

# Newsletter Interview

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## FOR AN ITALIAN RESEARCH STRATEGY BEYOND THE PNRR



*Interview with Luigi Ambrosio, Director of the Scuola Normale Superiore, coordinator of the Technical Working Group established by the MUR (Italian Ministry of Universities and Research) to develop a national strategy for fundamental research*

The final document

([https://www.mur.gov.it/sites/default/files/2022-07/Documento\\_Tavolo\\_Ricerca\\_Fondamentale\\_trasmesso.pdf](https://www.mur.gov.it/sites/default/files/2022-07/Documento_Tavolo_Ricerca_Fondamentale_trasmesso.pdf)) of the Technical Working Group established by the Minister of Universities and Research, Maria Cristina Messa, has been published, in order to formulate proposals for an Italian strategy on fundamental research. The work carried out by the Technical Working Group, coordinated by Luigi Ambrosio, Director of the Scuola Normale Superiore and consisting of Ugo Amaldi of CERN, Ariela Benigni of the Mario Negri Institute for Pharmacological Research, Paola Inverardi of the University of L'Aquila and newly appointed rector of the Gran Sasso Science Institute, Francesco Loreto of the Federico II University of Naples, Gianfranco Pacchioni of the University of Milan Bicocca, Angela Santoni of the Sapienza University of Rome, and Luisa Torsi of the Aldo Moro University of Bari, provides a careful analysis of the state of public research and concrete proposals to give solidity to the system. Starting from the study of certain structural problems of Italian research, the Technical Working Group went on to formulate a number of organisational proposals and an indication of an additional plan, compared to that already planned, of multi-year resources for national public research so as to ensure its excellence and competitiveness at the international level. In particular, it is proposed to stabilise public spending on research at the level of at least 0.7% of GDP: this investment would ensure that upcoming investments from projects funded under the National Recovery and Resilience Plan (NRRP) are not wasted.

**What is the background to the MUR's initiative to establish a Technical Working Group for a national fundamental research strategy?**

Already in 2021 there had been an appeal signed by Lincean Academics in favour of research, in which quite specific targets were proposed to be achieved, European-level targets in the ratio of public investment in research to the country's GDP. There were two appeals, to two different governments, the Conte government and the Draghi government. In the meantime, the NRRP came along and the topic necessarily evolved because of the impact of the NRRP on research. And two critical issues in particular emerged, which the Ministry immediately recognised and for which it assessed the need for prompt action. First of all, in the NRRP there is a certain imbalance in favour of what we could call applied research. Even though these distinctions, as indicated in our paper, may at times be subjective, at times even vary over time, because research that initially originates in the fundamental field may become applied, even within a very few years, this imbalance is objectively there. The second critical issue consists of the fact that the NRRP is generating a wave of funding, compressed in time and over limited areas of intervention. If offsetting interventions are not implemented, it will inevitably lead to a very dangerous sudden drop. Just think, for example, that, within the scope of the NRRP, it is not possible to hire people with permanent contracts. Without interventions, at the conclusion of the NRRP, we risk, as our graphs show, returning almost to 2008 or 2009 levels in the ratio of public research spending to GDP. We are talking about public spending, not research spending in general, which is a much higher percentage of GDP because it includes the industrial component, and which was obviously out of the scope of a ministerial working group such as ours. Another research need requiring attention, and one that is well known to anyone working in the university or research institution world, is that planning must be multi-year, even beyond the horizon of government documents. Therefore, the time frame that we decided to work on is a five-year time frame, so as, moreover, to also include 2027, the year of the sudden drop.

This, in short, is the genesis of the project. I was probably involved because I had been interested in these issues in the past, while the other members are academics and researchers, and also one of the signatories of the original appeals, Ugo Amaldi. In addition, although not part of the working group, we were able to count on the contribution of Nobel Prize winner Giorgio Parisi, and Francesco Giavazzi, economic advisor to the Prime Minister's Office, as well as other professionals.

Our work lasted about three months, but the Working Group actually has a three-year mandate, so it could also be given additional tasks in the future. Nevertheless, we felt we had to provide an initial output after three months, also in view of the deadline of the DEF, the economic and financial planning document.

