

# **Strategic Framework for the Université du Luxembourg 2006-2009, 2010-2015**

**Contribution of Professor Dr. Rolf Tarrach  
Rector of the University of Luxembourg**

*Michael Porter cited weaknesses of  
Luxembourg's economy such as:  
average skills, no world-class university  
(it can take 10 years to make the university  
work, 20 to 30 years to really reap its  
academic harvest),...*

paperJam, juillet-août 2005

*We will try to speed it up*

*Or,..., un Etat pourra difficilement rester  
deux fois plus riche que la moyenne de ses  
voisins sans s'appuyer sur une forte  
éducation supérieure.*

Lionel Fontagné, Mensuel FEDIL,  
décembre 2004

*A strong higher education is a must*

## **Preamble**

*Wenn auch nur wenige von uns imstande sind, eine Politik zu entwerfen oder durchzuführen, so sind wir doch alle imstande eine Politik zu beurteilen. Karl Popper quoting Pericles*

This is a very personal view of what the Université du Luxembourg should be in 4 and 10 years from now. It is based on 7 months of observing and scrutinising Luxembourg's higher education and research landscape, and on my own international experience as researcher, evaluator, professor, head of department, dean, vice-rector, academician, president of CSIC and member of EURAB and of other European boards and panels.

I wrote this plan during one quiet week in the middle of the summer and I decided to use English, because it allows me to concentrate exclusively on the content and, more importantly, because it facilitates criticism from colleagues. This plan is only worth the effort if it leads to continuity and coherence in university policy, beyond the mandates of the Minister responsible for Higher Education and the Rector. I do not say anything about the past; that would now be a waste of time and it is not part of how I envisage my task. The document should be the core of the University's *Plan quadriennal*. Bologna's aims, Lisbon's spirit and Barcelona's targets - to two of which I contributed, though very modestly - are well registered in my thoughts, as are those aspects of the Anglo-Saxon model which I like.

I hope my understanding of Luxembourg is now broad and deep enough to have taken due account of its specificities. I ardently hope that the politicians, journalists, entrepreneurs, the citizens of Luxemburg in general understand that few, if any, of its projects are more important for the future of the country than a university of which they can be proud.

Einstein is often quoted; this is my homage to his *annus mirabilis* exactly 100 years ago.

This paper, my speech has benefited from the input of a dozen friends and colleagues. They have improved it substantially. I owe them my most sincere gratitude.

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## 1. Introduction

*Il y a trois façons de dépenser l'argent, avec ..., avec les banquiers, la plus rapide, et avec les scientifiques, la plus sûre. Georges Pompidou*

A young university, with some old problems, in a pragmatic and wealthy country without a university tradition, but with a wealth of para-academic institutions, under sceptical scrutiny by society and by some competing institutions, will nevertheless fight to become an international, research-centred, innovative and creative, distinct university. Known for the quality of its teaching it will play the leading role in putting Luxembourg in the upper tiers of academic, research and higher education rankings, without alienating itself from society and human worries.

What follows are the main ideas behind our strategy. Platitudes will be avoided as much as possible. Hopefully, however, most of the difficult issues, where alternative choices are roughly equally arguable, will be dealt with. This will lead to a strong and well-defined profile. The challenge then will be implementing it, without corrupting it. There are always so many exceptions that demand consideration that soon the strong profile becomes a fuzzy, fluffy one.

For the most part, this paper covers the four years 2006-2009, which correspond to my remaining mandate as rector, but always keeps in mind the next six-year period, or our ten-year goals. Beyond that we enter the realm of fantasy, and we prefer to leave that realm to others or for later.

The philosophy of the strategy is centred on human beings, students, staff and young researchers. The rest is subsidiary. At least a majority of the leading professors and researchers must agree with the main ideas of the paper, otherwise its implementation will not get off the ground.

The command structure in a good university is less hierarchical than in a good company; professors should have lots of freedom, only limited by the minimal administrative procedures of a publicly funded university and by the global strategic aims of the university. Authority is shared by the Governing Council, the rector and his team, and the professorial staff. At least partial consensus building is a must; otherwise filibustering and unchecked sprawling of committees will make the university grow old before it grows good.

The paper is as short as possible, *intelligenti pauca*, but its implementation will require a number of issue-specific plans, which will constitute the body of the *Plan quadriennal*. This latter one will also take into account the constraints due to potential lack of space in the next few years.

