More than beef and tango

An interview with Lino Barañao, the Minister of Science, Technology and Productive Innovation in Argentina

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EMBO reports (ER): Could you tell us how, after a long and distinguished career as a research scientist, you became involved in politics and eventually became Minister of Science for Argentina?

Lino Barañao (LB): In 2007, I met the then candidate for President, Cristina Fernández de Kirchner, at a meeting at the Argentinian consulate in New York. I had the opportunity to express my ideas about what had to be done for science in Argentina, and after she won the election she decided to create a ministry and appoint me as the first Minister of Science.

ER: Argentina had not previously had a dedicated Ministry for Science, Technology and Productive Innovation. Do you think that the President’s decision was based on the conversation you had back in 2007?

LB: She related a story about her visiting a lab where she was able to see the nucleus of a cell under a microscope. I said, “OK, if a potential presidential candidate is able to identify the nucleus of a cell, something’s going to change in Argentina.”

But the decision was prompted by the contributions of all the Argentinian scientists who she met at the consulate because they were all relating to her the importance of science and technology and the need for investment. I was appointed to the federal ministry, and as my son said: “For a while you will be the best Minister of Science that we’ve ever had in Argentina!”

ER: In most countries, the political process usually involves parties switching power every 5 or 10 years. Are you concerned that the next Minister or the next government is going to undo everything, because they’ll just be the other party? How can you guard against that?

LB: It’s always a risk: look at Spain where they had a Ministry of Science, and they dismantled it because of the economic crisis. One thing that provides some optimism is that the opposition supports the Ministry of Science. One possibility is that they maintain the Ministry of Science but they don’t support it with the proper budget. This is the important aspect with the present government under President Kirchner: they not only said that science is important, but they also increased the budget seven-fold and they were able to maintain that support over the years.

ER: Given that you mentioned Spain, in some countries funding for research is decentralized into the Health Ministry, the Agriculture Ministry, the Environmental Ministry, and the Industry Ministry, so there’s no coherence. Can you comment on that issue?

LB: It’s really important to have a dedicated Ministry. We have the CONICET [National Council of Scientific and Technical Research], the National Institute of Agriculture and Technology, the National Atomic Commission. They have their own budgets, but mainly to pay salaries, but you are indirectly funding small grants. The big research grants are provided by our agency. We can offer up to 7 million [US] dollars under the condition that such projects have to be proposed by a consortia, so we have the possibility of inducing some coherence in the proposals. You can direct science policy through funding, and you don’t have to worry about salaries in other institutions. The only thing we do is to look at the projects, look at the quality and the potential economic impact.

ER: So you’re not funding group leader salaries, but you are indirectly funding post-docs, PhD students and technicians?

LB: The group leader salaries are funded by CONICET. We provide funding through competitive grants, based on national priorities. We have a list of national priorities to effectively couple the accumulation of knowledge and the accumulation of wealth with solutions to social problems.

ER: Is there a danger that if we’re too eager to dress up science as providing short-term economic benefits, whereas in fact the benefits will really be in the very long term, scientists set expectations that research can’t really fulfill.

LB: Fortunately we have success cases: we have patents that are worth thousands or millions of dollars. One of our researchers isolated a gene from sunflower that decreases abiotic stress in different crops, and, according to some estimation, that might increase global productivity in several crops by about 20 billion dollars per
year. In the case of biomedical research we also have some patents that are being negotiated with big pharma companies. So we calculated that the revenues from a single patent can compensate for 10 years investment into basic research.

ER: But you have to put a lot of investment in to get that one big result.

LB: The essential thing is to maintain funding. It’s not only the amount, it’s the stability. Many researchers who publish in Nature, Science and Cell also produce valuable patents, so there’s no contradiction between basic science and application. More than 40% of the patents that were obtained by the National Research Council were based on basic science. But in order to be able to harvest that, you have to induce a cultural change; you have to make sure that the researchers know the potential economic value of what they have found, and they have to tell the IP officer that they have something valuable, and we provide money for the professional handling of patents.

ER: This is a rate-limiting step for the whole process. How do you make sure that it works efficiently?

LB: We have a centralized service, and they handle only the most valuable patents. Because we provided their funding, we have a special clause that obligates researchers to come to this centralized office for the initial review for the patent. If we’re not interested, they’ll be able to follow another path. What we have learned is that you need highly specialised people, because you have to negotiate with companies like Monsanto, Glaxo, Sanofi.

ER: Presumably you need a combination of skills in law, business and front-line science, and that combination of skills is very hard to find?

LB: Some of the scientists we’ve attracted back from abroad have been trained appropriately. They work in the central unit together with highly skilled professionals.

ER: Do you think that scientific research in emerging countries, or in countries that are trying to ‘catch up’ with developed countries, should be more tailored toward applied research, before they start investing in basic research?

LB: That’s one thing we do. But if you look at the core of our funding, almost 90% is devoted to basic research. If you look at the real numbers, only 5% of the researchers are doing applied or technologically oriented research. The things that we publicize are those that are more applied, for political reasons.