To conclude the reconstruction of the facts, I would add that later, with Luciano Maiani, Ugo Amaldi and Angela Santoni, we signed a Lincean document ([https://www.lincai.it/sites/default/files/documenti/Articles/Piano\\_quinquennale\\_%20per\\_la\\_ricerca\\_pubblica-2023-2027\\_Lincei-06.09.22.pdf](https://www.lincai.it/sites/default/files/documenti/Articles/Piano_quinquennale_%20per_la_ricerca_pubblica-2023-2027_Lincei-06.09.22.pdf)), which appeared in early September and which in a sense is partially the child of the work of this Working group, and partially also of the proposals that arose beforehand in 2021. This is a more detailed document in the breakdown of the funding proposals, but it does not contain the discussion part of critical issues of the system.

**What goals did you set for the Technical Working Group?**

First of all, one objective is to try to mitigate the sudden drop with a proposal for additional funding: basically, it would be ten billion over five years, including three billion in the first three years, because the point is that this funding should be additional and also progressively increasing to offset the decline in NRRP investment. For example, within the scope of the NRRP no one can be hired with a permanent contract: at the end of the NRRP some of these investments in human capital should in any case be promoted.

Moreover, one of the main critical issues is definitely the variability of calls. For example, the issue of funding calls for research projects is basically random. But it is not only the timing of publication, it is also the moment when we can say that we know, for better or worse, the final outcome. Whereas, if we look at any other reality, even very close to us such as France, or Switzerland, or other advanced, albeit small realities such as Israel, they all have a research agency that is entrusted with the proper management of calls, and the entire timing of the calls is well known and strictly adhered to. This, of course, represents an element of great certainty that enables researchers to plan. Moreover, there are fluctuations not only in the timing but also in the amount of funding. In our document we have included a very enlightening table on PRINs (Projects of National Interest), which shows precisely all these fluctuations. What's more, there is also the constant fluctuation of rules from one call to another, which prevents a consolidated evaluation procedure, and the possibility of establishing more or less standardised behaviour. For example, in PRIN calls, one year priority is given to large groupings, while the next year the opposite happens. In the discussions within the Technical Working Group, in which colleagues from different disciplinary areas took part, it became clear that the needs are different: it would be useful, in order to draft calls that take into account the needs of the individual realities, to discuss with the various scientific communities so as to modulate the rules according to their specific structures. Imposing the same rules to everyone makes little sense.

One of the proposals that we, the Technical Working Group, hope can be taken up again in a bipartisan spirit is that of a research agency, on which, however, there must be a clear understanding. Some attempts have been made in the past that in the end came to nothing, probably because there was the desire to give the agency too much discretionary power in allocating funds. This could remain with the Ministry in question. We, on the other hand, have in mind an agency that is technical in nature, not policy-driven with respect to research, and that deals with the management aspects of calls.

### **Why is it important for an advanced country to have a research strategy, particularly for fundamental research?**

To answer this question, we do not need to go looking far back in time; we need only to look at recent history, even current events. For example, during the Covid emergency, we were able to have the virtually real-time development of new discoveries on vaccines. We could not have dealt with this emergency as we did without science, which was able to manage it at various levels, combining medical, epidemiological, even mathematical knowledge with very effective pandemic propagation models. This is just one example, but there are many others: think of scientific computing, with applications often stemming from fundamental research. We need to ensure two distinct lines of funding that must both be pursued; without the protection of one, the prospects of the other are limited.

Furthermore, having a research strategy also clearly allows us to position ourselves well on the international stage in terms of research, economics, society and even human capital. If we put ourselves in a student's shoes, one of our children, who has just finished his or her studies and is wondering "all right, now I have to start my post-graduate career, what are the prospects?" Well, you can't offer him or her a one-year perspective and then we'll see. If we look at other advanced systems - I again refer to France because that is the one closest to us - they are all characterised by great stability. I repeat, mainly concerning the rules. The funding may also vary somewhat, in the terms of macroeconomic conditions, but the rules are important. A multi-year strategy not only makes perfect sense but is necessary. In our document, we carried out a rather demanding analytical job, also with the aid of ISTAT (National Statistics Institute) economists and staff, in which we tried to distinguish the effect of the PNRR from the effect of the meritorious actions that have already been carried out, particularly with the last two governments, which initiated multi-year funding actions, on human resources and research projects.