## 2. Research

*Schau ganz tief in die Natur, und dann verstehst du alles besser. Albert Einstein*

The University of Luxembourg would quite likely not have been created without having research in mind. This is fortunate, since pushing forward our frontiers of knowledge is the activity which is most passionately pursued by academics.

Whether research is centred in the humanities, social sciences, natural sciences or technologies, it will be the lifeblood of the University. Research benefits society in many ways. For example, it has been calculated that at least 50% of economic growth in the OECD countries comes from technological innovations based upon R&D.

Each of the three broad categories of research is essential for a research-centred university.

1. *Curiosity driven or blue-sky research* is essential if the university is to be internationally known and admired. Even institutions like MIT, Caltech or the ETH excel in this and that is why they have their share of Nobel prizes. And that is why companies that look at their long term future seek to work with them. The themes of this research are international in scope and best chosen by the researchers themselves. There are few excuses for mediocrity; this research is either of top quality or usually not worth the cost. It is almost always financed with public money or by private foundations. The FNR, the Ministry in charge of research through the university budget, the Framework Programmes (FP) of the EU, and hopefully one day the European Research Council (ERC) should be the main funding agencies for this research. This financing structure is not ideal in its details, but difficult to improve upon, given the size of the country. Luxembourg being a small country, it would help to develop this research, when it involves costly infrastructures, in the framework of some of the European research institutions, or even some worldwide research institutions located in Europe. Most of the research in Arts and Humanities falls into this category.

Some research-policy goals would help. For instance, developing modern biology is expensive and very competitive, and would furthermore require pooling scattered human resources in Luxemburg. This is a major political decision which is urgent.

2. *Research driven by societal problems* is sometimes more local and its benchmarking is more difficult, and yet it has to be performed by a public university. Taxpayers expect it. It is financed by all kind of public institutions and private charities. Quality assurance is more difficult. The European Science Foundation (ESF) can help in this respect. We should concentrate this research mainly on those issues which are relatively unique to Luxembourg: the *Lëtzebuergesch* language, pedagogy in a multilingual and multinational setting,

accommodating a huge foreign working force, the sensitive integration of large minorities, the sustainability of social developments, etc. Of course, some service research in this category is expected too.

One can include *opportunity-driven research*, very prominent in Luxembourg, in this category. It is related to the presence of European and financial institutions in Luxembourg. Opportunities should always be seized upon. Law, Finance and Governance in a transnational and international context are a must for the University.

3. *Business-driven research* is the last, yet essential, pillar of the triad. Business is of course also part of society, but its special features suggest treating it apart. It contributes to the economic development, and thus wealth, of the country. And wealth is what allows the financing of the other two research categories. The local business landscape, membership of ESA, the development of *Galileo* and our existing know-how make ICTs and computer sciences an obvious choice. Materials sciences are another choice, although the research intensity in this area is so important in companies with R&D activity in Luxembourg and so much less significant at the University, that caution will be required. Since some of the CRPs are active in this field, cooperation and coordinated decision making would be most beneficial. Bringing outstanding researchers to the University would be costly and might lead to a situation similar to the one in modern biology. Service research in this domain should be mainly provided by the CRPs. This research should be co-financed by, and developed in cooperation with, business. It is essential that companies are ready to do so and that tax breaks are as attractive as possible.

Most research belongs to more than one of these categories, as e.g. Computer and Materials Sciences, which are both business- and curiosity-driven. Another interesting example is that of Earth and environmental sciences. These are international and global by definition, set in networks, use satellites, need precision measurements and deal with issues of utmost interest for a society which wants to be sustainable and farsighted.

The period up to 2009 should allow us to buttress and build a reasonably solid research basis for the University. This should be done at two levels: a broad one, further developing existing research activities, like philosophy or pure mathematics, and a selective one, where resources are concentrated on a few areas, not less than 6, not more than 8, which should become poles of attraction in the *Grande Région* and around which doctoral schools should be set up in co-operation with neighbouring universities.

These priorities should be initiated either by the faculty, and this process has started in 2005, or by external researchers, which could start in 2006. Maybe an agreement can be reached with the European Heads of Research Councils, EUROHORCS/ESF, to draw - from their European Young Investigators (EURYI) awards scheme short lists - excellent young researchers who have gone already through a rigorous double selection process.

We could then make offers on a sure-bet basis. The first *Centre interdisciplinaire* should be set up during this first period and possibly a second one should be in the pipeline.

A couple of research areas should have been selected for very intensive development at the latest in the period starting in 2010. The University should then be in a condition to attract top scientists. By 2015 selected students should be able to come from anywhere to carry out their Master or PhD studies in these two areas.

