



Closing the gap

Information and communication technology is making Europe a dynamic and competitive knowledge-based economy

Viviane Reding, EU Commissioner for Information Society and Media

The ultimate driving force of research is the search for new knowledge. In Europe, like all of its main trading partners, research is essential for long term competitiveness, economic growth and sustainable development.

The building of a knowledge-based society, as proposed by the Lisbon strategy, requires investments in the Information and Communication

Technology (ICT) sector. Not only this but the interface between the research community and industry, whether big or small, needs to be strengthened and the process of transferring knowledge from academia to industry must become more efficient.

This process will be supported by "technology platforms" which will

bring the main stakeholders together to devise and implement common strategies around key technologies.

Developing partnerships between universities and industries in the area of ICT has a significant role to play in progressing this agenda as Mrs Viviane Reding, the EU Commissioner for Information Society and Media, emphasises in this article.

I am very pleased to have this opportunity to present my views of the ICTs (Information and communication technology) sector and the role of universities in highlighting R&D in this crucial area.

The Lisbon strategy

Today the Lisbon strategy is at the heart of the European agenda. Just to remind you, in 2000 the European Council adopted this strategy to make Europe “the most dynamic and competitive knowledge-based economy in the world” by 2010. The objective is to strengthen the European model of society, which is based on high-quality education and sustainable growth, leading to more and better jobs as well as to the promotion of social cohesion and the protection of the environment.

Five years later, the strategy is being reviewed. From my position I can affirm that the EU has made great progress in some areas, but the final objective has not yet been achieved. In these five years we have faced some big challenges including: an economic downturn, threats to security, threats to the environment, demographic changes, the emergence of strong competitors from abroad – in particular from the Far East – and last but not least the enlargement of the EU.

This mid-term review urges EU member states and European institutions to revitalize the strategy. Competitiveness and economic growth are top priorities for the Commission and its President, José Manuel Barroso, as well as for the EU’s Luxemburg Presidency. One of the key recommendations is the realization of the “knowledge society”, which can only be done if we boost our capacity for innovation in industry and business by exploiting our creative potential and the new knowledge made accessible by research.

In the following sections, I will explore the European achievements and shortcomings in the areas of higher education, research investment and innovation and suggest some strategies for the future.

Higher education

Success will come with the development of the necessary skills to apply ICTs productively throughout the econ-

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omy. Good quality higher education is the basis of innovation. It is fundamental to promote research and spread know-how widely in our society.

A “knowledge society” can be realized if we boost our capacity for innovation in industry and business by exploiting our creative potential and the new knowledge made accessible by research.

If we compare the situation in Europe to that in US and Japan, investment in this area is still inadequate. The EU invests 1.1% of its GDP in higher education, far less than that of the US with 2.3%. We are also lagging behind in the number of researchers per 1,000 employees, 6 in Europe compared to 8 in the US and 9 in Japan. These figures can be partly explained by the low level of private investment in human capital. The EU invests about a third less than the US in R&D and 80% of the gap is due to underinvestment in ICTs from the private sector.

Universities have an important role in creating and spreading knowledge and must be prepared to establish

closer co-operation with industries and enterprises, while at the same time preserving their roles of education and generation of new knowledge.

European basic research is mostly done in universities. The high economic risk involved in conducting research in areas of increasing complexity, which often demand an interdisciplinary approach, is sometimes an obstacle for the private sector. Its importance, however, is now widely recognised. Even when it is carried out with the main objective of increasing knowledge without any direct link to possible applications, it often paves the way for totally unforeseen advances. High-quality basic research has a strong effect on economic competitiveness, growth and, more generally, on the well-being of society as a whole.

At a European level, we strive to enhance the quality and reinforce the European dimension of higher education by encouraging trans-national co-operation between universities through the ERASMUS programme. In addition, we have launched the “Marie Curie Actions” to support the training, mobility and careers of researchers. These actions are open to researchers in all scientific fields not only from EU member states, but also from third countries. The Marie-Curie Actions encourage the development and transfer of research skills, the widening of researchers' career prospects and the promotion of excellence in European research. These programmes take full advantage of our cultural diversity, which is essential to the long-term success of our model of society.

