

Reforming Romanian higher education: the ivory tower and the entrepreneurial model

Alexandru Ioan Căbuz
alexcabuz@gmail.com

Abstract. The Western model of higher education and research has traditionally focused on the notion of academic freedom, as symbolized by the “ivory tower.” However the evolution of the American system since World War 2 has given birth to a new kind of entity, the entrepreneurial university. I discuss its achievements as well as its weaknesses and argue that a compromise between the ivory tower and the entrepreneurial model must be found. Using the French Attali report as an inspiration I propose the creation of fixed term research positions in Romanian universities financed on the basis of fixed term projects. I put forward the idea of implementing a flexible two career track system: a research track and a teaching track. I argue that in this framework an equilibrium may be found between the ivory tower and the entrepreneurial model, and also between the old generation and the new generation of university researchers, so as to *minimize friction* and to maximize the chances of success.

Higher education in the Western world has a long and complex history. The relative weight of research and teaching as well as the independence and freedom of academic inquiry have varied wildly at different moments. It is today a widespread view that innovation and research have always been an essential part of the educational process, citing, for instance, ancient centers of learning such as Plato’s Academy or Aristotle’s Lyceum. Most observers also insist on academic freedom and autonomy as a necessary condition for a rich and sustainably innovative cultural landscape. However, it is an easily overlooked fact that the same freedom of thought and diversity of research activity as that of the Greek centers of learning was never again reached until the 19th century in Western Europe, and even later in other parts of the world such as North America, Russia or Japan. Ancient Greece excepted, the research university as we know it today is a fairly recent phenomenon.

Much of today’s public discourse concerning the state of education in Romania as well as in the rest of Europe is guided by current trends and fashions. This is as it should be, for we live and breathe in the short term, but I believe it cannot do any harm to inject a dose of a longer term view into the debate. What follows is an attempt to isolate some broader features of the continuously evolving educational landscape of the Western world. I begin with a broad review of the foundations of the modern higher education system, in Section 1. The emergence of the entrepreneurial model in the United States of the post-World War 2 era is discussed in Section 2. The European reaction to the American challenge is too complex to review in any comprehensive way, but from the point of view of the Romanian situation, the most relevant initiative

is the French Attali report published in January 2008. Section 3 contains a summary of its main ideas on university reform. The 4th and final section is dedicated to a discussion of the special case of Romanian higher education; I adapt the suggestions of the Attali report to the context of Romanian universities, seeking a harmonious but efficient implementation of a modern entrepreneurial and performance based system, while minimizing friction with existing structures and customs.

1 Freedom, utility and productivity

Individuals enthusiastic toward understanding nature have always existed. Exceptional examples since the Renaissance include Leonardo da Vinci, Galileo Galilei or Johannes Kepler. However, in their day, these were isolated cases without great impact or visibility in the wider economic or social context. We owe their achievements mostly to certain features of their temperaments, such as an affinity to empirical investigation, curiosity, mathematical ability, patience and perseverance. At the time of their formation as young men, there was almost no educational structure in place designed to harness their creativity and curiosity for the advancement of science. Their emergence as the luminaries they were later recognized to be happened not thanks to, but *in spite of* an academic environment focused mainly on the transmission rather than the creation of knowledge.

The main role of a man of learning at the time was to be a repository of knowledge, and to transmit that knowledge to the younger generations. Active research in the sense of seeking improvements and introducing new ideas was the exception rather than the norm. What we know today as higher education and academia in the Western World owes its layout to three major, successive, transformations corresponding roughly to the Enlightenment, the Industrial Revolution, and the Cold War. The most recent of these, which Romania and also parts of Western Europe have not yet assimilated, will make the subject of subsequent sections. I first summarize the highlights of the pre-Cold War evolution of the research university, as I see it.

In the beginning was the Enlightenment. It is the prototypical intellectual revolution because it not only challenged established dogma by subjecting it to unprecedented and previously scandalous scrutiny; it challenged the very notions of dogma and authority themselves and laid the foundations for a truly *sustainable* evolution of human thought and knowledge, which continues to this day. From the point of view of education, it is from this time that students started to be brought up not as vehicles of knowledge but as active, thinking agents of change [1]. For the first time innovations were no longer seen as *a priori* dangerous and evil. However, that does not mean that they became the norm overnight. Indeed, authority and dogma have remained with us and occupy prominent roles in academic life to this day. Extended periods of immobility and dogmatic slumber are still only rarely interrupted by Kuhnian revolutionary shifts.

