

SCANDINAVIA TIME TO INVEST?



Scandinavia is ranked as one of the most innovative regions in the European pharmaceutical sector.

Christer Hedman, Business Region Göteborg, takes an in-depth look at the changes the industry has undergone recently and reveals why Scandinavia is an attractive proposition for investors.

Scandinavian life sciences academic and industrial research is well-established in Europe, with its strong tradition of collaboration between industry, academia and the hospital system. A key success factor has been the focus on translational and interdisciplinary research. Pharmacology research has made outstanding progress, particularly in Sweden. A good example is the research performed by Professor Arvid Carlsson who was awarded the Nobel Prize laureate in Physiology or Medicine for his research findings of the dopamine system. He was also an important adviser for Astra AB, which led to a number of international blockbusters, and is founder of Carlsson Research (today Neurosearch).

The global trend of mergers and acquisitions within the pharmaceutical industry has shaped a new landscape in Scandinavia. In Sweden, flagship companies such as Pharmacia have disappeared due to several mergers while Astra is now a part of AstraZeneca. At the Astra R&D site in Gothenburg, blockbusters such as Losec/Prilosec, Nexium and Seloken/Toprol have been developed. However, productivity in these large companies has decreased and they are becoming increasingly dependent on in-licensing projects from innovative small and medium sized companies in late stage development.

Number of Swedish projects in late pre-clinical stage (excluding AstraZeneca).

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|------------------------|----|
| Late preclinical phase | 45 |
| Phase I | 22 |
| Phase II | 32 |
| Phase III | 11 |

Source: Invest in Sweden Agency, SwedenBio and Vinnova analysis, April 2007.



Author

Christer Hedman holds a PhD degree in clinical pharmacology. His present position is head of biomedical development at Business Region Göteborg, a regional industrial development. Previously, Hedman spent over 20 years working in the pharmaceutical industry including Astra and a number of start-up companies. He has worked primarily with R&D and business development issues.

In a survey performed by Invest in Sweden Agency, SwedenBio and Vinnova in early 2007, three major findings were uncovered:

- Around 80 Swedish firms are involved in drug discovery and development.
- 169 projects were identified as being in the late preclinical phase and in clinical development. Excluding AstraZeneca, biotech firms had 110 projects in development (less than 12 months before clinical trials). The majority of these projects focus on small molecules.
- While the projects have a broad research focus, the emphasis is on therapeutic segments with large unmet patient needs. The majority is in the fields of cancer-related conditions, neurological disorders and metabolic/cardiovascular diseases. These areas correspond well with forefront research performed at the universities. Similar situations are found in Denmark and Finland with emerging new drug development companies.

Drug development

One of the biggest challenges for academic groups and small biotech companies is to develop drug targets to lead compounds. New research ideas run the risk of not being taken up. In large companies, huge investments have been made in high throughput screening systems to screen large substance libraries. To come to large companies with only a drug target is rarely worthwhile. They want, at least, to have a validated

KEY FACTORS FOR INVESTING IN SCANDINAVIA

- Skilled workforce
- Strong alliances with industry and academia
- Strong biomedical clusters



lead compound. Therefore, a Scandinavian and European initiative has been established to make it possible to further develop drug ideas. A network of European universities will provide adequate screening services to identify new compounds from novel drug targets. This will further enhance the development pipeline in small-sized pharma and deliverables to big pharma.

Stem cell research has focused on therapeutic usage. Great hopes for new revolutionary treatments for diseases with unmet needs have been expected. Many thought that this would have happened

already, however, it is now clear that these expectations will not be fulfilled. The development time for new effective and safe stem cell therapy will take much longer.

Human stem cells could be used in the drug development process. The Swedish company Cellartis is focusing on using human embryonic stem cells as a tool for the screening and development of new drugs. Cellartis has the largest set of well defined differentiated stem cell lines, which can in early drug development be used as both efficacy as well as toxicological tools instead of animal cell lines. This means that human cells can be used in the early drug development process and hopefully increase the hit rate of new drug-able targets.

Innovation initiatives

In the late 1900s and early 2000, there was great hype for anything biotech. Investments were made in ideas that had a low level of verification. At the same time there was a lack of efficient models for innovation development, as well as early soft money to assess whether embryonic ideas had potential for success. The situation has since changed.

Drug companies and venture capitalists require more to make an investment. In Sweden, several important initiatives have been launched. The Swedish federal agency Vinnova has started several programmes aimed at improving the situation. One of these is the Vinnväxt programme, which is aimed developing efficient innovation systems. Biomedicine in the Western Sweden project focuses on two areas with great international edge: biomaterials and cell therapy, and cardiovascular and metabolic science.

Furthermore, education of tomorrow's biotech leaders has begun with the Göteborg International Bioscience Business School. Its master's programme mixes theoretical education with practical projects. Many of these projects continue as new start-up companies in areas such as Sahlgrenska Science Park,

an important structure to foster and develop new biomedical companies. Other initiatives include support for idea verification to develop projects before investors are approached, thus decreasing investor risk.

In recent years, major investments have been made in manufacturing plants in Scandinavia. In 2005, Pfizer invested in a production unit for biotechnology-based pharmaceuticals: over SK1.5 billion over a four-year period in Strängnäs, west Stockholm. In Denmark, Biogen Idecs invested around \$550 million into a large-scale production unit for biotechnology based pharmaceuticals, which will create 400 new jobs.

Scandinavian clinical research has long been attractive for trials of new pharmaceuticals. International pharma invests a lot in clinical trials performed in Scandinavia due to the ability deliver valid data, rapidly and cost effectively. More than 200 clinical trials a year are performed in Sweden. The Swedish Medical Product Agency is one of the highest ranked in Europe and is one of the most frequently consulted authorities in Europe. The availability of disease and population registers, as well as biobanks, is a unique resource for clinical research. There are also a number of high quality CROs, such as A+Science, Nordic Management of Clinical Trials and Trial Form Support, that can deliver services to the industry.

The pharmaceutical industry has undergone a number of mergers and acquisitions, and during the merging period the companies involved must consolidate their activities. Non-core projects are suspended or spun out when creating new companies. The Pharmacia mergers during the 1990s led to new companies such as Biovitrum and Phadia. Within AstraZeneca the company recently decided to suspend its research on lower gastrointestinal tract disease. A new company has been formed, Albireo, based in Gothenburg. It has raised \$27 million in its first closing and anticipates receiving up to \$40 million in a series of financing rounds.

Attractive proposition

Scandinavia has recently undergone a substantial improvement in the development of efficient innovation and support systems for emerging new biotech companies. More seed financing money has become available and investors can find companies that have reached a higher degree of maturity than before. There is a positive attitude to collaboration between industry and academia. Today, Scandinavia has one of the largest numbers of biotech enterprises in Europe with a promising project portfolio in different stages of development. Spin-outs from big pharma can find attractive environments to grow with excellent infrastructure.

A skilled work force, a tradition of successful drug development and a good collaborative climate between public sector and industry makes it an attractive investment for biotechnology-based manufacturing of pharmaceuticals. Clinical trials performed in Scandinavia are highly ranked worldwide, truly a worthwhile investment. **WPF**