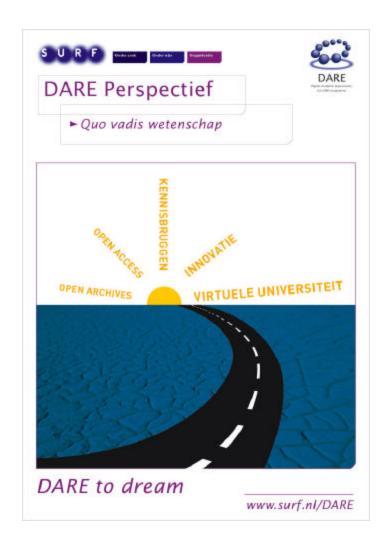# QUO VADIS ACADEMIA? A TRIPTYCH.

Positioning paper for the EU 7-th Framework Programme
Contribution to EU Workshop on
'Knowledge Infrastructure for Researchers' – 10/11 May 2004

Prologue

The following pages tell the story of the possible developments in academia and in its supporting knowledge infrastructure. It has been inspired by the experiences and activities in the DARE-programme, which SURF Foundation started in 2003 and which will run on until end 2006 (see www.surf.nl/DARE).
In line with those experiences, and with the approach taken in DARE, the choice for the story-form and for the approach of this submission is deliberate, to reflect and do justice to the richness and complexity of the issue at stake. The story is told from the perspective of a few important stakeholders. Each has their own view on the ecosystem he or she is part of. Even this triptych is still a simplification; a more kaleidoscopic approach would be appropriate, representing the perspectives of other important stakeholders like students, publishers and government. But time was a limiting factor, and the present story at least provides three different angles on the important questions that need to be addressed.

The epilogue of this triptych follows the positioning paper template as handed out by the Commission.

QUO VADIS ACADEMIA? A TRIPTYCH.

The Librarian's tale
"Right, that's it!" Philip leans back in his black leather chair with a contented smile. He has just signed an important tender. A group of astronomers is asking for a set of publishing and archiving services in support of the research and communication activities they are developing in a collaboratory. Two of the key people in the group have a chair in the Department of Physics of his university, and know about the new service unit Philip has set up within the University Library.
Philip has been Head Librarian for ten years at this university, his last assignment in a long career in the academic library world. He'll be retiring in a year or so. And he can look back with pride on his achievements. He's always guarded the principles of good librarianship, but has not been afraid of change. On the contrary, he has been one of the forerunners in the new developments that have confronted the library world in the last decade. The arrival of the computer brought about big changes, but that's nothing compared to the revolution caused by Internet. In his view, the computer and Internet will have a similar impact on scholarly communication as the introduction of the printing press and the postal system centuries ago. But with unparalleled speed. Already, there are significant shifts in the roles of the library and other players in the information world. Everybody is re-asssessing his place in the value chain, willingly or unwillingly. Of course, not everyone is willing to move. Some of his fellow librarians acknowledge the change, but tend to stick to their traditional role. So do quite a few of the publishers. However, not so Philip!
He takes of his glasses and rubs his eyes. They feel tired. Happens a lot lately. Perhaps he should have them checked. He puts down his pen, looks round his office. Still a beautiful place with its soft carpeting, dark wooden bookcases and rows of first editions. He walks over to the far end of the room, a bit stooped. He picks one of the books from the shelves and sits down with it in the wing chair he keeps for reading. In the fading light of the afternoon he sits, his lined hands carefully turning the yellowed pages.
While leafing through the book, he muses the course of scholarly communication. He firmly believes in a new role for the Library. It has always been the guardian of the university's information collections; and an ace at making them accessible. Why should it not extend that role to the university's own intellectual output? Why leave that to the traditional publishers? The skills involved are not that special, really. Editing, abstracting, classification, quality control – they are all services the library can offer just as well. The library may actually be better placed in some respects to support researchers at its institute. After all, it can provide archiving as well as publishing services, and of all sorts of materials: much more than commercial publishers will ever be able to cope with. What traditional publisher wants to deal with the long term preservation of image banks and datasets? With versioning during the process of research and writing? With different levels of access for different people at different times and locations? No, Philip cannot see traditional publishers easily dealing with issues like that. Or embracing Open Access publishing whole-heartedly. As long as they think there's no quick buck to be made there to satisfy their shareholders.
Admittedly, it's no piece of cake for his library either. But it's feasible, given time and perseverance. And international cooperation with some fellow librarians who are on the same track. As long as his university's administrators keep supporting the idea that it's

their duty to support their researchers in all aspects of their work. It's not always easy to keep them focused on this; especially during budget rounds new hypes sometimes tend to draw their attention away from it. But a reminder of the old days, of giving away their intellectual assets to profit-making companies who'd then sell it back to them at high cost, is usually enough. An extra selling-point of course is that Philip's service unit can provide to other universities who prefer to outsource this type of services. That way, some of the costs can be reclaimed from other sources. For there's no denying, there is always a bill to pay....

