

view from the top marja makarow

Technology with a human face

Research and new technologies can provide solutions to global grand challenges such as emerging infectious disease, climate change and the availability of sustainable energy sources. However, it is not enough anymore to find the technological solutions. Their usefulness and cost, as well as the implications of their adoption, must be explained in terms that political decision makers and society at large can understand.

The Intergovernmental Panel on Climate Change is an encouraging example of how research data can be disseminated in a way that activates policy makers and individual citizens to strive to manage the problem. A contrary example is that of biofuels. A number of governments hurried to invest in the harvesting of biofuels without taking into account the implications of that investment and without scientific advice. As a result, several poor regions are facing a crisis, as growing biofuels has replaced agricultural food production.

The Millennium Technology Prize, established and financed jointly by the Finnish government and industry, aims to narrow the gap between technology providers and society. An invention is worthy of the prize if it not only provides a viable ground-breaking technology that changes the world, but also increases the quality of life of humankind according to the principles of sustainable development.

The first prize, in 2004, went to Tim Berners-Lee for the invention of the world-wide-web, a completely new way to communicate both globally and between individuals. The web enhances the spreading and development of democracy by providing access to information and knowledge.

The second prize, in 2006, was awarded to Shuji Nakamura for the invention of light emitting diodes. LEDs are revolutionary new light sources, consuming 10 times less energy than traditional ones. With a solar panel, LEDs can provide lighting in regions where no electricity is available.

The prize's International Selection Panel is currently trying to identify the third winner or winners of the award, to be announced early next month. This time, for the first time, we drew up a short list to consider—four inventions that best fulfil the criteria, from 66 nominations from prestigious universities, research organisations and industry worldwide. It's proving to be a tough job.

There's the team of

Emmanuel Desurvire (France), David Payne (UK) and Randy Giles (US), who invented an amplifier that enables high-capacity and long-distance transfer of digital information via optical fibres. Then there's Alec Jeffreys (UK), who developed the DNA fingerprinting technique, used to identify family members, victims of catastrophes, and individuals in immigration issues and court cases. Robert Langer (US) made the shortlist for his development of new biomaterials for controlled drug release that have saved and improved the lives of millions of patients. Andrew Viterbi (US) completes the quartet for his creation of the Viterbi Algorithm, which is a key element in wireless communications systems, notably digital mobile telephony, and touches lives everywhere.

The winner will receive 800,000 euros and the three other finalists 115,000 euros each, awarded in Helsinki by the Finnish Academy of Technology, under the patronage of Tarja Halonen, the President of Finland.

As a member of the 2006 panel and chairwoman of the current one, it's clear to me that most of the ground-breaking inventions that I've seen have not only generated successful businesses but were sparked by research at a fundamental level. The inventors were and are engaged in top-class basic research, and have worked in the capacity of individual investigators, not as members of targeted application-driven research programmes. The researchers are exceptional individuals, who not only made discoveries at the frontiers of their fields but also had the talent to foresee what their research could be used for. The applications they have developed have not sidetracked them from fundamental research, but research and development are being performed in parallel.

Several governments and research funding organisations in Europe and globally are trying to find new ways for collaboration between academic and corporate research, to identify research areas for targeted funding, and to measure impact of R&D investments on their societies. While these tools are being developed, the decision makers should ensure adequate funding for fundamental investigator-driven frontier research, which finds its own research themes and pathways. The combination of supporting bottom-up individual creativity and wise top-down design of funding instruments is the fastest driver of knowledge-based economies, where science fertilises cultural, societal and economic development of the societies.

More to say? Email comment@ResearchResearch.com

Marja Makarow, chief executive of the European Science Foundation, is chairwoman of the International Selection Panel of the Millennium Technology Prize, which is due to be awarded in Helsinki on 11 June.

'Most of the ground-breaking inventions that I've seen have not only generated successful businesses but were sparked by research at a fundamental level.'

Marja Makarow