Digital Single Market

Projects story15 May 2012

Cyprus: from sun and tourism to science and technology

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According to the European Commission's Innovation Scoreboard, Cyprus is an 'innovation follower,' alongside countries such as France and the United Kingdom, with a level of innovation performance on a par with the EU-27 average. That is no small achievement for a country of less than one million people which joined the European Union in 2004 and developed its first real research system following the establishment of the University of Cyprus in 1992.

'Cyprus has made notable progress in building a research system and in creating a vision for its development towards a knowledge based economy, not least through its commitment to the public funding of R&D,' a peer review in 2009 by the EU's European Research Area (ERA) notes.

EU membership has undoubtedly had a big impact on science in Cyprus, giving access to EU funding and cross-border projects that have helped Cypriot researchers carry out groundbreaking work in fields as diverse as healthcare, sensor technology and the environment.

The Join-MED [2] (1) project is a clear example of an EU-backed multi-country initiative providing big benefits to researchers in participating countries.

The Cyprus-based Research & Consultancy Institute (RCI) participated in the project, which worked to establish a sustainable network of ICT research organisations in Europe and Mediterranean Partner Countries (MPCs) in North Africa and the Middle East. The goal, aided by the deployment of a web

directory and a series of networking events, is to reinforce research cooperation in this field between the north and south sides of the Mediterranean, building enduring links that remain long after the formal end of the project last year.

At home too, the Cypriot scientific community's progress has been widely recognised, not least by Demetris Christofias, president of the Republic of Cyprus: 'In a modern and full of challenges international environment, small Cyprus, also as a member of the wider family of European states, is called to keep pace with and to pursue and achieve its ambitious goals in the field of research and innovation. The establishment and operation of universities, both public and private, as well as research centres in Cyprus has contributed to the development of research activity, which results in the production of pioneering research with innovative content.'

'Important scientific achievements of Cypriot scientists are often prized, published in international magazines of high prestige and receive great acknowledgement from the international scientific community,' the president noted.

Technology for health

One such achievement made headlines last year. In a study published in the Nature Medicine journal, Cypriot researchers announced that they have developed a simple blood test for women to predict whether their babies are likely to have Down's Syndrome, avoiding the need for risky, invasive procedures.

Philippos Patsalis, medical director of the Cyprus Institute of Neurology and Genetics, who led the study, said the technique could lead to changes in clinical practice within two years, following larger trials of the innovative test.

Another Cypriot research team from AAI Scientific Cultural Services are working on diagnosis and monitoring tools for another serious disorder, affecting more than 50 million people worldwide: epilepsy. The disorder, which causes serious recurring seizures, provokes a wide variety of motor, cognitive, affective and autonomic symptoms as well as associated changes in the electrical activity of the brain, heart, muscles and skin.

By using state-of-the-art technologies to monitor these changes and communicate them to doctors, researchers working in the ARMOR [3] (2) project are developing a system that will provide real-time, accurate and continuous brain and body multi-parametric data measurements, suited to the patient's medical condition and normal environment, with the aim of greatly improving current diagnostic techniques.

'The project offers a way of crowning a decade-long research that used some of the most advanced neuroimaging devices in Germany and Japan, and their ongoing work at the UoP and Cyprus,' noted Prof. Andreas Ioannides, who is leading the Cypriot participation, and George Kostopoulos from the University of Patras (UoP), another ARMOR partner, at the project's kick-off meeting last year.

In the field of ICT for biomedicine, researchers at the University of Cyprus are making a contribution to the GRANATUM [4] (3) project. The initiative, which involves eight partners from five EU countries, aims to bridge the information, knowledge and collaboration gap among biomedical researchers in Europe working on chemoprevention techniques for different forms of cancer.

The project will help ensure biomedical researchers have homogenised, integrated access to the globally available information and data resources needed to perform complex cancer chemoprevention experiments and conduct studies on large-scale datasets; it will also facilitate

cooperation between them through social sharing and semantic analysis of information.

