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Uppsala BIO – the Life Science Initiative

Experiences of and Reflections on Starting a Regional Competitiveness Initiative

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Abstract

By nature, the biotech industry is a knowledge and R&D intensive industry, one in which new products and innovations develop at the interface between electronics, information technology, biomedicine, and drug discovery. This innovation generally results from the interaction between firms, public and private research organizations, financial institutions, governmental organizations, institutions for collaboration, and specialized services companies. Much of this interaction occurs within a localized geographical setting, often described as a cluster or a regional innovation system, in which the potential for intensified face-to-face interactions, short cognitive distance, a common language, trustful relations between various actors, easy observations, and immediate comparisons enhance the processes of interactive learning and innovation. As a result, numerous regions across the globe are implementing initiatives designed to improve their competitiveness through increasing the ability of their regional organizations to interact and innovate.

One such initiative is Uppsala BIO – the Life Science Initiative, a regional initiative in Uppsala, Sweden created by local representatives from government, industry, and academia. To fulfill its purpose, Uppsala BIO has chosen to use its resources to primarily support and collaborate with other regional actors who initiate, run, and most importantly, own various development activities. Examples of these activities include 1) promoting cross-disciplinary biotech research with a strong product focus through the establishment of a cross-disciplinary research center, 2) strengthening the region's innovation system through activities such as the development of an incubator to provide operative support for the commercialization of research findings, 3) ensuring the long-term supply of relevant competence to the region, and 4) improving the region's visibility both nationally and internationally in order to attract investment and competence. Uppsala BIO received considerable government and local funding by Swedish standards in the second half of 2003, and the purpose of this chapter is to describe the activities of this initiative during its first 18 months as well as to present some reflections gathered through a longitudinal study of this initiative. Thus, this chapter is relevant to both practitioners and policy makers involved in regional initiatives as well as researchers working to understand the dynamics of such initiatives.

Uppsala BIO – the Life Science Initiative:

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Introduction

The life sciences industry and even more so the biotechnology industry is a knowledge and R&D intensive industry in which new products and innovations develop at the interface between electronics, information technology, biomedicine, and drug discovery. Due to the possibility of value creation through high returns and increased employment, a number of regions across the globe are competing to become world leaders in life sciences through implementing government supported initiatives. For example, 41 states in the US have recently launched their own life science initiative as have other areas of the world, e.g., Germany, Singapore, United Kingdom, Saudi Arabia, and the Netherlands (Ketels 2005). Often the primary intent of these initiatives is to improve competitiveness through promoting the interaction between the region's local firms, public and private research organizations, financial institutions, governmental organizations, institutions for collaboration, and specialized services companies. Yet while regions continue to increase their efforts and new regions are constantly entering the arena, there has been little effort to transfer the knowledge and learnings from one initiative to another.

The purpose of this chapter is to present Uppsala BIO – the Life Science Initiative located in Uppsala, Sweden. The Uppsala region is 65 kilometers to the north of Stockholm, and it has been increasingly receiving worldwide recognition during the past five years as a strong and dynamic biotechnology region - some even proclaim it to be one of the world's most "biotech-dense" regions. In order to further support the region's development and competitiveness, local representatives from government, industry, and academia came together to create Uppsala BIO – the Life Science Initiative. This

initiative received government and local funding in the second half of 2003, and the purpose of this chapter is to describe the activities of this initiative during its first 18 months as well as to present some reflections gathered through a longitudinal study involving participant observations by the authors. Thus, this chapter is relevant to both practitioners and policy makers involved in regional initiatives as well as researchers working to understand the dynamics of such initiatives.

This chapter is organized as follows. First, we present a discussion of the relevant cluster and regional innovation systems concepts in order to provide some background as to why the interest and implementation of such initiatives has grown in recent years. Second, we provide a brief history and current overview of Uppsala and its biotech industry. The third section presents the background and organization of Uppsala BIO – the Life Science Initiative while the fourth section discusses Uppsala BIO’s four primary areas of activities during its first 18 months. The next section then presents some observations and reflections regarding the effectiveness of Uppsala BIO during this time months before we come to the final conclusion section.