If all departments and research institutes of the university were using Philip's service unit he might have enough income, but unfortunately that's not the case yet. In that respect, it's early days; many researchers still hesitate or are very confused about what's happening to their traditional ways of publishing. Or don't want to risk anything. Especially not their traditional ways of earning reputation. But according to Philip it's only a matter of time before they will be convinced, too, to change their ways. Just keep working hard at it, as he's always done.

The door opens softly, Raisa, his secretary, comes in: "Hi, I'm off, can I take the tender document?" "Yes, please; don't forget to make a photocopy for my personal archive. Anything in the email still?" "No, nothing. See you tomorrow. Shouldn't you go, too? You look tired." "Hmm, will do, just finishing this chapter on the history of publishing. Goodnight."

The scientist's tale

Anita is walking through the long corridors of the Physics Department, back to her little corner office on the third floor. She has just chaired a meeting of the support team of Astrolab, the new Astronomy Collaboratory set up by her and fellow astronomers from various universities across the globe. Three of them were there in person, two joined via webcast; the others will look at the results of the meeting which have been posted to the community readingroom. They have been looking at service providers who can support their collaboratory with archiving and publishing services.

As always when she walks into her office, she gives a brief sigh of relief. Glad to leave those gloomy corridors behind her. Her room may not have much of a view, but at least there's plenty of light coming in, from two sides. And she can look away into the sky, a wondrous scene whatever the time of day. The room itself is small, but with the large windows it feels spacious. It's big enough for her, her desk, a table and a few chairs. Thank God for the computer age, no need to have lines of shelving anymore. All the literature she needs she has at her fingertips on the large screen that sits flickering on her desk. Just one shelf displaying some presents she got one time or another: a hefty leather-bound edition of the classic Handbook in her field, a miniature replica of the Babylonian clay tablets her group is studying for historical data, the prize she won for the best article in the top journal of her field.

She sits down at her desk and lets the discussions of this morning run through her mind again. They are looking at three service providers: a commercial publisher, a society service provider and the service unit of her own university library. Each has something unique to offer, none offer everything they need. At least, as far as they can see from the information they have now. The publisher and her university library have sent in a

proposal, for the society service provider they have been able to find all information on their website.

Quite good, actually, everything can be done via the web with them, including contracting and payments. This really fits in with their ideas about a virtual work environment among peers, without any involvement of or dependence on their institutions. Services are offered in individual modules or in combinations; for example, authoring tools, repository software, input support, storage, open or blind peer reviews and editing support available at any stage in the writing process so that the exchange of research results can be speeded up significantly. That's a very strong point. And everything can be contracted individually for any length of time, so if e.g. you're dissatisfied with the peer review support you can go elsewhere for that while retaining their repository system. They also offer a range of support tools for research. Their repository system easily integrates with your own desktop work environment and allows for capture, storage and manipulation of very large volumes of data.

That's something the other two don't mention in their proposal. The publisher offers superb quality publishing support, no doubt about it, and has an excellent reputation from which they would surely benefit. But it doesn't deal very well with speedy self-publishing and open access, and covers only the last end of the spectrum of Astrolab's activities. Too much end-product based rather than service-oriented. They really need more support, also in the earlier phases of research and communication, and for a wider range of file types; otherwise, they'll be spending too much time on non-core activities. Also, both the publisher and the library are not as fully web-based yet as the society service provider; both still seem to stand with one leg in the old paper-based age. The flexibility the society offers is so much more alluring. She must admit the library service unit has submitted a good proposal, with interesting possibilities for archiving, communication and publishing support, for any type of files. They can also guarantee the long term preservation of important files, something the other two cannot to the same degree. Modularity of the services is good, too. She must find out, though, what they mean exactly by 'quality control services'; surely they don't think they will take over peer review? Are they fully aware of the ongoing efforts that an international editorial board requires? Moreover, their contracting and pricing options are definitely less flexible and all through the traditional channels. She shivers when she thinks of the red tape that may involve, knowing the ways of her university. You'd need a student assistant especially to deal with that aspect. Not something they want to train them for. Although it does wonders for developing one's perseverance...

There's a knock at her door. As she turns round her eyes fall on the poster on her door and she smiles. An SF-like vista of the future information landscape; "DARE to dream" it says. Quite. The Head of the Library peeks round the door. "Come on in" she welcomes him. No doubt he's curious about the outcome of the meeting. Nothing's been decided yet, they want to dig deeper with all service providers before making up their minds. And perhaps they'll go for a combination of service providers, each for their own strengths. The competition will keep them on their toes.