The key concept associated with the impact of the Enlightenment on higher education is *freedom* [2]. Academics are free to modify, transmit or discard received ideas, and encouraged to contribute their own. Higher education is about participation and curiosity and above all it must induce in its students a taste for adventuring into the unknown. A quest for intellectual *freedom* is what set off this great intellectual adventure and it is the fundamental feature that has fueled it to the present day. It is important to note, however, that the Enlightenment was, fundamentally, a backlash against a prolonged Medieval period characterized by extreme rigidity and by a radical repression of any critical appraisals of received notions. And like any backlash, in attempting to

compensate for previous injustice, it went to the opposite extreme. In order to secure academic independence and freedom from outside control, it attempted to squeeze all of academic life into the ivory tower. It was inevitable that, sooner or later, the ivory tower be increasingly perceived not as a mechanism of protection but rather one of confinement. It is not surprising, therefore, that eventually calls were raised for its revision. What is remarkable is that it endured virtually unmodified for as long as it did, over two centuries. I will come back to these ideas in the sections below. For now I will retain only that freedom of thought was the central factor which laid the foundation of the emergence of European culture as the global benchmark of progress and diversity as well as of technical, military and economic domination, and Europe is understandably reluctant to jeopardize it only because it is in fashion.

Of the many new ideas that the Enlightenment produced, the one that would lead to the most radical transformations in the worlds of both matter and mind, was not an understanding nor a theory, but rather a *technology*: the steam engine. When deployed on a large scale, it transformed whole countries and cultures by making it possible to produce unprecedented quantities of goods, and by giving an enormous strategic and military advantage to nations that had learned to harness it. The steam engine was the catalyst of the Industrial Revolution.

The keyword associated with the impact of the Industrial Revolution on higher education is *utility*. The strategic importance of industrial applications brought generous support for scientific research from both public and private bodies. The explicit goal of these policies was to enhance the military and economic *power* of its patrons by improving strategic military and civil *technologies*. This has provided a great boost to scientific research and today it is clear that without its extraordinary utility, its progress would have been considerably slower. I should also note that the universities were remarkably successful at defending their autonomy through much of the Industrial Revolution. Academia remained anchored in the values of the Enlightenment in no small part due to the wide influence of the German model [1, 2]. Its strong emphasis on freedom allowed universities to maintain their independence to a remarkable extent.

We now come to the latest phase mentioned above: The Cold War. It affected academia by its massive investment in science and technology. It transformed science from a preoccupation of a small elite, secluded in several ivory-towers scattered with parsimony around Western Europe, Russia and North America, to a profitable business. Universities prospered to such an extent that eventually they crossed a threshold: *they grew to the point where they spilled out of the ivory tower*. Many American researchers today work under considerable financial pressure and their *productivity* in terms of rate of publication and rate of attraction of funds is closely monitored by their institutions. This has produced a great leap forward in technology transfer to industry. However, I hasten to add that this is no reason to conclude that the ivory tower is crumbling, or obsolete, even though it clearly needs updating. It is still the indispensable nucleus of sustainable scientific growth and the guarantee against the paralyzing forces of dogmatic immobility in any society. The central lesson of the Enlightenment, freedom of thought, is anything but obsolete, and *a society neglects its ivory tower at its own risk*.

Nevertheless, the American model has presented European decision makers with a dilemma: finding the point of balance between the *freedom* of the *ivory tower* and the *productivity* of the *entrepreneurial model*. I first review the recent history of higher education and research in America. In the 3d section I discuss what Europe in general, and one European nation in particular (France), is doing to stand up to the challenge.

2 Research in America

Academic culture first started to change in America during the decades following World War 2. The reasons are multiple. First, the USA had emerged from World War 2 territorially unscathed and with a revitalized economy and industry, in contrast to Europe which was a theater of devastation. Second, it was faced with the challenge of the Soviet Union, who managed to replicate America's technological feat of building an atom bomb in only a few years, and to put the first artificial satellite into space. Third, the American cultural memory of the Enlightenment was in many ways different from that of Western Europe, resulting in a less purist and more flexible attitude toward traditional academic values.

Two major events stand out. The first is the explosion of federal funding for academic research in the late 40's, and the second is the shift in policy culminating with the famous Bayh-Dole act of 1980.

Federal funding transformed American academic life beginning in the early 50's [3, 4]. This was the result of the strategic decision of the US government to establish itself as a major force on the international scientific and technological stage, having learned the lesson of World War 2, that technical and economic superiority equals strategic and geo-political superiority. The corresponding doctrine and core strategy is outlined in the visionary Vannevar Bush report of July 1945 [5]. The catalytic effects that this revolution had on American science have been discussed widely, and in grandiose terms, and they have attracted much envy and admiration. But there are also some negative aspects that have received less attention: the quality of higher education, at both undergraduate and graduate levels, and the loss of independence of faculty members.