### **How did you organise yourselves to generate the document within the three-month time frame?**

It was a rather demanding job, partly because statistical conventions are not uniform among the various databases: ISTAT and OECD, which were our two main sources, adopt conventions that are not always consistent with each other. Moreover, when we talk about public spending, another element to understand is that it is not only the MUR that contributes to it, so it was necessary to discriminate the contribution of the different ministries. On this issue, Giulio Perani of ISTAT and a fellow economist of mine at the Scuola Normale in Florence, Mario Pianta, President of the Ciampi Institute, were also of great help. We had only one in-person meeting, at the MUR, the kick-off meeting of the Working Group. After which we worked electronically. We held about ten meetings, during which we developed analyses of the critical issues and considerations for developing proposals. The final proposal, broken down into three macro-areas, personnel, calls and infrastructure, was also formulated by holding discussions with the Minister, in the proper balance that there must be between the document of a Technical Working group and the room for manoeuvre that the decision maker must have.

### **What was the outcome for the three macro areas?**

On personnel, as already explained, it will be necessary to retain some of the human capital that was hired on a fixed-term basis with the NRRP: therefore, downstream of the NRRP, there must be room to hire some of the new resources, also taking into account the foreseeable turnover, which we have quantified. It is also necessary to take into account the new Law 79 of 30 June, which changed the rules for hiring in pre-tenure in universities and research institutes.

As for the calls, again as mentioned above, a widespread national system of research funding needs to be put in place, which is now largely insufficient and fluctuating. We articulated the proposal to take into account the various possible funding models. The PRIN should be the collaborative research model between communities, with rules that could therefore also be adapted to the needs of the scientific areas. In addition, we highlighted the need to strengthen the FIS (Italian Science Fund) and FISA (Italian Applied Science Fund) calls. Then there are those projects that have had extremely positive, above-threshold ratings in international research

programmes, but have failed to win. Bearing this assessment in mind can provide a good way to also select valid and internationally competitive projects. In addition, knowing that there is the possibility of a second chance at the national level can act as an incentive for researchers to compete in international funding calls.

Finally, as far as research infrastructure is concerned, within the Technical Working Group we were able to count on the collaboration of a number of infrastructure experts, in particular Professor Francesco Loreto of the Federico II University of Naples and Ariela Biani of the Mario Negri Research Institute. The direction in which we are going, which we also see with the PNRR, is one of distributed resources, serving the broader scientific community, as with Human Technopole. So, it is not only about creating infrastructure for individual local realities, but more importantly, also in view of the sometimes substantial costs, about providing support for multiple scientific communities. There is also a desire at the European level to share not only scientific equipment but also publications, data and software codes.

### **A further point is the one of assessment**

This is a very difficult topic. I do not intend to discuss numerology, the usefulness of tools such as bibliometric indicators or semi-automatic indicators, which are unavoidable when large amounts of data must be considered. However, here too, we need to take into account the significant specificities and variability in the various scientific fields. Unfortunately, the use of these tools for assessment sometimes generates a great deal of adapting oneself to the rules: once one understands what rules one needs to be followed in order to have a positive assessment one complies with them, but this compliance is not always positive, sometimes it is just a pretext. To reiterate, I do not deny the importance and usefulness of certain tools, but there needs to be some sort of clearing house that prevents abuse and takes into account particular specific situations, not delegating all responsibility for decisions to automatisms. Moreover, errors in the current assessment system objectively exist. Let me give a trivial example: the case of monographs. In the current system, a monograph counts as an article, but anyone working in a field such as mine, or in many others such as the humanities, knows well that writing a book is often quite a different undertaking from writing an article. And yet the two products are considered to be equivalent, and this may lead a young author to break down a five-chapter monograph into, let's say, five separate articles, which are worth far more for assessment purposes. These distortions generate losses of value in the country's scientific and cultural output.

### **How do you see the future of research in Italy?**

This is a difficult question. I continue to believe that research in Italy has enormous potential, and not only because I look at it from a privileged perspective, as director of the Scuola Normale Superiore, where I meet very many brilliant researchers. Our education system, including pre-university education, continues to function well, and the research system, in universities and institutions, is full of leading-edge work: we have all the potential. What we continue to face is a terrible deficit at the level of internationalisation. Let me give you one of the simplest examples: even today, to have a university degree obtained abroad, even in countries we consider advanced, recognised in Italy is a very difficult undertaking, which can even require long and complex ministerial steps. It's as if we have qualms about or antibodies to internationalisation, which we must absolutely fight, because this is one of the most important things holding us back. We need to overcome the excessive

bureaucracy in favour of greater transparency, simplification and accountability. If we want to acquire human capital, if we want our Research System to become truly internationally competitive, we must overcome this introspective approach we have.