I’m a fan of Louis Pasteur, who said that “chance only favors the prepared mind”. If you look at the history of science, some of the most interesting theoretical problems arise from the attempt to solve a practical problem. When Maxwell devised his equations describing electromagnetic fields, he wasn’t motivated by curiosity; he wanted to solve a problem. He had to run a cable from England to the USA, and something weird was happening there. The same thing happened with Pasteur. He tried to understand problems with the conservation of wine and the transmission of diseases, and in the process he discovered microorganisms.

ER: And then turned his knowledge into technology, with pasteurization and fermentation.

LB: Yes, and he claimed a patent, and he was able to convince Napoleon III that it was worth investing in science because he could demonstrate revenues from the vaccines that he developed. He was a scientist-entrepreneur, which is why the academics of the time hated him so much.

ER: How much public support do you have in Argentina for investing into science, given that Argentina has experienced a severe financial crisis and is still struggling with the aftermath?

LB: In the last 10 years, we’ve increased our budget steadily by almost 10% a year. We still have a rather low percentage in terms
of the GDP: it’s 0.65% and 75% of that is provided by the government.

ER: I think that’s comparable with Spain.

LB: I think it’s a bit higher than Spain. So far I haven’t experienced any limitation in any project due to lack of funding. If I had a new idea I would go to the President and say: “OK, I need 20 million dollars for this particular project.” And she would say: “OK,” and ask the chief of the cabinet, and we would get the money.

ER: So your whole project is driven by the support that you’re getting from the President. How does the rest of the political establishment handle that?

LB: The good thing is that we always highlight some achievements in the press: we launched the second nano satellite last week, which was built by a private company with the participation of students from many universities. Then we announced the sequencing of the genomes of three kids that were affected by a strange disease. One really important aspect was that we moved into a new building in a neglected area of the city—so people know that there’s a new ministry and that something different is going on here.

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ER: And that you are working for the future.

LB: You need to develop biotechnology and pharmaceutical products, but that takes time. We are interested in publishing such success stories because you need results in the short term. I’ve been lucky that some of these projects were a success to show, every once in a while, how one solved a particular problem, or someone got a prize, or they were able to publish an article in a prestigious journal; the marketing side is very important.

ER: So you don’t feel under constant pressure from the Ministry of Education or the Ministry of Health, for example?

LB: No. Our budget is run separately.

ER: How difficult do Argentinian scientists find it to get published in the top journals?

LB: If you look at the figures, if you compare 2012 with 2002, the number of articles published in the top journals, Science, Nature, Cell, have multiplied by seven. Not collaborations; pure Argentinian papers. Of course it’s important for the researchers. But for me it’s really important to show that research produced in Argentina appears in top journals, because that changes the image that we have as a beef-producing, soybean-producing country. If we show that we have top scientists like Juan Maldacena, it contributes to portraying Argentina as a different country. Something more than beef and tango.

ER: Do you provide guidance or support to people to help them publish in high-profile journals?

LB: Three years ago we introduced a new type of funding for established researchers, similar to the long-term large grants provided in the UK. Some of my colleagues would come to my office and say: “I have this idea I want to test, but I need more money and more time.” So we provide more money and more time and we invite foreign reviewers. I sat at a table with them and said: “Don’t look at the CV, look at the ideas and projects. If the title of the project is ‘Study of the possible factors affecting...’ we don’t want that. We need someone who comes up with a new idea.” We don’t need to ask every scientist to publish two or three papers per year in order to maintain their positions. They have tenure here. Their salaries are paid. So why don’t we say, “let’s try to do something completely different”?

ER: So there isn’t a traditionalist culture that regards the number of papers that someone has published as the most important thing?

LB: Here, we don’t weigh papers. We do pay attention to the h-index—which was created by an Argentinian by the way. The reviewers know that the citation index is important, your trajectory is important, the number of graduate students you have trained. Another thing that we introduced last year is an evaluation form for researchers. They decide to devote 70% of their time to basic research and 30% to be an advisor of a company or work with a particular social group. Then we have two separate evaluations. One would consider your publications and the other would look at what have you done for this company or how did you help this particular community. The outcome integrates both contributions.

We also value communication of science to promote science. We have created a national programme for the popularization of science. We have a digital TV channel run by our ministry, showing not only documentary films, but also trying to compensate for the TV show Big Bang Theory, which causes everybody to think that a scientist is a nerd. Otherwise we won’t have any youngsters interested in science. One of our scientists wrote a movie script, which was broadcast to 2.5 million people. How many scientists do you have whose paper has been read by 2.5 million people?

We also have a big science fair called Tecnópolis, which runs for 3 months with different exhibitions. The original idea is that the exhibition guides are science students; we pay them a stipend for food and clothing. They can empathize with youngsters better than an established scientist with grey hair discussing the importance of what they have found. Because university is free here, taxpayers should get something in return. The students have an obligation or responsibility to explain what they’re doing.

“We live in a global world, and science has a common language. We have to use this, to communicate with each other independent of geography.”

