

Here is a view from the coal-face – of what could be done to unlock our creative potential and enable Finland to claim its rightful place as a major global innovator.

Innovation is absolutely dependent on the pipeline of discovery from fundamental science. This cannot be programmed, and the success rate is inherently low. A small country like Finland must put the largest possible effort into that pipeline of discovery, otherwise there will almost certainly be nothing at all worth developing. Just churning out products based on other people's ideas has only a limited value: countries that go down this road end up as low-skill, low-income backwaters.

So my first message is: concentrate state resources on fundamental science and let the private sector take the lead further down the line. However, bridging the 'valley of death', the steps between robust scientific data and actual capitalization, also requires active measures to facilitate collaboration between these actors. One route that I hope to pioneer is to create a biotech innovation centre, funded by a major sponsor. It will offer a career time-out of several years to academic scientists, to develop a single promising idea arising from their research. During the time-out period the centre would supply 100% of their salary and project-costs, whilst relying on research infrastructure and facilities provided by the university partner.

A strict focus on excellence is the key to successful, publicly funded science, as practiced by all the world's top universities and the national funders that support them. Finland has taken steps to implement the excellence principle, but it is now time to sweep away the remaining non-transparent 'strategic', political or regional imperatives that can undermine trust and waste resources. Funding is limited so we should fund the best and forget the rest. It's the raw material of innovation.

Internationalization as a goal is widely accepted. But bold declarative statements mean little unless matched by practical actions. We have to create a viable environment for foreign experts to move here and integrate, to enable Finnish scholars to spend time abroad at crucial career stages, and to embed scientists from Finland into the global communities where they can have maximum impact, allowing Finland to 'punch above its weight'. Radical initiatives are needed. Here are a few:

- promote English language via universal bilingual (immersion) education. This is a prerequisite for Finns to compete globally on an equal footing in all sectors, not just science. At the same time, strengthen the place of Finnish language, culture, history and values in education at all levels, and make it compulsory for all Erasmus students.
- professionalize and streamline university education, embracing the Bologna system and the Anglo-Saxon model of 'two fails and you're out', plus peer-review of teaching and examination, and strictly time-limited degrees. Our doctoral graduates are of high quality, but they are mostly way too old to be properly mobile, because of all that comes before they even start doctoral study. PhD research should begin maximally four years after high-school.
- raise academic salaries so as to meet international standards after correction for real purchasing power. The current situation is a major barrier to recruitment.
- facilitate the integration of Finnish scientists into cognate international research teams e.g. through minisabbaticals, joint colloquia, student exchanges, joint projects and so on. This can enable us to create huge added value by sharing the best research resources and accessing the most vigorous partner networks for innovation.

Overall, Finland has immense potential for technological leadership. We have the basic natural resources, educated workforce and traditions of social responsibility that are the bedrock of such a leap to the future. But to capitalize on all this needs structural constraints to be fixed, to make Finland's 2<sup>nd</sup> century of innovation even greater than the first.