It's handy, though, to have him this close by, always easier to discuss the more intricate issues in person. Why not launch them with him right now. She moves to the table and invites him to the chair from which he can see the poster on the door. "Good of you to come by", she says; "let's do some dreaming".

The tale of the vice-chancellor
Tom sits in the lounge at Singapore airport, waiting for his departure call. Though he's been traveling all day, he still looks his distinguished and unruffled self. He's in transit, on his way back home from Australia where's he been on a study trip. Not the place most of his colleagues go, the US and Japan usually come first. But he's found it very inspirational. It hadn't really been planned; it was just one of those coincidences. One day his Head Librarian tells him about the great things "those Aussies are doing down there" in terms of developing a national information strategy and infrastructure. The next, an old schoolfriend of his who works at ANU in Canberra invites him to come down for a study trip on new developments in the knowledge infrastructure. It didn't take Tom long to make up his mind. "Thomas, my son, never think twice about a great opportunity" his father had always said. His father had been a wise man. Although he had not always followed his advice.

Tom adjusts his headphone. The raw voice of Joe Cocker sings to him. "N'oubliez jamais / I heard my father say / every generation has its way.." He hums along, with a slightly melancholy smile; "you can say that again, Joe Cocker!" It's exactly what he sees himself faced with at work. Oh, in his private life as well, of course, but he's found that easier to deal with than the work situation. Appointed vice-chancellor a few years ago, he gets to deal with a paradigm shift in academic life he wasn't quite prepared for. He's a trained physicist; and not stupid. Has always been able to keep up quite nicely with developments. But the speed with which younger researchers are moving into the 'virtual world' takes his breath away.

"...why do you dance to the same old songs / why do you sing only harmony / 'cause down on the street/ something's going on / there's a brand new beat...." "Quite, Joe Cocker". Those young scientists are dancing along the highways and byways of cyberspace with an ease and confidence he finds both admirable and scary. Not for him personally, but if that's the way things are going.......Anita, his star astronomer as he calls her privately, keeps telling him it is. But if it is, how can we accommodate it as a university, Tom asks himself, and his colleagues. Can we accommodate it at all? Are we still needed as an entity, or will we become just a facility, one amongst many? Will they all just zoom off completely into a virtual world consisting of networks and nodes, elo's and collaboratories, switching from one site to another service provider depending who has the 'best' to offer in the virtual here and now? How will they know what is 'best'? What will they be rooted in? Just the tradition of their discipline? Who will teach them that coherently in that new world of theirs? Or don't they need that?

Anita and her colleagues from Astrolab don't seem to worry at all about these questions. They just go ahead and do it, see what they come across and deal with it, they say. And they are not the only ones. True, there are still many who stick to the old ways, confused about what's happening around them. But he clearly sees it changing, in many disciplines, across the great divides of the arts, humanities and sciences. He sees them bridging those great divides of old as well; witness Anita and her Babylonian clay tablets, her efforts to get them digitized for inclusion in their data analyses.

And then there is the pressure from funding bodies to invest more in interdisciplinary research. And the wish to develop 'virtual faculties', coordinating research and teaching programmes between some national universities to become a more attractive international player. The call for more fruitful liaisons with industry. All developments that cut across

the traditional disciplinary and institutional boundary lines. Everything seems to be shifting. It's not clear what the connections are – if any - between the autonomous developments in research itself and those top-down initiatives; and if anything can be done to steer them in the right direction. Whatever the right direction is. After all, that depends on whether you see yourself as part of the old or the new world.

Tom feels like he's losing grip. The old planning and control mechanisms don't seem to work anymore. Perhaps it *is* a matter of following the researcher's intuition and curiosity. Go against the accepted rationalistic way. A bit like the Aboriginals who know how to find their way across hundreds of miles of desert without any visible signs, following the songlines.

"N'oubliez jamais / it's in your destiny / a need to disagree / rules get in the way.." "Yes, Joe Cocker, remind me". But there's such a thing as responsibility as well. His is a large, prestigious university, providing a place of high quality work and study for thousands of people; has been doing so for a few centuries. You don't dally with your raison d'être, with your patiently built up (intellectual) capital. The same goes for his colleagues. And for other stakeholders, in government, industry, publishing, just to name a few. Many get nervous about it, feel there is a lot to lose. Others primarily see the new opportunities, feel it's about reframing the university. Worthwhile to look into, Tom feels, but with care. It's like birds learning to fly: if they get it wrong, they fall to their deaths.

The image sticks in his mind. Birds may fly, for very long stretches even, but they always come back to a place to rest, breed, and to nurture their young until they are ready to fly. Perhaps that's what the university can be for its researchers and students in the virtual world: a nurturing place to start from and come back to regularly. The image tallies with an article Philip gave him on the pro's of an institutional base setting for an otherwise (inter)disciplinary organised research work environment. The virtual world has physical components, too, that need a place, upkeep and renewal. And whatever they say about the delights of cyberspace, there's nothing like the coffee machine for a good chat with your colleagues. Even Anita agrees to that.

