



A critique of the European commission's proposal for the 7th research framework programme

H. Matthews

Science Consultants International, Postfach, 4002 Basel, Switzerland

The European Union (EU) has recently published a document,¹ important insofar as it is intended to underpin central EU investments in research and development from 2007 until 2013, and whose basic purpose is “to strengthen excellence and raise the average level of research in Europe, ... to stimulate, organize and exploit all forms of cooperation in research, from collaboration in joint projects and networks to the coordination of national research programmes, competition at the European level as well as a joint implementation of large technology initiatives and the common development of infrastructures of European dimension and interest”. This statement, as diffuse as it is ungrammatical, epitomizes the whole tenor of the EU approach to funding scientific and technological research. The objective of this critique is to assess those aspects of the proposal¹ (henceforth ‘the Proposal’) impinging on nanotechnology and ultraprecision engineering. Nanotechnology (in the Proposal this covers nanosciences, nanotechnologies, materials and new production technologies) is one of nine thematic areas, the others being: health; food, agriculture and biotechnology; information and communication technologies; energy; environment (including climate change); transport (including aeronautics); socio-economic sciences and the humanities; and security and space. In reality, nanotechnology will impinge on all of these categories, an elementary consideration which does not appear to have been adequately taken into

¹ Proposal for a decision of the European Parliament and of the Council concerning the seventh framework programme of the European Community for research, technological development and demonstration activities (2007 to 2013) and Proposal for a Council Decision concerning the seventh framework programme of the European Atomic Energy Community (Euratom) for nuclear research and training activities (2007 to 2011) “building the Europe of knowledge”, presented by the Commission: Brussels, 6.4.2005 COM(2005) 119 final.

account. One could indeed argue that there is cross-impact between all of the areas; for example transport will influence health; energy will influence environment; and so on, but the influence of nanotechnology is very significantly more all-embracing than in the other cases.

The document¹ purports to be a distillate of the views of a broad range of Europe's citizens, including the scientific community and industry. It is however obscure—perhaps deliberately—which ideas emanate from the 12th Directorate General (DG 12) of the European Commission, which is responsible for research, and which takes responsibility for the Proposal, and which ideas emanate from the wider community of citizens.

For the sake of clearing away some of the brushwood, so to speak, I might as well mention some of the more minor errors, which might be overlooked were this document a draft, but by its own admission it is not, bearing the words “final” on its cover (page 1). One notices that some of the references are incomplete (page 6); the triteness of some of the statements would be hard to surpass, e.g. point 8 on page 7 (“the dynamism, creativity and excellence of European research at the frontier of knowledge should be enhanced”); and there is deplorable repetition, for example whole blocks of statements are simply duplicated word for word on pages 57 ff. One could continue in similar vein until the end of the document, but that is not my purpose in this article.

The nine thematic areas mentioned in the first paragraph of this essay constitute the so-called *cooperation* programme, supporting research carried out transnationally; apart from that, there are other programmes, namely *ideas* (supporting investigator-driven research carried out across all fields by individual teams in competition at the European level), *people* (strengthening, qualitatively and qualitatively, the human potential in research and technology in Europe), *capacities* (supporting key aspects of European research and innovation capacities such as research infrastructures, regional research-driven clusters, research for the benefit of small and medium-sized enterprises, etc.), and the *non-nuclear work of the joint research centres*.

One must of course read the more detailed descriptions of these programmes in the subsequent pages of the Proposal, but already the brief summary sows uncertainty in the mind of the reader. Thus, a major part of the effort will be directed towards *cooperative* research, but under the ideas programme individuals must also *compete*. Is this part of a coherent strategy inspired by, and a synthesis of, both Darwin and Kropotkin? That would be very surprising: far more likely it reflects a meandering desire to be all-inclusive. The ‘people’ programme, whose brief description on page 10 of the Proposal is an almost exemplary example of what R.H. Thouless has called non-communicating discourse (i.e. in the spirit of speeches such as “Ladies and Gentlemen, we have gathered together in this great hall. We have come from far and near. A year has passed since our last coming together, a year of hopes and disappointments, of joys and sorrows. Now again we lay aside our daily cares, and once again join in affirming our conviction that we must do what is right, and that we must identify ourselves once again with the dynamic stream of living