The University of Cyprus' expertise and experience in medical data infrastructures is also aiding another project, Linked2Safety [5] (4), which aims to improve the safety of patients by giving healthcare providers and pharmaceutical companies efficient, homogenised access to medical information contained in electronic health records (EHRs) across Europe.

By using EHR data in this way - anonymised to protect patient privacy - healthcare professionals should gain a much better understanding of the risks of adverse events from medications or procedures affecting any individual patient through analysis of past cases and incidents.

While medical and healthcare-related ICT is undoubtedly one of the Cypriot research community's strong points, it is far from the only one. Green technology, renewable energy and energy efficiency are also the focus of several ongoing research initiatives in the country.

Cypriot company CNE Technology, for example, is coordinating the ENERGY WARDEN [6] (5) project with the aim of developing several products to optimise the implementation of renewable energy sources such as wind and solar in buildings. An innovative simulator and modelling tool will help architects, contractors and engineers design and retrofit buildings for maximum energy efficiency, with an intelligent controller system to automatically optimise the performance of renewable sources based on forecast weather conditions. In addition, the ENERGY WARDEN team is also developing tools to monitor building performance and compare it against EU and national energy efficiency standards and to support emission trading calculations. The products are to be tested in several pilot trials across Europe.

In the transport arena, CTL Cyprus Transport Logistics Limited is participating in another environmentally friendly project, REDUCTION [7] (6). The initiative aims to reduce CO2 emissions and energy use by using a range of innovative technologies to help companies and public transport authorities better manage multi-modal transport fleets. The REDUCTION system collects historic and real-time data about driver behaviour, routing information and emissions measurements. It then processes the data using advanced predictive analytics to enable fleets to enhance their current services, for example, by helping drivers drive in a more efficient manner and implementing eco-routing schemes that reduce overall mileage.

In other fields, Cypriot researchers are also breaking new ground.

The Cyprus University of Technology, for example, is working in the PHOSFOS [8] (7) project on a new range of innovative optical sensors integrated with opto-electronic and electronic circuitry in flexible and stretchable skin-like polymer films. The technology has promising applications in fields as diverse as aeronautics and aerospace, robotics, healthcare and the automotive sector.

Meanwhile, Sigint Solutions, a Cypriot technology company, is involved in the COGEU [9] (8) project, which seeks to take advantage of the transition from analogue to digital TV across Europe, developing technology that will use the newly freed up radio spectrum 'white space' for new applications such as cellular and WiMax services.

With such a range of innovative projects being undertaken by Cypriot research teams, it may not be long before the country goes from being an 'innovation follower' to an 'innovation leader'.

The projects featured in this article have been supported by the Seventh Framework Programme (FP7) for research.

(1) Join-MED: Establishing the EU-Mediterranean ICT research network
(2) ARMOR: Advanced multi-paRametric Monitoring and analysis for diagnosis and Optimal management of epilepsy and Related brain disorders
(3) GRANATUM: A Social Collaborative Working Space Semantically Interlinking Biomedical Researchers, Knowledge And Data For The Design And Execution Of In-Silico Models And Experiments In Cancer Chemoprevention
(4) Linked2Safety: A next-generation, secure linked data medical information space for semantically-interconnecting electronic health records and clinical trials systems advancing patients safety in clinical research
(5) ENERGY WARDEN: Design and real time energy sourcing decisions in buildings
(6) REDUCTION: Reducing Environmental Footprint based on Multi-Modal Fleet management System for Eco-Routing and Driver Behaviour Adaptation
(7) PHOSFOS: Photonic Skins For Optical Sensing
(8) COGEU: COgnitive radio systems for efficient sharing of TV white spaces in EUropean context.

- FP7 on CORDIS [10]
- Join-MED on CORDIS [11]
- ARMOR on CORDIS [12]
- GRANATUM on CORDIS [13]
- Linked2Safety on CORDIS [14]
- ENERGY WARDEN on CORDIS [15]
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