The Importance of Clusters and Regional Innovation Systems

Since the publication in 1990 of Michael Porter’s book, *The Competitive Advantage of Nations*, the cluster concept has become widely circulated and used in both academic as well as in policy circles. However, while the term, cluster, is widely spread, no one universal definition of the term exists. Thus, for the purposes of this chapter, we define a cluster as a spatial agglomeration of similar and related economic and knowledge creating activities.

The work on clusters is based on four broad assertions. First, in today’s knowledge-based economy, the ability to innovate is more important than cost efficiency in determining the long-term ability of firms to prosper. Innovation is defined broadly here as the ability to develop new and better ways of organizing the production and marketing of new and better products (Porter 1990; Lundvall 1992; Nelson 1993; Nonaka 1994; Grant 1996). This does not mean that cost considerations are not important, but simply that the combined forces of the globalization of markets and the deepening divisions of labor make it increasingly difficult to base a competitive position on cost-advantage only.

Second, innovations predominantly occur as a result of interactions between various actors, rather than as a result of a solitary genius (Håkansson 1987, von Hippel 1988, Lundvall 1992). This fits with a Schumpeterian view of innovations as new combinations of already existing knowledge, ideas, and artifacts (Schumpeter 1934). Additionally, most innovations are based on some form of problem solving in which someone generally perceives a problem and turns to someone else for help and advice. In an industrial context, these interactions often follow the value chain. A firm facing a particular problem turns to a supplier, a customer, a competitor, or some other related actor to get help in specifying the problem and defining the terms for its solution. From this follows that the level of analysis for understanding the processes of industrial innovation and change is some notion of an industrial system or network of actors carrying out similar and related economic activity. The cluster is basically then an attempt to conceptualize an industrial system.

Third, and this is where “geography” enters the picture, there are a number of reasons why interactive learning and innovation processes are not space-less or global, but on the contrary unfold in a way where geographical space plays an active role. Spatial proximity carries with it, among other things, the potential for intensified face-to-face interactions, short cognitive distance, common language, trustful relations between various actors, easy observations, and immediate comparisons (Malmberg & Maskell 2002). In short, spatial proximity seems to enhance the processes of interactive learning and innovation; therefore, industrial systems should be assumed to have a distinctly localized component.

Fourth and finally, an implication of the above is that there are reasons to believe that the knowledge structures of a given geographical territory are more important than other characteristics, such as general factor supply, production costs, etc., when it comes to determining where we should expect economic growth and prosperity in today’s world economy (Malmberg & Maskell 2002).

Thus, the cluster perspective provides a way to describe the systemic nature of an economy, i.e., how various types of industrial activity are related. This way of approaching the systemic nature of economic activity has much in its favor. It opens up a scope for analyzing interactions and interdependencies between firms and industries across a wide spectrum of economic activity. An additional advantage is that it

contributes to the bridging of a number of more or less artificial and chaotic conceptual divides that characterize so much work in economic geography and related disciplines. These include, for example, manufacturing vs. services, high technology vs. low technology, large companies vs. SMEs, public vs. private activities, etc. Thus, a single cluster defined as a functional industrial system may embrace firms, actors, and activities on both sides of each of these divides.

Regional Innovation Systems

Very much related to clusters, the concept of regional innovation systems has been defined as the networks of organizations, institutions, and individuals within which the creation, dissemination, and exploitation of new knowledge and innovations occurs (Cooke et al. 2004). The regional innovation system concept has been introduced to describe how the industrial and institutional structure of a given national or regional economy tends to steer technological and industrial development into certain trajectories. As such, there is a stronger focus on innovation and on the way the research system and the regulations for immaterial property rights are organized in the regional innovation systems perspective than in the cluster perspective.

While there are differences between clusters and regional innovation systems, there are also many similarities. Groups of similar and related firms (e.g., large and small, suppliers, service providers, customers, rivals, etc.) comprise the core of the cluster, while academic and research organizations, policy institutions, authorities, financial actors, and various institutions for collaboration and networks make up the innovation system of which the cluster is a part. Both concepts have as their point of departure that innovation and industrial transformation are the result of interactions across sets of actors, and they both adopt a geographical starting point by emphasizing that this interaction takes place in a spatially defined territory (e.g., countries, regions).