realities...”),² does not improve upon examination of the more detailed description starting on page 38, where we read “abundant and highly trained qualified researchers are a necessary condition to advance science and to underpin innovation...”. There is also the curious statement that the desired strengthening of what is called the human potential in research and technology “will be done by putting into place a coherent set of ‘Marie Curie’ actions”—rather disappointingly implying that the existing ‘Marie Curie’ actions are incoherent (which perhaps they are).

One of the elements of the capacities programme is unlocking the research potential in the EU’s outermost regions. This conjures up visions of establishing research stations in places like Kiruna, north of the Arctic Circle in Sweden, and where I once applied for a job—but despite its evident beauty, especially in winter, I was reluctantly obliged to concede that living and working in that particular outermost region was more likely to lock up my research potential than release it. We have perhaps become so used to statements (emanating in particular from the European Commission) like “unlocking the research potential of the outermost regions”, which combine Orwellian newspeak with Thouless’s non-communicating discourse, that we no longer bother to criticize them and simply find them unexceptionable. Another element of the ‘capacities’ programme is “bringing science and society closer together for the harmonious integration of science and technology in European society”. Comment is superfluous here. It simply belies belief that serious people should have been willing to spend time producing statements like this—but perhaps we, as outsiders, have a quite mistaken impression of the supposed membership of the committees that presumably have produced documents like this Proposal.

Small and medium-sized enterprises (SMEs) are a favourite hobby horse of the European Commission, and the ‘capacities’ programme is where they emerge in this Proposal. It matters little that both the public perception and reality of SMEs is that the vast majority of them are like the corner shop where I can buy a newspaper if I so desire. The proprietor, it is true, has little or no research capability but his kiosk has what seems to me a quite high tech installation for processing lottery tickets. Nevertheless, the Commission states (page 42) that “low to medium tech SMEs with little or no research capability” are in need of outsourcing research to universities and research centres. It desires to support small groups of innovative SMEs to solve common *or complementary* (my emphasis) technological problems. It seems that one of the main pillars of European Union policy is being all-inclusive, both in ideas and in geography. The Commission also desires to “support SME associations and SME groupings” (may one ask what is the difference in this context between an association and a grouping?) to “develop technical solutions to problems common to large numbers of SMEs in specific industrial sectors or segments of the value chain.” Here, for some reason, complementary problems are excluded, but what

² R.H. Thouless, “Non-communicating discourse”. In: *The Scientist Speculates* (ed. I.J. Good), pp. 32-41. London: Heinemann (1962).

about non-specific industrial sectors or segments? At this point (but nowhere else) a mysterious Competitiveness and Innovation Programme is mentioned, whose purpose is to “provide support to networks of intermediaries and national schemes for actions to encourage and facilitate the participation of SMEs in the Framework Programme.”

Under the heading ‘Activities of international cooperation’ we read that the European Community needs a strong and coherent international science and technology policy. This policy (about which all we know is that it is strong and coherent) has, it is stated (page 45), “two interdependent objectives: to support European competitiveness... by engaging the best third country scientists to work in and with Europe; and to address specific problems that third countries face”. These objectives are perhaps more interdependent than the authors of this Proposal realize: it is considered to be one of the major problems hampering the economic progress of underdeveloped countries that their brightest and best intellects typically leave upon graduation and go to work in Europe (or North America). The policy proposed here would appear to strengthen that drain, doubtless to the benefit of European health services and other sectors, but scarcely focusing on the ‘particular needs’ of the developing countries, which this part of the programme purports to wish to do.