Co-operation and, even better, common decision making with the CRPs should be expected in those areas where overlap exists, especially if they are resource intensive. In a small country nothing else is acceptable from publicly funded research and higher education institutions. If by the end of 2006 this does not work out, we shall have to analyse the reasons. Among the measures that might be implemented a redistribution of research groups among the CRPs and the University, with the aim of reaching critical masses, enhancing efficiency and clarifying the institutional remits, should then seriously be considered.

All possible models of cooperation in R&D and training with industry and business should be explored in this first period. This will allow us to stretch the limits of the university law and see if additional, more flexible, legal structures are needed for satisfactory co-operation. It will also allow us to distinguish lip-service from genuine interest, on both sides.

A patents and rights policy of the university should be introduced by the end of 2006 or beginning of 2007. Its guiding idea should be that no roadblocks should hinder the innovative and creative activity of the staff of the University.

On the broader research landscape a snapshot of where research stands in Luxembourg should be commissioned preferably from the Institute of Scientific Information (ISI) or from other experts. It should take into account data on patent registration and licensing. It should, for the hard sciences, include area-weighted impact factors and citations of all listed publications of at least the period 2000-2005. For the soft sciences and humanities this task could be given to the ESF, which has enough expertise and experience. This evaluation should be the responsibility of either the Ministry in charge of Research or the FNR. If nothing has been commissioned by the summer of 2006 the evaluation will be carried out by the University, for itself only, but that would fall short of what is needed. This snapshot is essential for any setting of initial conditions, quantitative goals and time series; neither we, nor any other serious research institution, will be able to do without it. This will be the content of the future Annex 4. The OECD study which will soon be completed might provide some of these data.

Research units are the natural organisational structure for research and, where and when applicable, for the corresponding doctoral schools. A few *doctoral programmes* should be in place at the latest by the end of the first period, 2009. LIASIT, with whatever adjustments deemed necessary, could play a rallying role in the ICT domain. The success

of the University will very much hinge upon the quality of these first doctoral programmes.

### 3. Teaching and learning

*Wer auf ein Jahr plant, pflanzt Reis; wer auf 10 Jahre, pflanzt Bäume; wer auf 100 Jahre, bildet Menschen. (Aus dem Chinesischen)*

The main ideas of the Bologna process, in particular the focus on learning, or even better, understanding, rather than simple instruction, will be part of our policy. Learning is not only about acquiring knowledge and understanding, but also about sharpening skills and gaining wider competencies.

The policy governing the creation of Master's programmes will be part and parcel of research policy. This holds *a fortiori* for the doctoral programmes policy. At these levels teaching and research should form a mutually reinforcing unity.

The University should be *multilingual* and have a low student/academic staff ratio, eventually near 10, which would allow us to offer, if not full, at least partial undergraduate (Bachelor students) and graduate (Master students) *tutoring*.

- As a general rule French and German should be the simultaneous languages at the Bachelor level, their weight ratios going from 3:1 to 1:3.
- At the Master's level English is included as a teaching language and as a general rule two languages out of the three should be used in each programme.
- In those Master's programmes which aim at attracting students internationally beyond our neighboring countries, English should be used almost exclusively. At the very least one quarter of the Masters should be of this type.
- By 2015 there should be around 40 Bachelor's and Master's programmes running, with a predominance of the latter ones. There is, however, no hurry in increasing the present offer of 23 in the next few years.
- Master's degrees will have development priority.

In addition to multilingual education and tutoring, *mobility* is the third key feature of learning at the University. That is, at least one semester of Bachelor's Studies for all those students coming from the *Grande Région* should be spent outside the University. Other students, coming from farther away, could be encouraged to participate in mobility as well, under certain conditions. The universities in the *Grande Région* should, in general, not be eligible for mobility for the first group of students, but are well suited for the second. This multiple source of complexity, multilinguism, tutoring and mobility, will require a very professional student service and, very likely, a supportive language training centre. The choice of partner universities beyond the neighbouring ones, and the work on agreements, will be a major, time-consuming, challenge. At least one Chinese and one U.S. university should be on the list. Maybe the ASEF could be of help in setting up partnerships with Asian universities. For Europe one possibility would be to approach

the Coimbra group of historical universities. They are traditional universities with research strengths and would offer our students an experience in a university with a venerable tradition, something we will not be able to offer in the near future. Multilingual universities could also be interesting partners. European universities of single university countries, or recently created ones, are other groups with which we share problems and privileges. But other criteria certainly exist.

