Leading the way

EUREKA and its Information and Communications Technology (ICT) Clusters are making major contributions to the future of ICT in Europe. CATRENE, CELTIC, EURIPIDES and ITEA 2 have clear views on reinforcing roles and means for global European leadership in a domain that is crucial to the competitiveness of almost all industrial sectors as well as to the wellbeing of European citizens.

Europe needs micro-/nanoelectronics as a driving force and enabling technology, but intensified efforts are needed to exploit existing potential fully. To remain competitive globally, Europe must generate leading-edge technology at research centres of sufficient size and relevance to attain critical mass. This also requires the support of small flexible units – particularly small and medium-sized enterprises (SMEs) – in creating new ideas and applying them commercially.

The new CATRENE nanoelectronics Cluster is more than ready to take up these challenges, building on the success of the MEDEA+ microelectronics Cluster that ends in 2008. CATRENE intends to increase the interaction between applications and technology with a strong focus on markets with high-growth potential for innovation-rich goods and services.

CATRENE aims to ensure technological leadership for a competitive ICT industry by creating lead markets that include communications, security, transport and healthcare, as well as energy and environmental protection. "It is the ambition of Europe and European companies to deliver nanoelectronics solutions that respond to the needs of society at large, improving the economic prosperity of Europe and reinforcing the ability of its industry to be at the forefront of global competition. Close co-operation is foreseen with other EUREKA Clusters and with the ENIAC Joint Undertaking," says Enrico Villa, chairman of CATRENE.

Service innovation

Software is crucial in nearly all aspects of the economy and society. It will play an ever-increasing role as we move from a product-oriented to a service-oriented economy, according to Rudolph Haggenmüller, chairman of the ITEA 2 software and software-intensive systems Cluster: "For example, car manufacturers will no longer provide just vehicles but their main offering will gradually expand to full mobility services, with their income coming from these services." Service innovation is one of the great challenges in the global economy, which should be actively taken up by the European ICT research community.

"Research must support the competitiveness of the European economy and solve societal needs," insists Haggenmüller. "At the societal level, sustainability is a major challenge to which ICT research has to react. One trend is the move from enterprise to 'societal' computing – in addition to enterprise resource management systems, we will need resource management at the societal level, for example supporting more effective distribution of power and water."

To keep Europe ahead in the global market, the establishment of ecosystems involving large companies, SMEs and academia is essential. Public investment in research is an important instrument to support this. "It is interesting to see how the co-existence of old and new infrastructures expands these

to a competitive future

ecosystems – such as EUREKA Clusters with Competitiveness Centres and EU JUs," says Haggenmüller. "For example, ITEA works with all EUREKA Clusters and with ARTEMIS at EU level, as well as with the national 'Pôles de Competitivité' in Belgium, France, Germany, the Netherlands and Spain."

Overall, Haggenmüller believes that EUREKA Clusters play an indispensable role in European ICT research as they are very flexible, being both industrial and intergovernmental. "EUREKA's intergovernmental bottom-up approach allows a good project idea to attract funding from participating countries, even if it is not a priority for all of them," he says. "It is the only instrument in the software sector to enable this."

Smart devices and smart manufacture

"ICT in the form of systems, software and services is responsible for innovations in most fields," says Jean Luc Maté, chairman of the EURIPIDES smart devices Cluster. "Hardware and software integration is required in smart devices to deliver a complete system. However, while everyone thinks Europe is the leader in systems design and architecture, they all envisage manufacture in the Far East or other low cost region."

Priorities for research should be to break this paradigm by funding two or three projects that make people think differently about high-tech, low-cost production in Europe. "This could be achieved using heterogeneous technology to improve integration and cut costs dramatically," adds Maté. "However, it requires innovative, imaginative ways of manufacturing – also needing funding."

It is not only necessary to make breakthroughs to maintain employment in Europe but also to synchronise research investment for both low-volume, high-tech strategic devices such as for aerospace and defence, and mass volume, high-tech low-cost products for communications, multimedia, automotive, etc. This is the challenge EURIPIDES faces for the next generation of smart systems.

Research is transforming money into ideas; innovation is transforming those ideas into money thanks to markets, points out Maté. "EURIPIDES – following the bottom-up EUREKA process – is a booster to innovation. It takes the elements on the research shelf and makes them faster to generate market opportunities as a market-focused and industry-driven Cluster. Moreover, we can mobilise very small enterprises in all European countries to help accelerate this process."

Catching up with the USA and Asia

Europe still lags behind the USA and Asia in telecommunications, according to Heinz Brüggemann, office director of the CELTIC telecommunications Cluster: "If the industry is not supported here as in the USA, Korea and Japan, it will be difficult to catch up. We must close the gap – something CELTIC has already started to achieve."

Brüggemann regards the future Internet as a big challenge that offers major opportunities for Europe. "Telecommunications networks are key and will long remain so in the Internet business," he believes. Nearly all elements related to the future Internet are already part of CELTIC's work plans, including large-scale projects such as 100GET, which develops new Ethernet-based networking concepts and technologies. CELTIC also takes into account the strategic research agendas of related European technology platforms.

"It will be crucial for the success of future Internet and for assuring broad user acceptance that the existing networks and technologies are combined in a way that the complexity of the systems will remain manageable, safe and user-oriented," Brüggemann points out. "With so many actors involved, we need to take a pragmatic approach, improving existing networks gradually. EU framework programmes and national research programmes tend to take a top-down view. We are closer to the market and our work plans are broader. Our roadmap is more pragmatic, with lots of open doors."

Moreover, CELTIC has the most important telecommunications vendors and operators on board, and they play an active role in the research programme. The Cluster not only focuses on telecommunications elements, but also on the full system from end-to-end.

Aiming high for the future Internet

The CELTIC Broadband Access Networks Integrated Telecommunication Systems (BANITS) project, winner of the CELTIC excellence prize in 2007, obtained major increases in bandwidth across existing copper-based telecommunications networks. BANITS-2, which finishes this year, focused on xDSL to boost bandwidth even further, with speeds of 500 MB/s over a single copper pair, and up to 100 GB/s over multiple copper pairs. The objective is to ensure a solid foundation for high bandwidth Internet services – particularly in rural areas, where speeds are lagging far behind cities. High speed applications are an important element. The Medirob is a medical robot allowing heart examinations at rural sites and transmitting the high bandwidth data to hospitals in distant cities. Its use will be demonstrated at the EUREKA stand at the ICT 2008 event in Lyon in November. Other applications include high-definition TV (HDTV) distribution.

www.celtic-initiative.org/Projects/BANITS-2/