Over a period of less than a decade in the 1950s science departments in Universities witnessed the growing power of prominent researchers. Being able to attract government funds weighed increasingly heavily in the decision making process within university departments, and the availability of government funds started to influence the research directions chosen by faculty which led to a loss of interest in teaching. As E.T. Jaynes recalls [6], the situation in the Stanford Physics Department arrived at the point where a member openly referred to teaching as a "chore" in a memorandum. He notably recounts the occasion where one researcher openly complained that coursework was "interfering with the time that [graduate] students could spend working on HIS research!" The capitals and exclamation are Jaynes'; his indignation is evident as he laments what he perceives as a treatment of graduate students as "only a source of cheap labor" useful for furthering the supervisor's career ambitions. Jaynes' criticism of the "Publish or Perish" system is unusually virulent and is not characteristic of the mood of all of his colleagues, but the issues he brings up have continuously made the object of vivid debate in academic circles on both sides of the Atlantic. Eventually, Jaynes felt the direction taken by the physics department at Stanford was no longer consistent with his views and values, and in 1960 moved to the University of Washington in St. Louis Missouri, where he remained until his retirement. He is an example of a researcher who refused to be pushed out of the ivory tower. Taking a stand like Jaynes did, however, was rendered increasingly difficult by the second phase of reforms, starting in the late 1970s.

The emphasis on immediate, marketable research, was further deepened by the series of government measures culminating in the now famous Bayh-Dole act of 1980. These include the Stevenson-Wydler Act, which made technology transfer to industry a mission of federal laboratories, the court decisions in the cases of Diamond vs.

Chakrabarty and Diamond vs. Diehr, which greatly extended the definitions of what may be patented (most notably to living organisms), and the National Science Foundation's Industry-University Cooperative Research Centers created in the late 1970s. The Bayh-Dole act itself allowed universities to own patents obtained through research supported by government funds. Previously the government owned patents produced with government money, and, since the vast majority of academic research was federally funded, intellectual property was an issue mostly confined to the private sector. Public research was *open*. In the post Bayh-Dole era, universities became owners of patent portfolios and started spawning *start-ups* based on these patents. CVs of scientists started including patent lists and networking between the private sector and academia increased considerably. All of these greatly increased the rate of technology transfer from public to private sector.

However, among the (unintended [7]) consequences of this sequence of legal modifications was to give birth to a new kind of entity: the so-called *entrepreneurial university* [8, 9]. In addition to the two traditional missions of universities (teaching and research), since the 1980s American entrepreneurial universities have a *third mission*: contributing to the exploitation of knowledge for lucrative purpose.

It is a well known fact that American research institutions have derived immense financial benefits from the evolution towards the entrepreneurial model. In terms of prestige and international prominence they are world leaders. However, this remarkable success has also had a series of side effects which have raised questions about its long term sustainability [10]. To enumerate a few: conflicts of interest leading to scientific fraud [3]; time spent marketing rather than researching leading to the low quality or lack of graduate student supervision; patents and intellectual property as *inhibitors* of innovation [3, 11, 12, 13]; graduate students transformed into a highly qualified yet cheap work-force with little leverage to negotiate terms with their supervisors = "employers" [14, 15, 16]; educational "market forces" leading to a progressive lowering of standards of education to accommodate demands of students = "consumers" [17]; a drift toward a financing of research based on the notion of return on investment [3] rather than conceptual novelty; increasingly larger role played by fashion and hype in the financing of scientific research, leading to considerable downward pressure on diversity [18].

From the point of view of the quality of teaching, the problem is compounded by the fact that research has concrete, measurable output, while the effects of teaching are far more diffuse and difficult to assess. Industrial applications, articles in prestigious journals, popular books, successful start-ups, and Nobel prizes are so many public relations instruments on behalf of the benefits of research. It is impossible for teaching to keep pace, especially in a climate of the strongest economic growth and development that the world has ever seen. In the short term, research is the clear winner, but, increasingly, voices are heard that worry about the sustainability of this model when keeping in mind that *over half of all Ph.D. degrees awarded in America in the technical fields go to foreign nationals*. Paradoxically, the success of the American *higher education* system is at least partially dependent on a continuous inflow of *highly educated* young individuals.

It is clear that the injection of economic values and criteria into academia has helped push researchers out of the ivory tower. The process may even have gone too far [10], and there are policy makers, especially in Europe, who worry that the incentives in the entrepreneurial model are too unidirectional, leading, in the long term, to a complete corporatization of universities. They do not see any mechanism which would *guarantee* the openness and freedom of intellectual inquiry which are responsible for the global

success and appeal of European culture over the last two centuries. If current economic trends require that *some* researchers be pushed out of the ivory tower, then so be it, but *freedom must endure, and the tower must stand*.

It is this compromise that Europe is currently searching. I discuss it in the next section.

