise. These changes would require modifications to the internal taximeter system, with the levels of the premiums being sufficient to encourage the policies concerned.

215. We suggest the design of this modified taximeter system should be undertaken as a project; it would need modelling as the total funds to be distributed through it would need to equal the amount of funds available for it. Once designed, the premiums would be triggered automatically as part of the taximeter funding. The new taximeter rates, coupled with the premiums, would (probably) result in a different balance of funding between Colleges. It is possible that the first year changes in the funding for any one College might be too big for it to handle in one year; if so, the changes should be phased in over more than one year.

216. In addition, we suggested that there should be a central ‘pot’ of seed funds for developments of education programmes or courses that would help AU’s education policies. The Education Committee would propose, for SMT to agree, the criteria to be met for ‘seed funding’ to be given from the pot. SMT would need to decide the total level of funds that would be available to the Education Committee for this ‘pot’, taken as a (relatively limited) ‘top slice’ from the overall taximeter funds supplied by Government. The Education Committee would invite costed bids for such ‘seed funding’ and would judge which bids to accept.

217. Similarly for **research**, in section 3, we discussed the resource allocation process for basic research, recognising the need for continuity year on year, particularly for large research projects. But we argued that the parameters for its distribution should not go back to a 1994 base line. We also argued that AU should not simply follow the Government’s weightings of 0/1/2 for different levels of

published outputs; AU should have its own view about what it considers to be 'valuable' research outputs, which might well be different for different disciplines. To maximise Government funds under this heading, we suggest that AU should encourage those disciplines that traditionally produce many '2' rated publications (eg Chemistry) to find ways to increase their score (on behalf of the whole University): increasing the numbers of such publications from 3 to 4 in, say, history, would have much less effect on Government funding than increasing from 30 to 40 in, say, Chemistry (and the effort involved might be less for the chemists!)

218. Internally however, we suggest that the parameters for the distribution of basic research funds should reflect the research aims of AU. We also suggested a limited central 'pot' for seed funding research ideas which would help the University to develop its research profile in line with its research strategy (see section 3) for example, by seed funding embryonic 'blue skies' projects ideas that had potential but were not yet ready for external funding, or projects that straddled the basic – application oriented divide. The Research Committee would propose (to SMT) the research priorities for such funding for SMT decision; SMT would also decide the overall size of the pot, and again taken as a top slice, but this time from the basic research funds allocated by Government. The Research Committee would invite costed bids for such 'seed funding' and would judge which bids to accept.

219. These two central pots, for Education and for Research, should not be large within the University's overall budget. The amounts for each pot would be a University budget decision, made as part of the annual budget process, approved by the SMT. These pots should absorb the more historical aspects (albeit recent history) of what is currently referred to as the Rector's fund.

220. We propose that each pot should take its funds as a top slice of the relevant Government funds because the funds that would go into the central pots would be available for bids from the same units as would have received them had there been no top slicing, but via a different route – and probably with a different distribution. This approach is therefore neither a 'tax' nor a 'charge' on Colleges; it is simply a part of the mechanism to distribute funds.

221. The two other main University Committees, **Talent Development** and **Knowledge Exchange,** do not have significant requirements for funding incentives in the same way. A case could be made for allocating to each Committee, a limited amount of (central) funds to help 'oil the wheels' of their planned activities (eg for the Talent Development Committee to arrange its seminars – see section 2). The amounts involved would be modest, determined as part of the University budget setting process. For Knowledge Exchange, there is also a separate central function whose funding could be considered as part of that for central administration (see below), although we think it would be better done as an explicit allocation for Knowledge Exchange as part of the University budget setting.

222. For the **central administration** functions, the first question about their funding concerns the size of the overall administration budget. In virtually every university in which we have worked, there has been a widely held view among academics that the central administration budget is too high. In some cases, it is; it is important that it is not in AU. It is not always easy to tell whether the administration costs are too high or not - 'benchmarking' them between universities is of limited value as the functions are very varied, with the added confusion about the amount of administrative work done at Faculty and Departmental levels. Academics' beliefs about inefficiency in administration can feed a lack of confidence in university leadership – which would be very unhelpful at a time of major change. The administration must not only be efficient, but must be seen to be efficient. (In this respect, past tendencies to avoid redundancies have been unhelpful – no doubt for the individuals concerned, but certainly for AU as a whole.)