This network of partner universities, not set in stone, should be in place by the end of the first period. Comprehensive tutoring and possibly generalized multilingualism might need some more time.

The University should also further the shaping of strong personalities, with healthy ambitions, who come with a sense of solidarity and who understand that there are few limits to the power of the will. The catch is only that one does not know exactly how to bring this about, except by exposing students as much as possible to personalities who themselves possess these traits. Intelligent tutoring will be a cornerstone in the development of this role of the University.

Bachelor's training should be broad, while Master's training should dig deeply within narrower boundaries. A first contact with research should be part of the last two semesters of a Master's programme. This includes having senior Master's students taking part in the usual activities of a research unit, supervising first year students or enjoying a temporary traineeship in a company.

Special attention will be given to the creation of a possible Research-MBA, or other products of the post-MBA era. This will take at least the whole first period since such a programme cannot be offered by us alone. Suitable and experienced partners will have to be found. However, Luxembourg's special position can play in our favour for such an initiative. The LSF should be buttressed with strong research activities in finance.

Continuing, education (mainly professional, lifelong and/or cultural) will also be part of the University's offer, particularly in those disciplines where a university training level is the best choice. A certain offer exists already in Luxembourg. Avoiding unnecessary competition, being pedagogically innovative, looking for adequate evaluation paradigms and setting up a complementary and targeted set of offerings with the best partners will require a decided effort and some time.

#### **4. Infrastructures**

*Science demands 5% inspiration and 95% perspiration. Thomas A. Edison*

There is no good university without good infrastructures, necessary for both teaching and research. In particular a good library with advanced information technology services and access to electronic journals and data bases, like the *web of knowledge/ web of science*, is a must.

Many of these services should be offered to all research and higher education institutions countrywide by the *Bibliothèque nationale et universitaire*, which would allow us to lower costs substantially. If not, the University will have to proceed on its own, in 2007. A library needs to be set up in each of the two campuses of the university, ideally one of them being the central premises of the *Bibliothèque nationale et universitaire*.

Some research areas are very demanding with respect to infrastructure, and often very expensive. Long-term financial planning will be required in these cases.

The IC services should be of the highest professional level: one should not be aware of them.

Given the size of the university, the uncertain future of academic publications on paper, the danger of localism, the costs and risks involved and uncertainties about paying customers, a publishing activity under the university label is unlikely.

The three, eventually two, University sites will increase the cost of infrastructures. They have to be well linked, otherwise *interdisciplinarity* will be a white elephant. Existing buildings must be adapted for physically handicapped students and staff; otherwise we could not even try to hire a scientist like Stephen Hawking. Public and private transport, bike or foot, will be encouraged when and wherever possible.

## 5. Students

*Ich habe keine besondere Begabung, sondern bin nur leidenschaftlich neugierig.*  
A. Einstein

Students are the reason for the existence of a university, which should become their *alma mater*. There is no good university if *alumni* are not proud of it. Thus, Student Services are, together with tutoring, another of the necessary cornerstones for our University. In this context, student life is of the utmost importance. The campuses should provide the necessary ambiance. As the university will have two campuses, the size of the student body will have to reach, over time, the thresholds necessary to provide this atmosphere, between 3000 to 4000 students per campus. This is an issue which is not a minor one; it is on campuses where society is critically analysed, and being able to do this in an informed and rational manner is an essential part of a comprehensive higher education.

Students should be selected according to criteria based on merit and potential. This is a major, difficult and sometimes controversial issue, as well as an important challenge: if not enough qualified demand exists, the University will not be what is described in this paper.

- EU residents should, as a matter of principle, have the same rights as residents from Luxembourg. This could cause problems, given the

disparity in size of the national groups of potential applicants. If so, some informed, corrective measures would have to be put in place.

- A certain percentage of places should be reserved for non-EU citizens.
- Comparing the qualifications of a candidate from one country with those of a candidate from another country might be almost impossible or otherwise absurdly costly. General, broad and generous criteria should be used for the selection of first semester students. More rigorous selection should be applied after the second semester. For these selected students low drop-out rates should be expected. This selection policy may be somewhat more costly, but socially and individually more just and certainly scientifically more correct. Its dark side, a high discontinuity rate after the first year, merits further thoughts.
- Some steering in the distribution of the number of students among the different programmes will be needed.
- Visa problems should be solved efficiently for the selected students; this might require some regulation or even legislation.
- Students should be allowed to work part-time, if they do not have a scholarship.
- Fees should remain at a low level for the whole first period. They should be raised when the university offers more quality and state expenditure on Higher Education approaches the figure of 1% of the GDP.
- Selected, well qualified and promising students, not able to pay fees, will be offered arrangements which will allow them to join the University.

