

Project Summary (S. Bagchi-Sen, Geography, SUNY-Buffalo)

The biotechnology industry, which is characterized by new products/processes of unusually high market value, differs from other high tech industries because it is driven by hypercompetition, intellectual property issues that are arising faster than the laws to govern them, and high levels of uncertainty in the incubation and commercialization of new products and processes. These conditions have allowed for risk-balancing organizational arrangements, such as alliances with universities and other firms, to promote innovation. Furthermore, the completion of the human genome project has introduced endless possibilities of research and product/process development, which cannot be accomplished within the boundaries of a single firm.

The proposed research addresses the following questions:

- To what extent do biotechnology firms depend on regional clusters of other biotechnology firms and universities to form R&D alliances?
- Do R&D intensive biotechnology firms, which have forged alliances with other firms and universities, exhibit better innovation performance than their counterparts?

The research questions are based on two major limitations of recent studies of innovation in the biotechnology industry: (1) the effectiveness of different types of alliances has not been examined under one framework of analysis, that is, the role of formal/informal and domestic/international partnerships in promoting innovation has not been studied, and (2) the role of geography has been limited to the analysis of whether linkages are localized, that is, the role of regional clusters of biotechnology industry in the development, growth, and impact of these linkages on innovation has been largely ignored.

Data will be obtained from a postal survey of the entire population of biotechnology firms in human diagnostics and therapeutics and interviews of appropriate scientific and managerial personnel in a selected group of firms. The research methodology includes both quantitative and qualitative analyses.

The proposed study will provide an understanding of specific processes influencing the organization of innovation in the biotechnology industry. In doing so, the study will offer an in-depth assessment of:

- the spatial organization of innovation in one of the most dynamic high-technology industries of the 21st century, that is, the role of clusters in the organization of innovation in the biotechnology industry and in turn, the role of these new technologies in developing dominant centers of innovation,
- firm-level behavior in a highly competitive and uncertain environment, where barriers to innovation can stifle growth and cause premature demise of brilliant scientific efforts,
- processes by which localized alliances, as well as linkages over long distance are initiated, organized and sustained,
- the knowledge transfer mechanisms in biotechnology, that is, the role of different types of alliances in innovation,
- the role of international alliances in the global competitive positioning of the biotechnology industry,
- how the innovation trajectories are indicative of urban and regional development based on yet-to-be developed cutting-edge technologies, and
- broader societal implications of (a) university-industry partnerships, (b) the protection of intellectual property rights, and (c) the Federal regulation of innovation.

The study will be a two-year project. The research will be undertaken in the Department of Geography, University at Buffalo. The Baldy Center for Law and Social Policy, Canada-U.S. Trade Center and the National Center for Geographic Information Analysis will provide research, administrative, and technical support, respectively. At least three geography graduate students will be trained in survey research, quantitative and qualitative data analyses. The results will be disseminated in several ways: the survey respondents will receive a report of the study, research papers will be published in appropriate refereed journals, and a summary of findings will be posted on well-linked departmental and center websites.