223. An agreed budget for central administration, with efficiency gains clearly noted, can be built up from plans and costs for its constituent functions. Plans can be examined on the basis of what the function contributes to the effective working of its 'customers' (which must include the University as a whole as well as the Colleges), what are the priorities for that function and what are the proposed efficiency gains. In the management arrangements we propose above, the central administration budget would be presented, discussed and agreed by the SMT. Thus the senior managers who would be 'paying' for the central services would all be part of the decision making that determined their budget. This may not make it any easier to swallow, but at least

they will understand its basis.

224. At present, the costs of the central administration are 'allocated' by applying 'cost drivers' to the total budgets of each Faculty and unit; the cost drivers are intended to be proxy measures that reflect the usage by the Faculty/unit of the various services involved. Harsh though it may sound, this is probably the fairest principle for deriving the funds needed for central administration – Faculty/unit budgets do provide an approximate indication of their size, which in turn is a crude proxy for their likely use of central services. It is a form of *charge* - but not a tax, as it is designed to reflect usage.

225. Unless there are any glaring anomalies in the cost drivers, we doubt it is worth trying to be precise about them; there will always be a significant amount of 'rough justice' in this approach and any attempt to improve it might please some, but would displease others. Stability is better. Of course, last year was particularly unfortunate for the 'new' parts of the University: in their eyes, what happened was that their previously dedicated administration was taken away from them, replaced by a more distant one offering a less tailored service and they were then charged (over the odds) for the privilege – no wonder they complained! It may be that some of the 'new' entities are sufficiently different from the 'old' 8000C for the cost drivers to need modification; we did not examine this, but it might be worth doing once the new Colleges are defined. But we repeat, our experience tells us that there is no point in trying to be accurate and that, no matter what changes are made, no-one will be happy!

Human resources management

226. Good management of staff is as important to the University as good management of finance. We did not find much emphasis on the concept of 'performance management' across AU, but nor did we find much evidence for its need. Unusually for a university, we found very few people who had anything negative to say about the working commitments of others - although we did hear of one department where the students were not happy with what they received from their lecturers and another where the staff themselves were not content. But on the whole, almost all academics would seem to be content and working hard!

227. Nevertheless, it is good practice in a modern university to have some form of performance management which, as well as being developmental also includes an appraisal dimension - even if it is fairly gentle. The purpose in AU's case would be to find ways to make the academic experience even better, not only for staff, but especially for students – while also dealing with any anomalies of poor performance, albeit seemingly few. This would mean making more active use of student feedback and staff surveys - both of which are already collected, but not much used. It would be for the central HR function to stimulate this and to provide the support needed for it to happen.

College management

228. **Planning within Colleges** is not only where University priorities are initially developed, but also where they are converted to reality. In any university, academic planning must be done from the bottom up – indeed that is the very essence of academic freedom; but there are two 'constraints' on unmitigated freedom. First the College is a part of the overall University and thus it must take account of the strategic direction that the University sets – although of course the strategic direction is itself fed by input from the bottom up. Second, the Departments (and other units), are parts of their College and need also to take account of the University's (and College's) strategy, must also take account of the external environment in which they operate, not least their 'markets' – for want of a better term, for example for research grants and for students.

229. Thus, planning within a College must be done in a context and by a process that recognises these constraints, but by one which also encourages maximum creative imagination from its members. Creative imagination is not normally in short supply for research – although it can be for knowledge exchange activities. External constraints are also usually recognised for research (as they are often directly related to grants), but again not so often realised for education.

230. The course and programme review process (discussed in Section 2) is an important tool in the management of a College. In planning for next year, it is important that each College knows the longer term trends in its Department's student

numbers by course and programme – as well as feed-back on their quality, their success in labour markets and, of course, their costs and 'implied' income. The Study Board(s) should provide one input for this information; another input should be provided by the course monitoring process (which may or may not also be done by the Study Board(s) – see Section 2). It would then be for the College management to decide where expansion should be sought, what adjustments should be made and, most difficult, which courses and/or programmes should be closed. Without such active decisions, inertia will rule and AU's education risks stagnating.