ER: How do you address the problem of training and attracting enough scientists to catch up with the growing demand?

LB: We have increased the permanent positions at CONICET by 10% per year since 2003. We also increased the number of fellowships available to graduate students. We also want to provide them with other job opportunities, aside from academia. The best ones will probably work in research, but we want to show that a PhD graduate is someone who should be able to process information and discover answers to particular problems. That type of skill is useful in
every aspect, not only research. We have a particular fellowship that allows PhD students to work for 2 years in a private company, and we pay the full salary.

ER: Are you trying also to promote the idea of people going abroad and coming back? On the one hand you’re gaining a lot by sending people to top labs, but on the other hand there’s a danger that you’re going to lose them permanently if you don’t have some mechanism for attracting them back.

LB: We have a program called RAICES. It means roots, but it’s the acronym for a network of Argentinian scientists working abroad. We have a database of all Argentinian scientists; they receive a newsletter once a week and we have a program for repatriation. When a university, public institution or a company wants someone who has worked abroad, they fill out the application—not the individual scientist—and we find a candidate. If the university doesn’t have the budget for a permanent position, we provide them with money. We promote this instrument for new universities, and universities that are not located in the main cities. It’s a very successful program; we employed scientist number 1,030 last month.

What we do now is instead of paying for post-doctoral training for 2 or 3 years, we provide sandwich fellowships to spend 6 months abroad and then come back. It’s less likely that students remain in the other country and they promote local research activity once they come back. We think it’s very important for students to have some experience abroad, but they should focus on the local problems.

ER: What about attracting foreign researchers to Argentina?

LB: I think that we have been really successful in improving Argentinian science when we start to have more applications from foreigners to work in Argentina. Right now we’re creating a Latin-American center for interdisciplinary research. We’ve devoted space in two new buildings at the Buenos Aires University campus for people to come to Argentina to work on a particular project. We offer lab space, offices, secretary/assistant support. We have the I4, the International Institute For Interdisciplinary Innovation. They have partners at the Max Planck Society, the ICGB in Trieste, the CNRS in France; we have a partnership with a consortia of four Italian universities on industrial design. We offer an environment where researchers can work on different problems, and the way to promote interaction between disciplines is that we have only one restaurant so they have to sit together and start talking to each other. And that restaurant is open also to the public. But we also have visa problems: American scientists have to come here and every month they have to go to Uruguay to renew their visa.

ER: We’re struggling with a lot of those same issues in Europe. It’s somehow quite difficult to attract foreign scientists because they think they’re going to struggle with the language. Another issue is that at the age that we ideally want to recruit group leader level foreign scientists, they usually have a family, they’ve bought a house, so they have all those baggage issues. Do you have a dedicated agency to handle those mobility issues?

LB: We offer some support, in terms of providing travel expenses and a special line at the immigration office to handle any problems a foreign scientist might have. We have the possibility of providing salaries for foreign scientists from the National Research Council. But still, we don’t have more than five or ten foreign scientists working here, so we want to increase that number. The rest of the issues are difficult here. For someone who’s speaking only English it might be tough, except in some cities.

ER: What do you think that European countries and European research can contribute to your project to create a sound basis for science in Argentina?

LB: For us, this interaction with Europe is very important. We have a great success rate in participating in the Framework programmes. We have very close contacts with many countries and with the EU as a whole. I think there’s a huge potential for mutual aid. The Commissioner of Research asked me to go to Brussels to relate our experience in communicating science, how to promote vocations in youngsters. And it’s good that we can provide advice or useful experience, because most of our science comes from Europe. We live in a global world, and science has a common language. We have to use this, to communicate with each other independent of geography. Scientists from Japan and scientists from Argentina have more things in common than the Japanese with their closest neighbor. It’s the equivalent of the societies of old times, which would communicate with each other independent of the local political authorities. Scientists are almost like a secret society. I would like to make good use of that.

ER: As long as we maintain the communication to the wider society, to draw them into those contacts.

LB: That’s the challenge: to show that science is probably the most beautiful tool to deal with reality. It’s very important. Because something that worries me is this increase in fundamentalism. We’re going back to the Middle Ages. So science has to have a strong position on that, because that’s very dangerous.

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ER: What are you going to do next in life? Are you going to be a minister of science as long as you feel you can be useful, or as long as the president and the people who ultimately elect her think you can be useful?

LB: Well, I don’t think I will be back in the lab, although I still have my lab. But I think that once you feel the rewards of supporting a particular project and seeing the results, I will try to keep doing that.

I cannot be a minister forever, because there will be a change in government, probably. And I hope someone will take my position, because it would be a sad thing if no one was interested in doing what I’m doing now. But when I think about the long term, I think that I will be doing projects dealing with social inclusion. When you travel across the country, you see so many communities that need some help, not only in terms of information and funding. So when you’re able to organize them, provide information and money and see the results of that, that people for the first time have the feeling of dignity, it’s kind of addictive.

ER: Dr Barañao, thank you for the interview.