3 Universities in Europe

In the American case, the shift toward the entrepreneurial model was natural, and Bayh-Dole was not so much a cause as a consequence of an academic environment which already had a strong entrepreneurial inclination *before* the law came into effect. This is not the case in Europe. There is a strong contrast between the mind-sets and value systems of the academic world and the private sector. The many particularities of the European economy and legal system make it unlikely that a direct imitation of a Bayh-Dole approach would have positive results [19]. Consequently a more gradual approach is required.

Any substantial evolution such as the one which the European higher education is now undergoing will inevitably involve all aspects of the economy and the society. The issues are complex and intertwined, and disentangling them is far beyond the scope of this work (or of any other work, I fear). This is why I would like to focus on the issue of the balance between freedom and economic pressure. *The question is of providing enough flexibility to allow institutions to adapt to the needs of the wider economy, but without endangering the freedom of the ivory tower or the quality of education, which are fundamental in the long-run.*

The focal point of efforts by European authorities to jump-start innovation and technology transfer is the Lisbon Strategy. Its two pillars, *innovation* and the *knowledge economy*, are Europe's responses to the American challenge. However, progress on the path to Lisbon has been slow and disappointing according to the influential Kok report [20]. In this field as in many others, decision-making and problem-solving on the EU level has fallen victim to Euro-paralysis. It seems likely that, as in other fields, initiative and leadership will come from the national level. In this case, and for the time being, the most high profile, ambitious and far-reaching project in this direction seems to be the initiative of the new French president, Nicolas Sarkozy. This initiative broadly follows the directions set out in the Attali report [21]. Of the more than 300 suggestions it makes, touching all aspects of the economy and society, the discussion below will focus on those which would impact the internal dynamics of universities directly.

Before starting, however, it is important to note that even though French academic culture does not have the natural affinity to entrepreneurship of its American counterpart, the importance of the contact with the private sector is not a completely new concept. Incremental steps in this direction have been made since the 1980s. The two main obstacles that seem to persist are the mismatch of *mentalities* between public and private sector, and the *administrative* overhead and red tape which suffocates all public sector decision making. We will see that there is an analogy to the Romanian case, discussed in Section 4, conferring this discussion a double relevance.

There are four main thrusts of reform:

1. **Autonomy.**

Currently in France recruitment is done via the National University Council

(CNU), a government agency responsible for all aspects of recruitment and career development of university faculty (*enseignants-chercheurs*). Consequently, a laboratory or University cannot recruit as it sees fit, but must always go through the CNU to obtain approval. The number of hours faculty members must teach is fixed nationwide to 128 course hours per year or equivalent, amounting to a (nominal) half-time workload. The other half is in principle dedicated to research. The remuneration of faculty members is fixed by the Ministry of Education, and evolves according to a complex set of rules based on seniority, and on research and teaching activity. Hiring is done only on the basis of permanent contracts (*Contrats à Durée Indéterminée*); all positions are permanent. The freedom of movement of universities is therefore very limited.

The autonomy reform, which is already under way, changes the decision-making structure of universities and removes *some* of the constraints previously imposed on internal management and distribution of resources (see Flexibility below). Broadly speaking the contact between the university and the government would be limited to its *budget*, which would come in one installment per year, with no strings attached, the national *evaluation agency (AERES)*, which would evaluate performance, and *the president of the university*, who would be responsible for the performance. The removal of some of the constraints on the internal management will give the university president real *power*, and real *responsibility*, for the performance of the institution.

2. Flexibility.

From the discussion of the first direction above, it is clear that universities have little freedom to adapt to evolving conditions by attracting researchers with improved remuneration, or to redistribute research and teaching work loads among faculty to optimize performance. By relaxing *some* of the imposed regulation and controls, a more flexible academic experience would be possible.

Instead of a rigid 50/50 division of work between research and teaching, faculty would be able to adjust their emphasis as needed. Those with above average research productivity, teaching ability or with a stronger record of technology transfer and contacts with industry would be allowed to spend more time on what they are best at. Hiring on fixed term contracts (*Contrats à Durée Déterminée*) is allowed. Having control of these new fixed term positions would allow universities to adjust remuneration to more flexibly follow performance. The notion of flexibility will be particularly important in the Romanian context, See Section 4.

3. Evaluation.

Academic work is notoriously difficult to evaluate due to the long-term nature of its benefits and relevance and to the unreliability of quantitative measures of success. This is why the only evaluation which has been implemented on a large scale is peer-review. However, peer-review can only reliably evaluate the visibility and impact of *research* work within the *research* community, whereas the roles of universities in a society are far broader. A more comprehensive evaluation approach is now required.

The Attali report suggests the creation of a national evaluation agency, AERES, which would factor in, in addition to publication rates in peer-reviewed journals, aspects such as the evolution and success rate of alumni after graduation, technology transfer, and the international visibility and initiatives.