231. It would be for each College to decide how it wished to arrange its management processes; this review has not examined internal Faculty management in any detail - and nor was it intended to. But the good practice principles that we adduced above for university management equally apply to Colleges. Thus a senior College management team would comprise the Dean and the Heads of Departments – along with the head of the College administration. This team would make its decisions on the basis of good information and analysis (including that supplied by the Study Board(s)) and in ways which were transparent and in the best interests of the College, while also being consistent with overall University directions and priorities.

232. While such a management remit is not too difficult to envisage, it is not as simple as is sometimes thought (not least by academics). We suggest that everyone holding such a management post in a College should be expected to attend a short course on management (our experience suggests this is best done from outside the University, as the 'prophet is not usually appreciated in his own land').

233. A frequent matter of contention for administrative functions is the relative **split of responsibilities** between Faculties and the 'central administration' of a university. There were, of course, very different arrangements for the 'new' parts of AU compared with the previous 8000C; the reorganisation provides an opportunity, and a good reason, to review this split in responsibilities. We suggest that the principles for the decision about responsibilities are that they should be close to the 'front line' of the College, unless there are good reasons for them to be held at the centre. The 'good reasons' are usually either for economies of scale (which may relate to expertise as much as to numbers) or the need to ensure consistency across the

university.

234. These reasons usually imply that the functions retained at the centre would be the general provision of: strong central finance; human resources; IT systems and MIS; public relations and communications; the main aspects of student administration; buildings and grounds maintenance. For functions delivered from the centre, we think it would be very unwise to allow the possibility of an individual College 'opting out' and building a 'shadow' capacity that would duplicate. On the other hand, if any central function was not performing well, the response should not be to delegate it to the Colleges, but to put it right – and putting it right will increase academics' confidence in the central administration. The University level planning and budget process discussed above would mean that the 'clients' of the administration functions that operated from the centre would all be members of SMT and so would discuss their performance and agree their plans and budgets.

235. In moving to four Colleges, there should be economies of scale within College administrative functions as there would be a reduction from nine 'Faculty' administrations down to four College ones. In addition, we think there has in the past been some lack of clarity about the relative administrative responsibilities between the Faculties and central administration. Some aspects of Faculty administration seemed to 'shadow' that of the centre, which illustrates a lack of clarity (and/or of acceptance) in the split of responsibilities. The reorganisation provides an opportunity to inject greater clarity into this split, which should result in further efficiency savings by reducing duplication.

236. At the College level, there will need to be some direct managerial support to the Dean for the functions for which he/she is held accountable – and his/her management role will be quite considerable. For example, the Dean is likely to need a finance specialist to help with financial management of the College and is also likely to need help with the aspects of student administration for which he/she will be held accountable. Similarly, there will be HR matters for which the Dean will be accountable, for example on the performance management of his/her staff. Importantly, the Dean will need a capacity within the College to prepare the short policy notes needed for College management decisions (eg on developing - or closing

- education programmes, and on research priorities).

237. This is not to suggest that the Dean will need a vast support army – and certainly the College administration should not even think about trying to 'shadow' the central administration. But each Dean will need to have a small cadre of reasonably well qualified and/or experienced staff to help him/her discharge his/her duties as Dean. Exactly how many such staff would be needed in each College to support the Dean would be a function of exactly what was agreed to be the split in responsibilities between the College and the centre. The clarification of the split in responsibilities is not quite as simple as it sounds and has been the cause of many a serious problem in other universities which left matters confused or even conflicted. The task is to define clearly exactly what the College is responsible for, in administrative terms, and hence what is the responsibility of the centre.