Research investment

Europe invests on average only 2% of GDP in research as against 2.8% in the US and 3% in Japan. However some countries in Europe, like Sweden, already do much better than that. ICTs research spending accounts for over 30% of the total R&D budget in all major OECD countries, but in Europe, the figure is only 20%. At Union level, the current framework programme (financial support programme to which all the Member States contribute) amounts to more than €4 billion annually. The Commission has requested a doubling of the budget for the next framework programme. In addition, this overall

increase must be accompanied by an equivalent rise in the share of research in ICTs.

But increasing the budget is simply not enough! We must improve the management of the whole R&D cycle, from basic research to the transfer of results. I am personally convinced that we need to become more efficient in managing research at national and EU level. We must remove bureaucratic obstacles and accept the risks inherent in research.

Innovation

In the end, these changes should spread research results wider, broaden their take-up and promote innovation, which is the key to competitiveness. The creation of more and better jobs can only be achieved by productivity growth, which in turn relies on creativity and innovation. In fact, most current business processes, new functions and new products are based on new or improved ICTs. About half of the productivity gains in EU economies between 1995 and 2000 are explained by the influence of ICTs on products, services, working methods and improvements in overall organisation.

Moreover, this capacity for innovation in high-tech sectors has a knock-on effect on the less technology-driven

sectors. ICTs are enabling technologies and almost any area of our everyday life is or will be affected by them, and some will depend heavily on them.

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systems and mobile communications. And we have a strong industrial base in areas like automobile, aeronautics, consumer electronics and electrical equipment, and telecommunications. But perhaps what is most important is that a true and inclusive knowledge-based society means citizens must be

placed at the centre of technological advances. How should ICT-based systems evolve to meet society's growing needs? Only by understanding these needs can improvements benefit society as a whole.

Strategies for the future

Europe is in a good position to thrive in the global arena, because it has all the basic ingredients for success: high-quality education, an enormous potential for creativity, a good scientific and technical base, a strong industry that leads the world in many domains and world-class infrastructures. However the right level of public and private investment is still missing:

- Europe needs to stimulate the transfer of knowledge from academia to industry and make this process more efficient. To do that we need to explore new cooperation models between universities and enterprises.
- The creation of "science villages" in the neighbourhood of universities could be one way of achieving a larger interface between the research community and innovative businesses that can turn good ideas into European products and services.
- We have to stay open to the rest of the world and cooperate with third countries for the benefit of all parties.
- Careers in research and education must be made attractive, not only





for those within in the Union but also for those outside the Union, to promote the sharing of experience and expertise.

The Commission wants to explore innovative approaches for private-public partnerships. In this context “technology platforms” bringing together all key actors in specific strategic domains – industry, small businesses, universities, research institutions and public authorities – are being set up. Their main objective is to define common strategic agendas and to coordinate the research efforts and initiatives across Europe in their own areas.

The strategic agendas of the technology platforms can help achieve the necessary investment in human capital and influence educational orientation and skill development.

Ultimately, these technology platforms should provide the necessary impetus to increase the joint public-private investment that will generate competitiveness and world leadership.

A good example is the ARTEMIS platform that has been setup, with the participation of ABB, in the area of

embedded electronic and software systems. Embedded systems have an increasing strategic and economic importance as they are already at the heart of most innovations in ICT. In 2003, there was an average of 8 billion processors worldwide, and this figure is expected to double by 2010, which means 3 per person worldwide. In the automotive industry, for example, electronics will make up an increasing share of a vehicle’s production costs, rising from 22% in 1997 to between 33 and 40% in 2010. Embedded ICTs are also becoming more and more common in everyday life, like programmable ovens, intelligent refrigerators and cars that keep to the speed limit. Europe needs to keep its lead, as the development of these sectors not only improves our economic strength but also our quality of life.

We have to be ambitious and make Europe a world centre of excellence in ICTs. It is only the EU as a whole that can pool sufficient resources to be able to offer a favourable environment for R&D investment in ICT, an environment that would stop the brain-drain and would moderate the shocks of de-localization and outsourcing.

In this fast-changing and increasingly interconnected world, Europe has the capability and the experience to collaborate across borders, and this will be the key for future breakthrough innovation. There is no time to waste; now is the time to make Europe not only the most dynamic and competitive knowledge-based economy in the world, but also the best place to work and live in.

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