4. Funding.

The funding of French research has seen a very gradual evolution from permanent funding dependent on the position (also called recurrent funds), toward funding based more and more on the activity and performance (project based). The basic funding used to depend only on the number of researchers in a given laboratory. Equipment would be bought through public acquisition from public funds, approved through a public decision process. Subsequently, project based funding from the European Union appeared in the form of the first Framework Programmes. In 1999 the Allègre Law sought to facilitate and stimulate technology transfer, though the effects were below expectations except in a handful of institutes such as the CEA and the INRIA [22]. More recently France created its own National Research Agency (ANR, inspired from the American NSF) which awards projects to groups based on proposals. Public funds are being gradually shifted away from the older recurrent budgets and towards the ANR.

The Attali report is the last (and most ambitious) in a line of changes and adjustments stretching back over 2 decades. Among the more daring of its proposals is the creation of fixed term positions in universities financed through ANR projects as well. This idea is one of the main inspirations for the proposals in the next section.

4 Reform in Romania

Romanian education is in far worse shape than French education. In fact it ranks last in Europe on all relevant and available indicators of quality and performance [23, 24]. The system follows a traditional ivory tower model. However, the lack of funding and the limitations on free inquiry over several decades of communism, combined with an exodus of talent, particularly during Ceausescu's regime and immediately after its fall, led to a system dominated and tightly controlled by a privileged caste of highly conservative and scientifically obsolete faculty. Once again, the obstacles to change are the mentality and the administrative structure.

- **Mentality.**

The very low intensity and quality of scientific activity in Romanian universities is the result of decades of financial neglect combined with a systematic promotion on criteria of *loyalty, obedience and conformism*, values exactly contrary to Enlightenment values promoted in successful universities in the West. This has produced a pathological academic medium with a strong hostility to novelty, reform and innovation. In this case, the ivory tower is not a mechanism of *freedom and independence* (as originally intended), but on the contrary, it has become a mechanism of *control and censorship*.

- **Administration.**

Resistance to renewal and reform is possible due to the architecture of the decision making structure. This architecture has been designed by lawmakers and implemented by the universities in such a way that decision making power is concentrated in the hands of those who occupy certain *key positions*. The system by which one is promoted to these key positions is carefully controlled in order to ensure the perpetuation of the system of values based on loyalty and obedience, leading to the continuity and resilience of the pathology.

We saw how the French system has implemented a drift toward improved productivity and performance. This is what must happen in Romania, except that we do not have the luxury of gradual adaptation, over several decades, as the French system has had. In Romania the situation is dire, and it requires stronger measures. Many of these necessary measures have been put forward in the Report of the Presidential Commission of July 2007 [25]. The ideas discussed below are meant only as additions or perhaps completions to the *essential framework* proposed in that document.

The majority of faculty members at Romanian universities today have a very weak or non-existent research activity, and they concentrate on teaching to such an extent that certain individuals have double or triple time teaching duties. Consequently, I would propose the introduction of **two career tracks: the research and the teaching track**. The two tracks would be regulated by **two separate and independent national agencies: the research agency and the education evaluation agency, respectively**. All current faculty would start out in the teaching track.

The separation between the evaluation and financing of **research** and of **education** is the main idea I put forward here. The detailed implementation of this idea is a complex technical matter that is beyond the scope of this article. What follows is simply a collection of ideas from which policy makers can pick and choose those they find most useful.

In order to start a career on the research track one would first have to win a project from the national *research agency*. The agency would open annual calls for proposals of two main types: subject calls and white calls. The subject calls would finance research in predefined directions decided through a multi-annual national research strategy. The white calls would be researcher driven; individuals would be able to propose a research direction of their own choosing. The white calls will be designed to encourage and support researcher freedom and originality.

Each project would include not only financing for the research expenses such as equipment, bibliography or travel, but also the salary of the researcher who had submitted the proposal. Research track faculty would therefore be initially financed on the basis of **fixed term** projects. A fixed term researcher cannot accumulate salaries from multiple proposals. Instead, if a researcher wins multiple, overlapping projects, he or she can either waive the additional salaries and work on the projects alone, or can hire a person of their choice, who would receive the salary. In this way researchers would be able to establish and grow their own research teams or groups. However, even then, they would themselves still be financed on a fixed term basis, according to the projects they win.