*Alumni* will continue to be part of the University. Keeping in contact with them will require important resources, but that should be worth the cost. The satisfaction and success in the lives and professions of our *alumni* comprise one of the best benchmarking indicators of the quality of the University, and their later support - material, societal or intellectual - to the University, is essential for its success.

The fastest possible growth scenario for the number of students is given in Annex 1. It leads to nearly a doubling of the number of students in the ten-year period. Our limits come from both the space and teaching staff available, taking into account that tutoring relies intensely on staff.

## **6. Staff and young researchers**

*Der Mensch als Mittelpunkt. Nicht als Mittel. Punkt. Berthold Brecht*

Providing optimal working conditions for staff will be a high priority of the University. The huge diversity of tasks in a modern university allows gerrymandering the distribution of tasks to adapt somewhat to individual interests and skills. This flexibility will be fully exploited.

Staff should be - unless there are reasons for doing otherwise - controlled as little as possible, but performances will be assessed regularly, for efficiency as well as efficacy. This evaluation should of course be adapted to the individual distribution of tasks. Misdemeanors should be rigorously dealt with.

Ideally, all salaries should have a substantial part dependent on performance. This is however easier said than implemented, and there is little margin for error.

- A very careful evaluation procedure will have to be worked out. This will take most of the first period to put in place.
- At the professor level and for some administrative, scientific and technical positions we cannot do without flexibility in salaries. That is, adapting to market values should be relatively straightforward. A professor in Finances is likely to demand, *ceteris paribus*, a higher salary than one in Philosophy.
- Professors and Assistant-professors should never, unless it is their wish, spend more than 10% of their time with administrative duties; this would be wasting a professor's salary. This holds *a fortiori* for postdocs and other junior researchers.
- Having and nurturing a family should have as little negative consequences as possible. Kindergarten, the redistribution of tasks to gain flexibility in working hours and other informed measures are part of a modern, serious university. A special effort should be made to break glass ceilings.
- Sabbaticals are part of the *flexibility* which should characterize our university. They should be an integral part of the professorial life.
- A policy for recruitment of *vacataires* will be worked out. One should tell apart professionals which provide a value not to be expected from university staff from professionals substituting staff which has not yet been recruited. These last ones should be swapped for staff as soon as possible. The first ones should be treated exquisitely.

Recruitment should conform to best practices and should take serious note of most of the recommendations of the *Code of Conduct for the Recruitment of Researchers* published by the EC in March 2005.

- In particular an effort should be made to assess efficiency, i.e. output vs. input, rather than effectiveness, i.e. just output, since the future of the University hinges largely upon the quality of the recruited staff.
- Research couples should be specifically targeted, in particular in collaboration with other research institutions, like the CRPs, whenever possible.

Among the people working at a research university young researchers, and *postdocs* in particular, will very strongly determine the quality of the research done at the University, and thus the prestige of the University. They will be selected with great care and the best possible working conditions will be offered to them. Usually they will become senior researchers or university staff somewhere else, and only exceptionally will they be

offered staff positions at the University immediately after their postdoctoral period. Their career process should follow the guidelines of the *European Charter of Researchers* published by the EU in March 2005.

Correctly receiving and hosting new, usually foreign, *postdocs* and staff will be another characteristic of the University. There is more to this than meets the eye.

Data on staff and young researchers and their development in time are given in Annexes 1 and 2. They are mainly research-driven. We propose quintupling the research force and more than doubling the teaching force in the ten-year period.

## 7. Society

*The way to influence the past of tomorrow is to act today. Anonymous*

In a public university, society, which pays for it, is the main stakeholder. Eventually, any benefit from the activities of the University - knowledge creation, knowledge transmission, training, problem solving, critical appraisal, knowledge-based development of processes and technologies, to mention a few - should revert to society.

But there are a few activities which aim at society directly: outreach activities, including public debates, and communication. The first one can benefit from collaboration with other entities, like the *Musée national d'histoire naturelle*, the *Musée national d'histoire et art* or the *Centre national de littérature* and should be financed by public or private institutions. The second one requires a strong communication service. It should be full-fledged by the end of 2006. Sustainability of demographic trends, of energy consumption rates and of use of mineral and biological resources should be among the major themes for these activities.