Much of the extant literature on regional innovation systems and clusters tends to focus on formal interactions between actors; however, there is increasing evidence of the importance of informal interactions as well. For example, in one of the most well known studies Saxenian (1996) proposes that one of the primary reasons for the relative success of the Silicon Valley area over that of Route 128 in Boston is that knowledge is easily

shared through informal relationships between individuals belonging to competing firms as well as other organizations in the Silicon Valley region. This is in direct contrast to the Route 128 area in Boston where informal inter-organizational fraternization was discouraged.

In response to this increasing body of literature, many regions are now implementing their own regional initiatives designed to improve the formal and informal interaction between local actors as well as to facilitate local innovation. In the next section we provide a brief history and current overview of Uppsala, Sweden before we present the region's competitiveness initiative.

Uppsala and the Uppsala Biotech Industry

Similar to other biotechnology intensive regions across the globe, Uppsala is the result of a close historical relationship between industry and academia and traces its origin back to a number of researchers and research findings at Uppsala University, e.g., the development of the ultra-centrifuge by Nobel Laureate Theodor (The) Svedberg (1926), research on serum proteins by Nobel Laureate Arne Tiselius (1948), and the discovery and development by Gunnar O. Johansson, Hans Bennich and Leif Wide of the immunoglobulin E (IgE antibody) used in allergy diagnosis and treatment. Additionally, in order to be located physically near leading research, Pharmacia relocated its business from Stockholm to Uppsala in the 1950s. Today the development and production of biotechnology methods, instruments, and research tools is considered to be the traditional core of the Uppsala cluster, leading to an international reputation as “the city of methods”.

The Uppsala region employs approximately 4000 individuals in almost 100 active biotech companies of which more than one-third have been founded since 1995. Moreover, almost 10% of the total Uppsala workforce is employed in biotech related activities through working in industry, academia, or government organizations. In terms of the research environment, Uppsala University and the Swedish University of Agricultural Sciences (SLU), encompass more than 900 researchers and graduate 900 students each year in biotechnology-related areas. An academic hospital as well as several research centers serves as customers, suppliers, and knowledge resources for

Uppsala's biotech companies. Additionally, the universities have created business centers and holding companies that work specifically with the commercialization of research results, while there are a number of related national government authorities, e.g., the National Veterinary Institute, the Medical Products Agency, and the National Food Administration, employing together around 1200 individuals. Recently, Uppsala has seen the growth of an extensive sector of specialized services firms, such as patenting, legal advice, business development, recruiting, auditing and marketing. Finally, a number of local organizations have as an explicit objective to stimulate the development of the region, e.g., STUNS (Foundation for Collaboration between Uppsala's Universities, the Business Community, and Society), the Uppsvenska Chamber of Commerce, Invest in Uppsala, etc. These organizations act as meeting points for representatives from industry, academia, and local and regional authorities (Waxell 2005)¹.

In addition to the above, the Uppsala region has a sound basis for being a strong and dynamic biotechnology cluster. For example, the region continues to produce outstanding research in terms of both quantity and quality, and it has a long tradition of successfully commercializing this research. There are a relatively large number of start-ups and established companies across the whole span of the biotech sector, several of which are world-leaders in their field. Moreover, Uppsala is a region that is used to rapid change since it has weathered the dismantling of Pharmacia in Uppsala. This dismantling has led to numerous start-ups and seasoned entrepreneurs who have experienced all aspects of the biotech sector and who have a strong customer and market focus and understanding.

Uppsala BIO – the Life Science Initiative for Improving Regional Competitiveness

In 2002, the Vinnväxt program was initiated when the first call for regional development proposals was launched. Vinnväxt is a program run by the Swedish Agency for

¹ For an in-depth description of the Uppsala Biotech Cluster, see *The Uppsala Biotech Cluster – Economic-geographical Studies of Interaction, Knowledge Spillover, and Labor Mobility* (Waxell 2005).