In order to obtain a **permanent** research position, a researcher would need to accumulate a certain number of points. The points are given according to the projects won, and to the number and impact factors of peer reviewed publications. The algorithm may evolve, but it would involve the number of project-years divided by the number of authors. For example, if a 4 year project is won by a proposal with two authors, each of them would gain 2 points. The point system may also take into account European projects. All proposals will have to clearly distinguish between the **authors** of the proposal, and the **other researchers and group members** who will be working on the project if and when it is awarded. A group will be composed, in general, of faculty from both career tracks, research and teaching; it is the authorship of project proposals that will distinguish between the two. Salaries of permanent positions would be fixed by the ministry of education and would evolve based on seniority and quality of research and teaching activity, with the added bonus that a **permanent** researcher who wins a project and does not use it to hire someone in his or her group, may add

that salary to their own, up to a certain ceiling fixed by the ministry of education. The net result of this measure would be that permanent researchers who do not produce projects on a regular basis will be paid less than researchers with a sustained level of research activity. Thus, the distinction between the *authors* and the *other participants* to a submitted project would be important to permanent researchers as well, though for a different reason than to fixed term researchers. The proposal *writing* activity of a researcher is central to the evaluation and reward process in most Western private and public research laboratories.

The teaching track faculty members would be subject to evaluation at the *department and the university levels* by the national *evaluation agency*. This agency would measure the success and career evolution of alumni from a given department and university, the student evaluations, the success of books published by faculty, the level of implication and international visibility of the department and the university, as well as other criteria of educational quality (see, for instance the criteria used by the *US News and World Report Best Colleges ranking* in the United States) and it would submit a verdict on their *educational* relevance. Universities dropping below a certain level of educational relevance would be closed. All faculty members on the research track at such a university would be redistributed to other public universities. The evaluation agency would be composed of current faculty members of Romanian universities, most of whom will start out on the teaching track, as noted above.

The teaching duties of faculty on the research track would be lighter than of faculty on the teaching track, and they would generally teach M and D courses. Faculty on the teaching track would teach most of the L courses. A minimum of 10% of the overall grade in L and M courses would come from homework.

The national research agency would rely on expert referees who would be either individuals with permanent positions obtained using the above research track, or foreign researchers of international standing and recognition. The European Commission may be able to make available some of the experts from the Framework Program expert pool for this purpose (see paragraphs 8 of Refs. [26, 27]). At the beginning, therefore, the national research agency would rely *exclusively on foreign experts*, since no *permanent* researchers will have been appointed yet. Only after several years, when some researchers had won permanent positions on this track, would some of them be recruited as referees. But the proportion of internal experts used in the evaluation of projects must not be allowed to increase beyond 50% in order to prevent conflicts of interest, with referees colluding by approving each other's proposals.

Now that I have described the broad lines of the reform I propose, I will try to explain the rationale behind it. I emphasize that these ideas for reform are at an incipient stage and they may evolve considerably. My aim here is not to put forward a detailed project, but only to launch some ideas, and lend some new life to the debate surrounding the stalled reform of the Romanian higher education system.

Any solid system of higher education must find an equilibrium between several different sets of competing alternatives or views. Among these are the following: fundamental vs. applied, research vs. teaching, public vs. private, social vs. economic and novelty vs. tradition. Each of these sets of competing views is basically a spectrum. As politics, society, the country and the world evolve, the optimum position on each of these spectra changes. It is usually impossible to know exactly where this optimum is, and in any case it is a moving target. What is important, however, is that the system have the appropriate set of *adjustment knobs or dials* enabling it to adapt to a changing environment, within certain limits. I believe that the system described very summarily above provides this flexibility:

- **Fundamental vs. applied**

The national research strategy would evolve every few years and would take into account current trends in the development of both applied science and fundamental research. Moreover, white calls would give scientists the opportunity to work on fundamental subjects and ideas of considerable novelty, which would be naturally unpredictable by the body who formulates the national strategy. White calls would favor high-risk/high-payoff projects, and they would provide an ivory tower refuge for the most original thinkers.

- **Research vs. teaching**

The existence of two career tracks, research and teaching, would allow the equilibrium between the two to drift. By changing the relative amounts of funding given directly to universities as wholes and to individual researchers (or groups) through projects, the balance of power between faculty members on the two tracks can be adjusted. Also the number of hours of teaching of research track members can be adjusted.

Note that according to the description above, when evaluating the quality of education, departments and universities are treated as wholes, while the quality of research is evaluated on an individual basis, for each researcher, according to the number of projects awarded. In short, the public authorities will be concerned only with the quality of *education* offered by public *institutions* (through the education evaluation agency), and with the quality of *research* projects submitted by *researchers* (through the national research agency). Any other rankings and evaluations are left to the private sector. Note also that researchers will be interested in the teaching evaluation and ranking of their university because it will eventually be correlated with the quality of the students in their M and D programs, students which they would later recruit as part of their research projects. Thus the fact that universities as institutions are evaluated on the basis of teaching quality alone would force researchers to have an active interest in the quality of *education* in their institution.