The most severe charge that can be made against the policy of the European Union regarding the technology of the future is that the policy is appallingly incremental. It claims to be visionary, but in fact has no vision at all. Nowhere does it succeed in emerging from its box of ideas that is firmly rooted in the present. Thus, for example, we are promised a host of technologies that will contribute to making motor-cars better—safer, quieter and more comfortable (but probably not faster). There is no hint that efforts are being directed towards envisioning a society in which motor-cars are not necessary at all. Similarly, under information and communication technologies (ICT), much is made of the importance of ICT meeting societal challenges, for example “to improve inclusion and equal participation and prevent digital divides...”, and so on, and similarly for governments, to promote “efficiency, openness and accountability... links to citizens and businesses, supporting democracy”, but nowhere do we find even a hint of radical ideas such as the use of ICT to develop a system of direct democracy even more effective and inclusive than the Swiss concept of *das souverän Volk*: the provision of decision screens to every household, or to every mobile telephone, enabling polls to be carried out constantly and highly effectively, and rendering the elaborate and expensive apparatus of the already largely superfluous parliaments, both national and European, completely redundant.

In other words, there is no acknowledgment even of the possibility that technological progress will not be linear, but exponential.

At this stage one might be tempted simply to write off the whole Proposal as a typical product of committees—and, in the case of European Union, it happens all too frequently that these committees have no real common language, and that there can therefore be no debate above the level of the bowdlerized language in which, for example, this Proposal is written—were it not for the fact that this product ultimately may have considerable

influence, partly through the funds that are directly disbursed for research projects by DG 12, and partly through legislation (e.g. setting new standards for pollution control), which is one of the main drivers for industrial innovation and industrial spending on research in the private sector. The Proposal in any case suggests that the goal of spending 3% of gross domestic product on research (by an unspecified date) would be reached by one third of that spending being direct government support for research projects, and two thirds being the outlay of private enterprise. It is, incidentally, completely unclear whether the recommendations of the Proposal are meant to apply exclusively to state-funded research or whether they are intended to be applicable to the entire research community, including the private sector (which should actually know what it wants and be prepared to pay for it, if it is available). It should be recognized however that the type of Maecenas typical in the US, willing to spend half a fortune on a daringly innovative technical development, is conspicuous by absence in Europe: he or she is more likely to endow an art gallery or a museum. Nor can one rely on the State to fill the gap: the Government of Basel deems it to be more expedient to spend millions of francs on renovating their football stadium than to support their cash-strapped University.

Even if only the state funding is to fall under the constraints embodied by this proposal, large sums are at stake and it then becomes a very serious matter that alarming trends, mostly regarding the state of the environment, are given very superficial attention. It is beyond the scope of this essay—which should be subtitled ‘with reference to nanotechnology’—to expand on these aspects, but at any rate one should be aware that they need attention. Standing back for a moment from day-to-day concerns, it truly beggars belief that the entire thrust of this Proposal is essentially business as usual with no hint of the clouds on the horizon—and even a dispassionate appraisal will recognise that these are not little fleecy benign clouds, but menacing thunderclouds. Apart from environmental degradation, there is also the problem of adverse demographic trends, latent and possibly uncontrollable social disorder, the displacement of all manufacturing to India and China, public acceptance of new technologies, and you may think of others—it is not my purpose to provide an exhaustive list here.

The objective of the nanotechnology theme of the cooperation programme is stated as (page 60): “Improve the competitiveness of European industry and ensure its transformation from a resource-intensive to a knowledge-intensive industry, by generating breakthrough knowledge for new applications at the crossroads between different technologies and disciplines.” It will be noted is that this statement is fairly generic; nevertheless, the authors of the Proposal would appear to have correctly identified nanotechnology as the future driver of manufacturing.

Nevertheless, it must be counted as a serious omission that there is no word here about the need to ensure public acceptance of the new technologies. In many countries, regrettable recent events have somewhat diminished the stature of scientists in the public eye. Following the furore surrounding genetically modified organisms, nanotechnologists

are all too aware of the necessity of bringing the public round to their side through frank, open debate. Perception of this need is absent both under the EU nanotechnology research programme, and under the socio-economic sciences and humanities research programme.