Innovation Systems (Vinnova), and the primary objective is to promote sustainable growth and international competitiveness in functionally defined regions through supporting initiatives that result from the coordinated actions of companies, academia, and the public sector. The program is designed as a competition in which regional teams compete for a package of financial support for a period of ten years - a maximum of 10 million SEK per year for up to 10 years for a total of 100 mln SEK. While the program offers government support, a prerequisite is that the region has local sponsors that match the Vinnväxt funding. In other words, the money paid by Vinnväxt to the regional initiative must be matched by equal support from the region's organizations either in the form of cash or hourly labor. For example, if the local initiative is successful in only raising 8 mln SEK one year, then Vinnväxt will only pay 8 mln SEK for that year. More information can be found at www.vinnova.se.

In the first Vinnväxt call in 2002 Vinnova received 150 Vinnväxt proposals from across Sweden, and of these, 25 proposals made the first cut and received a planning grant to be spent on developing a full Vinnväxt application. In June 2003, Vinnova then selected from these 25 applicants as well as a handful of Vinnväxt pilot projects a total of three recipients of the Vinnväxt grants, of which Uppsala BIO was one recipient. (While Uppsala BIO won the Vinnväxt 2002 competition, the initiative actually dates back to 2001 when a pilot project headed by Uppsala University's Holding Company (UU AB) found that the collaboration between industry, academia, and the public sector needed to be increased to promote the long-term growth of the region in biotechnology.) As a recipient of Vinnväxt, Uppsala BIO now has the added resources to support this collaboration.

Uppsala BIO is organized as a project under STUNS and not as a legal entity – the Foundation for Collaboration between Uppsala's Universities, the Business Community, and Society. As such, it does not have a board, but rather a steering committee. This steering committee reflects the initiative's commitment to increasing collaboration between academia, industry, and government, and it comprises senior executives and leading figures from Uppsala's leading biotech companies, top county officials, and influential individuals within Uppsala's universities (figure 1). More information on Uppsala BIO can be found at www.uppsalabio.com.

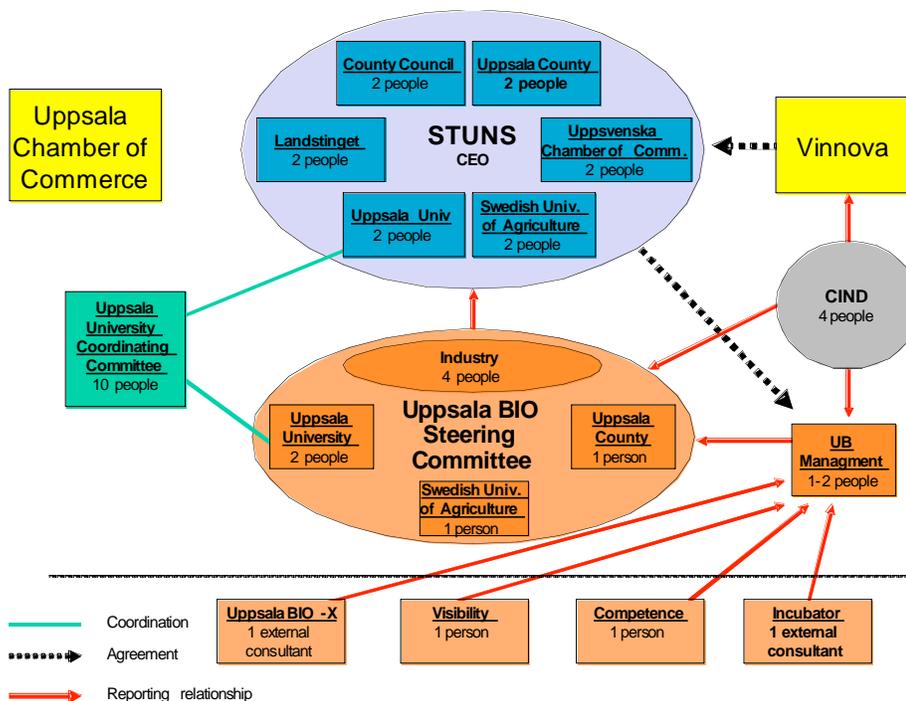


Figure 1. The Uppsala BIO Organization (December 2004)