The importance of the separation of the research and teaching in the evaluation process, by the separation between the two national agencies, is due to the different natures of these activities. Broadly speaking, *while research happens in the international arena, education is a national concern*. Romanian higher education is financed by the *Romanian* taxpayer, and its mission is above all to contribute to the development of the *Romanian* society and economy. The international relevance of higher education therefore derives in a large part from its connection to research. Research and teaching are activities of quite different natures and objectives, and it is natural that two separate agencies and evaluation mechanisms be implemented in Romania. The European Union has already implicitly acknowledged the distinction between the two, as can be seen from its concern with the European harmonization of the *university* systems only (the Bologna reform), while leaving secondary and primary education to the latitude of the national governments.

In my view the distinction between research and education is generally valid in any country, but the argument has exceptional relevance in the Romanian case. In Romania this separation is the only way to allow researchers to work effectively, and avoid friction with the existing faculty members, who are *overwhelmingly teaching-oriented*. An additional, and *crucial*, feature of this separation is that, if correctly implemented, this reform will not constitute a threat to the existing

faculty because in the short term it will not aim to remove them, *but only to bypass their inefficient management methods*. This aspect is *essential*, because *this group of faculty control the current system to such an extent that the chances of success of any reform which they perceive as threatening, or which places them in control of research policy, are nil*.

- **Public vs. private**

The technology transfer aspect of scientific research would have to be regulated in cooperation with European authorities, because this aspect will depend in a crucial way on the European patent system. I would advocate a system whereby researchers own the patents arrived at through government funded research, but the government retains the right to award non-exclusive rights to non-profit researchers [11]. This means owning a patent obtained with public research funds does not allow one to prevent others from using it for *non-profit research purposes*, notably in public universities. Researchers would be encouraged to create start-up companies based on their patents, but *some of those profits should find their way back to the university* (the experience of more advanced countries should be used to come up with the best way to achieve this). Teaching track members would therefore also be interested in the success of the research track members. *This would introduce a healthy relationship of cooperation between the research and teaching tracks* as well as between the public and private spheres “without unduly encumbering future research and discovery” (Bayh-Dole Act, 35 USCA, Sec. 200) or the quality of education.

- **Social vs. economic**

Universities are centers of intellectual effervescence and activity whose relevance extends beyond technical education and research. They have always been at the center of social and political movements. Being non-profit institutions, and encompassing a large amount of youthful energy and enthusiasm, they are ideally placed to play a major role as members of the civil society. From this point of view, public universities are not only responsible for the education of their student bodies, but of the society as a whole. This social dimension and mission of public universities should be made explicit in their charters; *they are not only vehicles for (1) transmitting knowledge through education, (2) creating it through research, and (3) exploiting it through technology transfer but have the additional (4th) mission of ensuring a responsible use of that knowledge*. Consequently, both science and humanities departments of universities should take on an active role in the broader civil society by initiating exchanges, debates, and various other experimental projects of social interest. They should be encouraged to spawn think-tanks and non-profit research centers and to establish public-private partnerships for various non-profit purposes. Universities can become active watchdogs in corporate social responsibility and related fields such as the protection of the environment, consumer protection, or government corruption. *All of these aspects and activities should be taken into account by the evaluation agency*.

- **Novelty vs. tradition**

There are several knobs that this proposal provides, enabling a fine tuning of the system: the number of points required for obtaining a permanent position, the proportion of funding reserved for white calls, the number of teaching hours re-

quired (or perhaps *allowed*) of researchers, the remuneration of research track members for their *teaching* activity (which would be in addition to their research related remuneration), the difference between the salaries of permanent research and teaching track faculty members, the rate of taxation on the profits obtained from commercial licensing of patents obtained from public research. *These should be adjusted to minimize friction between the teaching and research parts of the faculty of universities, and to bring their interests in alignment wherever possible.*

Any reform should be designed to be as non-intrusive as possible to the existing educational establishment. Note that in my proposal the situation of all existing faculty is left intact. At no point do any of them lose their current status (aside from the possible closing of several small and underperforming universities), and they will continue to play an important role in the new order. For instance they will make up the initial composition of the evaluation agency. The reform should endeavor to *harness their undeniable teaching experience for the best result and in the most constructive way possible. Change is not a zero-sum game and everybody has something valuable and important to contribute.*

Conclusions

There is great hope for the future of the Romanian higher education system. Its historical foundations are sound, in spite of the period of decline and decadence from which it is only now emerging. Romanian students and researchers are active at some of the most prestigious institutions in the world, and the younger generation of high academic achievers is not a myth but a very concrete reality. However, the pathology of the inverted ivory tower described above has pushed many of them away. The international status and confidence of a European Romania depends in a crucial way on the advancement of true achievement rather than of obedient immobility.

As self-evident as these facts might seem, they have been recognized officially *for the first time* in June 2007 [25], in the Report of the Presidential Commission for Policy Analysis and Development in the Domains of Education and Research. This article is meant as a contribution to the public debate initiated by that Report, and as an attempt to provide a somewhat more panoramic view of the historical context in which upcoming Romanian reforms will be unfolding. The above proposals are certainly incomplete, and inevitably so, since, in a subject as complex and multi-faceted as this, no single individual can be expected to be in possession of the “ideal solution”. The most that can be hoped is that these ideas will help decision makers better integrate upcoming initiatives in the international context of higher education evolution and reform.