Finally, outside our country, it would be surprising if the University of the future would not actively provide substantial academic and intellectual know-how to one university in one underdeveloped country, which we would support with *in situ* actions. This is a complex issue, which requires substantial preparatory work to avoid failure. It will take the whole first period to launch a realistic project with secured long-term financing. Its gradual implementation will take at least the better part of the second period.

## 8. Budget and Finances

*Money is like muck, not good except it be spread. George Soros quoting Francis Bacon*

A good research university is expensive. Most of the latest studies show that the more successful its researchers are, the more it costs. During the growing period the budget will be almost exclusively public. But in the long run, financial diversity is of the utmost importance. This is not small beer and will take a lot of confidence building.

- An overhead, in agreement with the FNR, and a fundraising policy will have to be set up.
- Some financial partners may also demand legal structures, like foundations, which would allow them more leverage and a closer control of resources.
- An endowment policy, probably with private-public partnership, should also be an aim. Chairs, bursaries, *postdocs*, special equipment for laboratories, upping of salaries in market-driven disciplines or for top-level professors are further examples of items that might benefit from the financial products of an endowment.
- An association of *les amis de l'université* could help in approaching donors and sponsors and certainly *alumni* would also play roles in this undertaking.
- Soliciting legacies is another aspect of this policy.

A support office will have to be put in place at some point for these difficult and resource-intensive fundraising tasks, which must be performed in the most professional way.

A very rough estimation of the budget, financing, and a timeline are given in Annex 3. It is based on only two independent indicators: the number of students and the number of equivalent full-time researchers. As any university activity is somehow related to one or the other, this is a plausible initial approximation.

- The annual full cost of a student starts at 9000€ and grows over the 10 year period to 11000€, because tutoring will require the student-to-teacher ratio to diminish.
- The annual full cost of research starts at 120000€ per equivalent full-time researcher, and grows over the ten-year period to 140000€ because improvements in the quality of research are unlikely to be for free.
- Any other expenditure, like administrative costs, is included in these two. By the end of the ten-year period the budget coming from the government will approach 0,5% of the GDP.
- A capital or endowment of 25 M€ should have been generated by then too.

There is a part of the budget which in a larger country would come from the general, non-prioritized, research budget of a research funding agency, and would thus be external. Some thought will have to be given about how to deal with this in a one-university country. By the end of the ten-year period roughly 10% of the budget should come from external sources.

The cost of large, new buildings is not included.

## **9. Administration and governance**

*Things have to be made as simple as possible, but not simpler. A. Einstein*

The administration should be ruled by the right equilibrium of two somewhat opposing principles: the one of subsidiarity and the other of economies of scale. What can best be done at the faculty level should not be centralised. But what can be performed more efficiently by pooling resources or requires coordination should be centralised. The administration should facilitate the learning, teaching and research activities of students and staff in the most effective and professional way. This will require the development of a vigorous middle-management. Administration is like health: unnoticed when performing, but very troublesome when doing badly.

The governance of the University is defined by the law. It should be assessed and evaluated from the very beginning. A university with inadequate governance will be wasting its human and its financial resources. The autonomy of the University is an essential requirement for success.

Data on administrative personnel, and a few significant ratios, are given in the Annexes. The figures are kept at the lowest possible level; they may have to be raised, mainly because of the foreseen growth of research activities.

## **10. Conclusion**

*If a machine is expected to be infallible, it cannot be intelligent. Alan Turing*

We will very likely not succeed in properly implementing all the ideas set out here. But a few are a must and will provide a welcome quality benchmarking of our performance. Some of the essential questions we need to ask are:

- Will we be able to select good students and good postdocs?
- Will the University be their first or last choice?
- Will excellent professors come to the University?
- Will our Masters and PhDs be employed in the right positions?

Indeed, we should not forget that PhDs are the most effective knowledge- and technology-transfer system known, making them a very significant future benchmarking criterion for the University.

If we succeed in these issues, which usually come together, then nothing will stand in the way of our becoming a strong, internationally renowned research university. There are few, if any, better assets for the country than having thousands of bright, ambitious,

critical young students from all over the world in Luxembourg. We will concentrate on the essentials. The proactive support of Luxembourg's society, business and government will all be needed. I take them for granted, it cannot be otherwise.

## **1. Annexes. Data timeline**

*Predictions can be very difficult, especially those about the future. Niels Bohr*

1. Etudiants et ressources humaines par catégories.
2. Equivalent temps complet de ressources humaines en trois groupes d'activités : recherche, enseignement, administration. Ratios.
3. Budget et financement.

Rolf Tarrach  
Luxembourg, November 2005