

Sweden - striving to sustain its model for economic success

As befits the home of the Nobel Prize, bestowed annually for ground-breaking achievements in medicine, physiology, physics and chemistry, Sweden has a tradition of original research that it must now convert to commercial and strategic advantage if it is to maintain its legendary success and competitiveness in these increasingly challenging times.

Sweden has long been the envy of Europe and beyond, on account of its high standard of living, generous welfare benefits and much admired education and health-care system, funded by high levels of income tax and underpinned by a robust economy. The latter, fuelled by strong exports and consumer spending, is outpacing the Eurozone, of which it is not a member, with an annual growth of 2.8% for 2007.

Timber, pulp and paper and mining (iron ore, copper and uranium) have provided the basis of the country's economic growth since the 1920s. Today, its subsequent success in manufacturing and design is manifested in international household names such as Volvo, Saab, SKF, Ericsson, Electrolux, H&M and IKEA. AstraZeneca leads the healthy pharmaceutical sector, which comprises a big and expanding group of biotech and biomedicine SMEs.

Sweden's sound, mixed economy and relatively low unemployment put it in a good position to withstand the worst of the effects of the devastating economic downturn that has hit many other countries with a vengeance. "The downturn is not good for anybody, but we have gone into this crisis in a strong position be-



Tomas Aronsson, EUREKA National Project Coordinator

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cause we have the resources to act," says Tomas Aronsson, EUREKA National Project Coordinator. "We have a big surplus in the State budget and our key industries are doing well. We're not unaffected though. Our automotive and telecommunications

companies are cutting their workforces, but they are strong multi-nationals and can see opportunities to take market share in the current economic situation."

Putting science first

Technological change has been the key driver of Sweden's above average growth in GDP per capita in recent years. The country puts 4% of GDP into research and development, making it one of the top three OECD countries in terms of R&D activity. Approximately 75% comes from industry and 25% from government funding.

The country's industrial research strengths lie in medicine, telecommunications, IT and automotive technologies; basic research has been dominated by medicine, healthcare and biotechnology, principally pharmaceuticals. Sweden has 12.6 researchers per 1,000 employed people, 68% of whom work in industry; it also has one of the highest graduation rates in advanced research programmes and is second only to Switzerland in the number of scientific articles published.

"Our investments in innovation and new industry have had a good impact on our industry structure", says Tomas Aronsson.

POPULATION **9.2** MILLION

Gross National Income per capita
(World Bank, 2007)

\$46,060

"The potential for improvements is big, however, considering the 4% of GDP we invest in basic science. Basic research is vital and an investment in the future, but we would like to see more resources put into innovation and research that are of immediate and strategic importance to industry."

Maximising opportunities for innovation

Sweden's Ministry of Education and Science has overall responsibility for the co-ordination of research policy, although research resources exist within the scope of all ministries. National science, research and technological development programmes are run through agencies such as the Swedish Research Council and VINNOVA, the Swedish Governmental Agency for Innovation Systems, which also runs the national EUREKA office. VINNOVA's principal responsibilities are to increase the country's rate of innovation by funding the needs-driven research required by a competitive business and industrial sector, and to strengthen the necessary networks.

October 2008 saw the government introduce the 2009-2012 Research and Innovation Bill in a bid to strengthen Sweden's international competitiveness and maintain its position in the international research arena. It aims to achieve these objectives through initiatives aimed at improving the commercialisation rate of research results, increasing the support and funding for high-tech SMEs and maximising opportunities for the research institute sector – unusually small and underfunded for an OECD country – to take a greater and more inclusive role in R&D activities.

The Research and Innovation Bill and its funding provisions are not before time, given Sweden's need to preserve its export markets in an increasingly competitive global market, to optimise conditions for the



Key industry sectors: automotive, telecommunications, medicine and pharmaceuticals, paper and pulp, iron and steel, engineering and high-tech manufacturing



Cover feature



Sweden's EU presidency logo sets sights on climate

Swedish EU Affairs Minister Cecilia Malmström unveiled the logo of her country's upcoming EU presidency at the beginning of March 2009. The design, a golden S-shaped curve was described as reflecting "openness, dialogue, climate and light". The Swedish EU Presidency begins on 1 July 2009, taking over from the current Czech Presidency. The Swedish government has held the bloc's six-month rotating presidency on one previous occasion, in the first half of 2001. The winning logo submission's text suggests that climate change and the environment will be given a high profile during the presidency. The Swedish government has set its sights on preparing the path for a successful conclusion to the UN Copenhagen summit on climate change in December. Speaking at the College of Europe recently, Malmström said that Sweden will "play a crucial role in ensuring that the EU delivers on climate, environment and energy" during its presidency.