As Tom switches disks, he hears his flight being called. Queuing up to board his plane he has a picture in his mind of his university as a pigeon house, birds flying in and out all the time. Quite a change from the present, rather industrial-looking buildings. "What's the use of roots if you cannot spread them / What's the use of wings if you cannot fly" he sings along with John Wright as he slowly makes his way forward to his plane. He should really convince some colleagues to go to Phoenix, Arizona; apparently, they're developing something like a virtual university there.

But first, back to base. He's looking forward to it. Tomorrow night this time he'll be home again, going to the theatre with his wife, to watch Hamlet.

Epilogue

Items to be addressed:
a) **digitization** */(non-textual) corpora for research purposes.*
Especially, though no doubt not exclusively, in the arts and humanities, where important corpora would need to be available in digital form to conduct satisfactory research. Digitization of these corpora can be complex and expensive, and there seem to be few sources of funding for it. Also important to enable and stimulate interdisciplinary research. Would have to address policies for selection and preservation of both the digital and the original sources.

b) **e-depot** */long term preservation and accessibility/usability of a wide variety of file types, including very large datasets, complex models and formulas, sophisticated designs.*
Research needs this guaranteed for its key sources. Very large volumes of data pose specific storage and maintenance problems. International cooperation is necessary to deal with cost and back-up issues.

c) **repositories** */seamless, coherent and secure access to a diversity of distributed digital sources for research purposes integrated with research, communication and publishing tools.*
Access independent of time/place/licenses/organisational setting/discipline.

d) **collaboratories** */the effects of virtualization on the ways people learn and work, individually and within communities/peer groups.*
Do people who have grown up with computers from a very early age learn, read, select info, work differently from the way we do presently? How does it affect loyalties? What is the link with/necessity of physical locations/presence of communities and how are they affected? How does it affect ways of cooperation, and scholarly communication and publishing traditions

e) **e-science** */(policies for) conditions that nurture innovative developments in academia and its 'umwelt' and that stimulate traditional players to explore new roles and techniques.*
What barriers are there, (how) can they be removed; what risks are there and (how) can they be managed; what style of leadership, management, monitoring is needed; how do autonomous developments and top-down initiatives line up, and/or can they be aligned.

f) **open access** */reengineering the proces of scientific and scholarly communication.*
The current publication process is still paper based (although the documents itself are digital). Make full blown use of the internet, institutional and disciplinary repositories and search engines and develop new business models to bring the results of science to the public domain.

Summary of position:
The protagonists of the three tales raise a substantial number of questions that need to be tackled, in experiments to gain practical knowledge and insight, or through research to explore the issues further. At this point we would like to highlight five of them, listed below. All five surpass what can be done satisfactorily at the national level in terms of scope, application and impact. They would benefit from the wider and multifarious view that can be taken at the European level. They would bring together experiences already

being gained in various countries on some of the issues. They would foster the cooperation that will be necessary in the longer term for successful implementation of systems and policies developed.

Motivation for recommmendation and for action at EU level:
Although creation and communication of new knowledge are equally important, the latter process has been relatively underexposed in the scientific research domain. Universities and research institutes rarely have an articulated scientific communications policy, let alone a matching strategy and infrastructure. Yet, the appropriate technology is available. It is time realise an irreversible breakthrough in the flow of research results to education, to professionals, to society and, not the least, to the scientists themselves. A concerted effort at EU level could give the decisive push.

Recommended R&D and related policy priotities for Europe in FP7:
Next to the more or less standard instruments (studies, tenders, etc) the realisation of a European Research Charter could be very helpful. It is the equivalent of the Charters of Bologna and Lisbon that cover Higher Education in Europe (Bachelor-Master structure). The Research Charter should define generic guidelines for open access to (publicly financed) research results and include recommendations to European Governments and the research community.

Sources

www.surf.nl/DARE

Report of the Round Table Session DARE, Utrecht, 19 January 2004 (internal document)

Bruce Chatwin, Songlines

Joe Cocker, N'oubliez Jamais, The Ultimate Collection 1968-2003

Clifford A. Lynch, Institutional Repositories: Essential Infrastructure for Scholarship in the Digital Age, ARL Bimonthly Report 226, february 2003, http://www.arl.org/newsltr/226/ir.html

A.J. Meadows, Development of Science Publishing in Europe, Elsevier Science Publishers, Amsterdam-New York-Oxford, 1980

David Whyte, Crossing the Unknown Sea, work as a pilgrimage of identity, Riverhead Books, New York, 2001

John Wright Band, What's the Use of Wings, John Wright Band Live