

SHORT REPORT TO NACI

SOUTH AFRICAN VISIT TO FINLAND TO REVIEW THE NATIONAL SYSTEM OF INNOVATION AND THE OULU REGION CENTER OF EXPERTISE

INTRODUCTION

The visit to various institutions in Helsinki and Oulu were initiated by DACST as a follow-up to the Ministerial visit in 2001. The group of 13 participants from various universities, science councils, innovation support mechanisms, the Department of Communications, DACST and NACI spent 4 days studying the "Oulu phenomenon".

The team attended presentations by a number of institutions including the Science and Technology Policy Council (closest equivalent to NACI), key institutions supporting the national system of innovation in Finland, government funding agencies, the University of Oulu and its research institutes, innovation incubators offering business development services and hi-tech operating environments, hi-tech companies and start-up companies and government agencies supporting innovation.

The "Oulu phenomenon" describes the development of this region of Northern Finland from a largely agricultural base in the 1980's to a hi-tech R&D base in the 1990's, servicing the communities of Northern Finland and enhancing the economic development of the region.

A coherent research and innovation agenda has developed over the last decade that fits well with the local needs of Finland (Information Society/Wellness Society) and with the global economy. The development of a high technology center at Oulu is focused on supporting sustainable rural and regional development.

The cohesion and coherence of the system of innovation is visible and demonstrates a clear flow of activity and understanding from developing the intellectual capital through developing the hi-tech products and services, commercialization and business development.

A detailed report is being prepared for DACST. The following is therefore an overview of the key observations from the 5-day visit.

CONTRIBUTION OF HIGHER EDUCATION TO INNOVATION SYSTEM

Based on the Finnish tax system, all education including higher education is free. Thus accessibility to higher education is significantly enhanced. A Masters level qualification is regarded as a **first degree** and the University of Oulu has a 75% pass rate for all registered students. A larger proportion of students are registered for science and technology programmes than for the commerce and humanities programmes. The system therefore produces significant numbers of young graduates who are enthusiastic

and are generating new ideas for research and inventions. This also presents a renewable source of teaching professionals.

There is strong support for students completing doctoral and post-doctoral research programmes and these students are valued contributors to national R&D. The education system promotes a very high standard of R&D training and practice and has succeeded in bridging the R&D divide between Finland and countries like the US and Japan.

R&D ENVIRONMENT

There is a strong development vision and focus that is common for the country and the R & D and innovation system

- Economic growth
- A wellness society

This vision describes a society where citizens health and quality of life are enhanced by the application of emerging technologies, in particular ICTs, to health and wellbeing, thereby also generating economic growth opportunities. The emphasis in R&D therefore is on biotech, medical technologies and ICTs. Research quality is managed at a premium and only excellence in research output receives long-term funding.

The importance of dialogue at all levels within and among institutions and the broad research community is promoted and highly valued. This creates a multiplicity of opportunities for collaboration on research and development.

Early research strives to be low cost and utilise the various research grants and loans that are available. Collaboration between research institutes and the university also means that research programmes can commence as virtual centres and only build physical centres once the programmes are well established.

FINANCING RESEARCH AND INNOVATION

Funding mechanisms are available for both basic and applied research and for the final step in the innovation chain – commercialisation. Research teams can source funds from a number of agencies simultaneously to put together the required funding for a research or commercialisation programme.

The range of financing instruments covers virtually every element in the innovation value chain and a broad spectrum of incubation, commercialization and business development services. By selecting and applying for a particular set of funds, a research project or business can fund almost every aspect of the start-up and business development programme including salaries, making an approach venture capital funds a consideration only at the stage where the business idea has demonstrated relative success.

INSTITUTIONAL RELATIONSHIPS

Relationships among all the various stakeholders and players in the R&D and innovation system are strong and highly collaborative. Universities, which are the main seats for R&D promote multi-disciplinary research teams and the participation of social scientists

in science and technology research to promote socially relevant outcomes. The institutional relationships cement a climate of collaboration and co-operation that continues to produce successful hi-tech products and services. The University of Oulu and its research institutes participate in the commercialization phase of hi-tech products and services, while existing businesses participate in R&D programmes and start-up businesses giving freely of their knowledge and expertise (though not of course proprietary knowledge).

COMMERCIALISATION AND BUSINESS DEVELOPMENT ENVIRONMENT

The commercialization phase is supported through a multiplicity of mechanisms to enhance the possibility of successful commercialization. Support mechanisms include financing instruments, commercialization infrastructure (Innopoli in Helsinki and Technopolis and Medipolis in Oulu) that offers not only an attractive business address, but also a full range of business development services including ICT infrastructure, marketing, conference, business and lifestyle management services. Researchers and businesses can therefore focus on doing what they know best – development of hi-tech products and services.

The emphasis in various start-up businesses is on a combination of strong technical knowledge, cutting edge technology and team building. A few of the technology start-ups in the 1990's were spin-offs from Nokia. A large number of technology start-ups are spin-offs from university based research programmes. The people involved in the start-up businesses have typically been engaged in research in their field for between 3 – 7 years.

The start-up businesses that made presentations to the South African team consisted of young people with technical know-how and little or no management training or experience, as the management services are on tap from the Technopolis-type institutions.

At the commercialization and business development phases, there is continued open dialogue and good flow of information within the "innovation community", and university and business leaders participate strongly on advisory bodies or Boards of start-ups. This is coupled with effective funding mechanisms supporting national priorities.

BRANDING AND BRAND MANAGEMENT OF THE HI-TECH SYSTEM

The Finnish hi-tech system is very well branded both locally and internationally. Brand management is paid great attention by all institutions in the system including the City government of Oulu which also has a business development unit. The publications of the various players in the innovation system are widely available from all the institutions and the visitor can learn about the full range of institutions in the system by visiting any one of the institutions. The Technopolis concept is also a key factor in the branding game as it "consolidates" hi-tech companies at its premises, though the premises themselves are decentralized.

WHAT INNOVATIONS?

The report would be incomplete without some references to the particular examples of innovation that are being researched and produced in Finland. Mobile applications over wireless networks, 3G multimedia applications for a range of uses - from health and wellness to entertainment - are high on the agenda. Applications of robotics to the security and home-based care of elderly people is a significant area of research at Oulu university.

APPLICATION OF THE OBSERVATIONS TO SOUTH AFRICA

The DACST team is preparing a detailed set of recommendations. However a few comments are pertinent:

- South Africa may choose a different path focusing on a combination of hi and low-tech (hi and low cost) R & D
- Education and the development of our intellectual capital in the relevant areas for our development path are critical success factors
- The Department of Education should therefore be considered a major actor in the SA National System of Innovation
- Absolute focus on building the coherence of the SA National System of Innovation and closing the gaps in the system over the next few years should be a high priority for NACI and all stakeholders

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