<http://www.se2009.eu/>

Key exports: motor vehicles, machinery, paper products, pulp and wood, mining, iron and steel products, telecommunication equipment, pharmaceuticals

Research breakdown: industry performs approximately 75% of R&D, universities and higher education institutions about 20% and the research institute sector 4.5%



major innovative, research-based companies which are the engine of its economy and who might otherwise decamp to more advantageous countries, and to develop new, renewable sources of energy.

Most of the 15 billion krona (approximately €1.4 million) being funded by central government will go to universities and other higher education institutions over the Bill's four-year life. Strategic areas targeted for investment include those where Swedish research is already world-class and where the industry sector and society have a priority need for new knowledge: medicine and life sciences; ICT, nanotechnology and material science; and climate-related research such as climate models and ocean research and renewable energies.

Shortening the journey to market

Sweden currently participates in around 90 running EUREKA projects at any given time to the tune of €33 million, including at least 20 Cluster projects and 13 Eurostars projects – not bad for a country with a relatively small population, says Tomas Aronsson.

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"The Cluster projects are very important to us, particularly ITEA and CELTIC. We also know that we need to improve R&D support and funding for our high-tech SMEs, and the Eurostars programme fits their needs well. For the first cut-off for projects, we invested €3.5 million, making Sweden the fourth largest country in terms of funding, behind France, Germany and Spain, and it looks as though it will be similar for the second cut-off. We're happy about this, as these countries have much bigger GDPs and populations than Sweden. Eurostars also complements another of the national programmes VINNOVA runs, Research & Grow, which focuses on SMEs and in which we're investing €10-12 million annually.

"EUREKA's flexibility and network of 38 countries is a tremendous asset. As members of the network, when we're evaluating a project, we know exactly how the other partner countries are assessing it, and we help and trust each other, which is very important. Recently, my Danish counterpart emailed me urgently for some information he needed for a presentation in his ministry and within a couple of hours he had everything he needed from me and our colleagues in the Norwegian and Finnish EUREKA Offices!"

Taking food quality control to a new level

In food production, the composition of wheat kernels is closely associated with product quality, with some grains better suited for bread, for example, and others for biscuits, pizza or pasta. The grain-sorting process developed by project Σ!3176 EUROA-GRI+ TRIQ is capable of detecting these differences and sorting as many as two billion individual wheat kernels an hour with a high degree of accuracy. The market potential is considerable, given the wide range of potential applications in the food and brewing industries alone.

Swedish partner: BoMill AB

Double hull for oil-spill prevention

Baltic Sea ferries and oil and cargo traffic navigate one of the busiest shipping lanes in the world, which is also home to many rare and unique ecosystems. The consequences of a major spillage of oil in the region would be environmentally disastrous. Project Σ!2772 BALTECOLOGICALSHIP's twin hull design for short-range and coastal tankers enables vessels to withstand greater stresses, reducing the risk of oil spillage during a collision and the environmental and economic consequences. The partners have applied the same designs to container and roll on-roll off ships as well as river-sea vessels.

Swedish partners: Ecoship Engineering AB, Boj and Partners AB

Personal warning system for asthma sufferers

Project Σ!2921 PLASENVAL has taken the technology behind an existing method developed to monitor the airway inflammation that characterises asthma and transformed it with new sensing technology into the first device for home use. By giving early warning of an impending attack, the inexpensive, easy-to-use instrument will dramatically increase the quality of life of the two-thirds of sufferers whose conditions are severe enough to occasionally require emergency treatment, which in turn will significantly reduce the cost to healthcare services.

Swedish partner: Aerocrine AB

Defining European standards

Sweden's companies have been active participants in EUREKA Clusters such as MEDEA, CELTIC and ITEA, helping to develop generic technologies and define European standards in ICT, biotechnology and production and materials. One of ITEA's most successful projects, 00009 EAST EEA, brought together 23 partners from the car manufacturing industry, suppliers and universities to develop a new software interface that will make the next generation of cars quicker to design, cheaper to bring to market and safer to drive while maintaining high quality standards.

Swedish partner: Volvo