238. Once the split has been clearly determined, it would be for the College to decide the numbers of administrative staff it needed to discharge its responsibilities; the costs would come from the College budget. But it would be reasonable for the central administration to ask questions if it thought that the numbers in any one College were excessive. We have not looked at what numbers might be involved, but, assuming that administrative functions were generally the responsibility of the centre, we would be surprised if there were to be less than 4 professional staff reporting for the Dean in each College – and similarly surprised if there were more than about 8. These staff would be College staff, not out-posted from the central administration; it would the Dean who appointed them, the Dean to whom they reported and the Dean who conducted their annual appraisal. There may well be benefit in these staff meeting their counterparts in central administration from time to time, but we think care is needed to ensure that the signals and perceptions arising from such meetings did not confuse their position.

239. We are not sure whether this is the position for Faculty administrative staff at present, but we do think there is a lack of clarity in the current staffing position – arising from a lack of agreed clarity in responsibilities. Clarification of the split in responsibilities would provide the equivalent clarification for the staff.

240. Some of the administrative capacity at the centre would be for the 'front line' central functions that are provided at College level; the centre would be responsible for the services and not the College, for example aspects of student administration. Such staff may, but may not, need to be physically located at the College. Some of these will be counterparts of staff supporting the Dean, but their reporting line would be to their function head in the centre and not to the Dean.

241. In addition to the administrative functions at College level, the **levels of delegated authority** need to be clear, particularly on matters of staffing and finance. We found no serious issues on such matters in general, but again a reorganisation provides an opportunity to revisit this to ensure that delegated authorities are clear to all concerned. One frustration we encountered stemmed from the ability of Faculties to set their own teaching hours and dates of terms. While this may seem a trivial matter, for students, it makes it difficult to take courses across different Faculties. Another seemingly trivial point concerns the use of terminology between Colleges; we think it would help avoid confusion, for staff as well as for students, if there were consistency of the use of terms between Colleges (eg for words such as Centre, Institute, School, Department, and various job titles). AU as a whole would clearly benefit internally and externally in having more consistency on such seemingly small matters and similar 'rules and regulations'; all this would now require would be a simple SMT decision as all Deans would be party to the decision. Students and junior staff are good sources of information about the factors which cause such confusion.

7. Conclusions

242. The changes we propose in this report are designed to enhance further the excellence of the Aarhus University, while also taking maximum advantage of the mergers. The result should be a new Aarhus University which takes its proper place among the best in Europe.

243. We stress that our reorganisation proposals (in Section 5) are only one part of an overall package of reform; reorganisation by itself will achieve little. The changes we propose for Education (Section 2), for Research (Section 3) and for Knowledge Exchange (Section 4) are all equally important parts of making a difference in the University. Integral with those, are the changes we propose for internal funding (in all sections and repeated in Section 6); it is vital that the mechanisms for funding inside the University should actively encourage staff to look forward to innovative and creative ways of doing things. We have no doubt at all that the staff of AU have a great capacity to think in such ways; the key is to find ways to release and to encourage that creative capacity. The changes we have proposed for University management (Section 6) are explicitly designed to do that.

244. In summary, our proposals should be viewed as a package, based on the underlying aim of helping AU to develop to the next plane.

245. There are a few external obstacles on the road to international excellence, not least the fact that some of the positions taken by the Danish Government cannot be part of a higher education system in the 21st century. In essence, AU does not yet have the levels of autonomy that other world class universities enjoy. This applies not only to financial matters (eg on the use of capital and assets) and to staffing (eg for variations on terms and conditions), but also to academic matters. In particular, the constraints on the development of new degree programmes that are imposed by ACE (Denmark) are preventing AU from reaching international excellence in its provision of education; we do not even see their point. These constraints are further reinforced by some of the rigidities that are unhelpfully built into the operations of Study Boards. Such matters are internal responsibilities in world class universities; there is no need for them to be a matter for legislation at all. We hope that this report will help AU to

make the case for changes in the legal position in Denmark to enable its universities to become up to date in international terms.

246. The next step in the process of reform within Aarhus University is for this report to provide a basis for wider discussion, with the intention of reaching clear conclusions within a defined timetable.

247. We wish Aarhus University every success on its journey.

Sachi Hatakenaka
Quentin Thompson
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