The lack of vision referred to above is not limited to technological short-sightedness. Even a superficial appraisal of events in the commercial world, such as might be gained from skimming the financial pages of a newspaper, cannot but fail to indicate the rapidly growing capabilities, and hence competitive threat, of India and China. There is no mention of this threat in the proposal, despite very frequent reference to increasing the competitiveness of European industry. The international dimension is given solely via collaboration with ‘third countries’, which, it is implied, are developing countries, and South America being excluded by virtue of the Monroe doctrine, those singled out for attention are likely to be almost exclusively former colonies in Africa, Indochina and the East Indies.

The final part of this report is in some ways the most depressing, for it clearly implies that scientists and engineers are not to be trusted—despite the implicit recognition in this proposal that it is to them alone that the execution of these plans must be entrusted. I refer to the section headed ‘Monitoring and evaluation’ (pages 65 ff.), which even includes anti-fraud measures. To carry this out effectively and rigorously, one would need to employ a corps about as numerous as the corps of scientists and engineers who are doing the research and development. Will the expense of the monitoring be included in the 3% of GDP which should be spent on research? If so, we are well on the way to put in place a splendid social system that solves the unemployment problem and which yields minimal technical output; in deference to *quis custodiet custodiet?* one will of course have to employ monitors of the monitors and so on, until the entire working population is thus engaged.

However one seeks to achieve the bureaucratic control of scientists so strongly desired by the European Commission—and which even the leadership of the Soviet Union realized had to be held in severe check in order to allow the scientists to fulfil their creative potential—the imposition of such control will drastically diminish the effectiveness of science spending. Either the controls will be in the hands of bureaucrats, in which case they can only impede the real creative work of the scientists, or they will be carried out by experts capable of doing the monitoring job properly, but in that case half the workforce will be engaged in monitoring, and in effect 3% of GDP will become little more than 1.5%.

The Proposal is set in the context of a desire to become “the most dynamic and competitive knowledge-based economy in the world” while maintaining the “European Model” (page 3). The “European model of research”, sometimes referred to simply as European research, is frequently mentioned, not only in this Proposal but also in many pronouncements emanating from the European Commission. Nevertheless, exactly what this European model is is nowhere defined. Presumably it is meant to stand in contrast to, and distinct from, research activity in the USA and Japan (once again India and China are ignored—perhaps it is supposed that they do not have distinct models of their own). If it

refers to the way of financing research, then all of Europe, not only the member states of the European Union, are now adherents of the system of grant awards that came to us from the USA. In the time of the Soviet Union, there was an alternative system, namely that of allocating funds *en bloc* to the research institutes, which funds were then distributed to the research staff by the Director on the basis of scientific excellence—and often with excellent results, especially in the case of establishments such as the Lebedev and General Physics Institutes of the Soviet Academy of Sciences in Moscow. Insofar as this system was not to be found elsewhere in the world as far as I am aware, it could be called a European model. Since the demise of the Soviet Union, however, it has been swept away, and even Russia now follows the American system of grant awards. In the USA though it seems to work moderately well, and there is certainly room for pursuing ideas that in Europe nowadays would be regarded as distinctly offbeat and very unlikely to get any funding. If this European *interpretation* of the American model were to be defined ostensibly, a straw poll taken among European researchers would quickly yield a description containing epithets such as hidebound, incremental, time-serving and so on. Rejecting this grass-roots opinion does not improve matters, for one will then be led into conceding that the *implementation* of the current system for organizing research in Europe, however lofty and rational its ideals, has failed dismally to deliver both fundamental excellence and global economic competitiveness.

Much of this critique has ended up being generically applicable to the entire Proposal for research in the European Union and associated states, not merely to that part dealing with nanotechnology. It would be beyond the scope of this essay to make definite suggestions for improvement, but I hope that in several places implicit suggestions can be discerned. The most pressing need however is for there to be a much wider perception that matters are seriously wrong, and cannot be remedied by pretending that they are not; nor can they be rescued by insisting on a uniquely “European” research—there is only good research and bad research, and the problem is that at present the official criteria seem to be barely better at identifying the good than unashamedly random choice, which would at least have the merit of being inexpensive.