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International Mega-Trends and  
Growth Prospects of the  
Finnish Biotechnology Industry

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*Essays on New Economic Geography,  
Market Structure of the Pharmaceutical Industry,  
Sources of Financing, Intellectual Capital  
and Industry Projections*

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**INTERNATIONAL MEGA-TRENDS AND GROWTH PROSPECTS OF THE FINNISH BIOTECHNOLOGY INDUSTRY – *Essays on New Economic Geography, Market Structure of the Pharmaceutical Industry, Sources of Financing, Intellectual Capital and Industry Projections.***<sup>1</sup> Helsinki: ETLA, Elinkeinoelämän Tutkimuslaitos, The Research Institute of the Finnish Economy, 2004, 172 p. (A, ISSN 0356-7435; No. 40). ISBN 951-628-410-8.

**ABSTRACT:** The aim of this dissertation is to predict the economic growth impacts of the Finnish biotechnology industry on the Finnish economy and analyze the international and industry-specific factors behind these predictions. The New Economic Geography of the European regions suggests that spatial agglomeration of economic activities will be strengthened internationally if European integration deepens. Sparsely populated geographic peripheries, such as Finland, might have difficulties in creating a critical mass of factors of production. For example, the Finnish pharmaceutical industry has enjoyed high regulatory protection and it has achieved similar price markups during the 70s-90s as its counterpart in the US. After changes in regulatory systems and problems in drug development within large pharmaceutical companies strong pressure for lower markups arose. This drives large pharmaceutical companies to outsource their R&D activities to small biotechnology companies. The large companies are also interested in taking over the most prominent and maturing biotechnology companies. The takeovers offer one pathway of exit to the investors of start-up companies.

According to the analysis of small and medium-sized Finnish biotechnology industry, it seems that most promising biotechnology companies have a well-balanced combination of intellectual capital. According to the analysis of intellectual capital, there are many promising branches in addition to drug development activities, such as applications related to biomaterials, diagnostics, food and feed, industrial enzymes, agriculture and forestry. Despite expectations of rapid growth, it will take decades rather than years for the biotechnology industry to catch up with the

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three pillars of the Finnish industry: pulp and paper, metal products and engineering, and the electronics industries. To fulfill the expectations, there is a need for the creation of a critical mass of factors of production and comparative advantage by building collaboration and financing networks between the biotechnology industry and traditional industries, such as forest industry, electronics industry and pharmaceutical industry. Most of the current Finnish biotechnology companies are related to health care activities. The health care sector has reached a major crossroads owing to the aging of the population and advances made in medical science. On the one hand, the aging of the population and the medical possibilities to diagnose and treat more illnesses than before increase the cost pressures on health care. On the other hand, biotechnology applications are expected to spawn cost savings over the long run by, for example, making time-consuming diagnostic methods more efficient and facilitating targeted therapy. As a policy implication for companies, public sector and academia, this dissertation concludes how the Finnish biotechnology industry could offer solutions to the cost crisis in health care while at the same time spurring development of an internationally competitive industrial cluster.

**Key Words:** spatial agglomeration, price-cost margins, capital structure, intangible assets, input-output analysis.