I would like to thank Mr. R. V. Florian for his useful comments and suggestions.

References

- [1] Hermann Röhrs and Gerhard Hess, editors. *Tradition and Reform of the University under an International Perspective*. Verlag Peter Lang, 1987.
- [2] Walter Rüegg, editor. *A History of the University in Europe*, volume 3 - Universities in the Nineteenth and Early Twentieth Centuries. Cambridge University Press, 2004.

- [3] Howard K. Schachman. From "Publish or Perish" to "Patent and Prosper". *J. Biol. Chem.*, 281(11):6889–6903, March 2006.
- [4] D. C. Mowery and R. N. Langlois. Spinning off and spinning on?: The federal government role in the development of the US computer software industry. *Research Policy*, 25(6):947–966, September 1996.
- [5] Vannevar Bush, editor. *Science - the Endless Frontier*. A Report to the President on a Program for Postwar Scientific Research, 1945.
- [6] E.T. Jaynes. *A Backward Look to the Future*. Cambridge University Press, 1993.
- [7] Wendy Schacht. The Bayh-Dole act: Selected issues in patent policy and commercialization of technology. Technical report, Congressional Research Service, 2005.
- [8] H. Etzkowitz. *MIT and the Rise of Entrepreneurial Science*. Routledge, 2002.
- [9] H. Etzkowitz. Evolution of the entrepreneurial university. *International Journal of Technology and Globalization*, 1:64, 2004.
- [10] Jim Coleman. How is the Bayh-Dole act shaping the landscape of graduate education. *The Research Mission of Public Universities*, 107, 2003.
- [11] Aaron Miller. Repairing the Bayh-Dole act - a proposal for restoring non-profit access to university science. *Intellectual Property and Technology Forum at Boston College Law School*, page 093001, 2005.
- [12] A. B. Jaffe and J. Lerner. *Innovation and its discontents: how our broken patent system is endangering innovation and progress and what to do about it*. Princeton University Press, 2006.
- [13] David Mowery. The entrepreneurial university in the "pro-patent era": Lessons from the US experience. In *6th Biennial International Conference on University, Industry and Government Linkages*, 2007.
- [14] E. Sharnoff. Neither fish nor fowl - graduate students, unionization and the academy. In *Annual Meeting of the Modern Language Association*, 1993.
- [15] Cary Nelson, editor. *Will Teach for Food: Academic Labor in Crisis*. University of Minnesota Press, 1997.
- [16] Robert A. Rhoads and Gary Rhoades. Graduate employee unionization as a symbol of and challenge to the corporatization of US research universities. *Journal of Higher Education*, 76:243–275, 2005.
- [17] Ronald G. Ehrenberg, editor. *The American University: National Treasure or Endangered Species*. Cornell University Press, 1997.
- [18] Lee Smolin. *The Trouble with Physics: The Rise of String Theory, the Fall of a Science and What Comes Next*. Houghton Mifflin, 2006.
- [19] D.C. Mowery and B.N. Sampat. *Essays in Honor of Edwin Mansfield - The Economics of R&D, Innovation, and Technological Change*, chapter 3, pages 233–245. Springer, 2005.

- [20] High Level Group headed by Wim Kok. Facing the challenge - the Lisbon strategy for growth and employment. Technical report, The European Commission, 2004.
- [21] Rapport de la Commission pour la Libération de la Croissance. Technical report, République Française, 2008.
- [22] M. Langlois-Berthelot, P.-A. De Malleray, E. Macron, J.-R. Cytermann, P. Balme, J.-L. Dupont, C. Szymankiewicz, and H. Guillaume. Rapport sur la valorisation de la recherche. Technical report, IGF and IGANER, 2007.
- [23] Propuneri de reformă a sistemului cercetării științifice din România. Asociația Ad Astra, 2005.
- [24] F.A.R., Ad Astra, and Daniel David. Propuneri de reformă a sistemului de învățământ superior și a cercetării din România, 2006.
- [25] M. Miclea, D. David, D. Funeriu, R.V. Florian, D. Ciuparu, M. Ionac, T. Luchian, D. Banabic, R. Iucu, P.T. Frangopol, L. Vlăsceanu, and C. Bârzea. România Educației, România Cercetării. Technical report, Comisia Prezidențială pentru analiza și elaborarea politicilor din domeniile educației și cercetării, July 2007.
- [26] The European Commission. *Official Journal of the European Union C*, 305:52, 2006.
- [27] The European Commission. *Official Journal of the European Union C*, 305:54, 2006.