Uppsala BIO's underlying driving goal is to enhance value creation for the region though increasing the number of new, qualified jobs within the life sciences sector, improving economic growth, and strengthening the region's academic and industrial attractiveness and competitiveness. The vision for the initiative as stated in the original Vinnväxt application is the following:

Within a period of five years, the Uppsala-Stockholm region will be one of the world's five leading biotechnology regions supported by a sustainable competitive industrial base, world-class research and education, and a good climate for companies, academics, and employees. In this region, Uppsala will be the center for the research and development of research methods, models, and tools within biotechnology research.

One of the conditions of the Vinnväxt program is that the recipients work together with academia in order to ensure that learning and knowledge created during the ten years

could be captured and disseminated to other Vinnväxt participants. As a result, Uppsala BIO contracted CIND, the Centre for Research on Innovation and Industrial Development, at Uppsala University (www.cind.se) to facilitate in this process by monitoring, analyzing, reflecting upon, and giving advice regarding all aspects of Uppsala BIO's activities. This chapter is the result of this cooperation, and during the period of June 2003 to December 2004, the CIND team conducted 29 interviews with individuals both within Uppsala BIO and with others active in academia, industry, and government in the Uppsala region as well as participant observation in 29 meetings, e.g., steering committee, project management. In addition, the team conducted an online questionnaire of the region's various actors during the winter of 2004 in order to collect baseline statistical and social network data.²

Uppsala BIO – the First 18 Months

As mentioned above, Uppsala BIO's vision is that within a period of five years, the Uppsala-Stockholm region is to be one of the world's five leading biotechnology regions. However, this is a very broad goal, so one of the first steps of Uppsala BIO was to break down the vision into clear, attainable and measurable goals. In order to do so, the Uppsala BIO team performed an analysis of the challenges facing the region and found the following:

- *Difficulty in attracting capital* for investment and growth in the region's small and medium-sized companies and a poor international collaboration network to attract investment to Uppsala
- Tendency in recent years for *commercial ideas to disappear from the region* through sales and licensing
- *An unstable pipeline of new and realistic product ideas* arising from innovative individuals and research
- *A declining supply of skilled and specialized labor* for current and future companies of all sizes

² For the results of this questionnaire, see "Uppsala BIO – The Life Science Initiative: An Empirical Study of an Initiative Promoting the Development of a Swedish Biotech Region" (Teigland et al. 2005).

The region and Uppsala BIO face a further challenge in that Uppsala is small and as a result, resources are limited. Thus, Uppsala BIO established the guiding principle that while it should initiate and support new activities, all of these activities should be owned and operated by already established regional actors. Thus, Uppsala BIO's primary role in the region's development is as a **facilitator rather than an operator** of various activities. Uppsala BIO may act as an external coordinator when no other natural coordinator existed, and it provides funding for activities that would significantly contribute to the end goal. Thus, Uppsala BIO supports and collaborates with existing regional actors who initiate, run, and own Uppsala BIO activities. In this manner, Uppsala BIO aspires to leverage and efficiently use the region's resources so that the region becomes strong in every aspect – an industry that attracts the most skilled individuals, universities that attract the best students, and a local community and infrastructure that attracts people to settle in Uppsala.

In addition to the above, Uppsala BIO also decided to determine a focus in terms of what kind of life science activity it should primarily support or prioritize. It was decided that this focus would build upon the main strengths of Uppsala - the area of ***methods, models, and tools for biotechnological research***. This was not to imply that this would be the only area in which Uppsala would excel since in Uppsala there are several successful companies providing products within drug development. However, in order to ensure the maximum return on expended resources in the shortest term, Uppsala BIO felt that it was important to focus, wherever relevant, on its areas of existing strength.

Four Focus Areas

Uppsala BIO's guiding principle in determining its primary focus areas was to examine the region's innovation and commercialization chain and to determine which areas needed support in order to ensure a dynamic and productive value creation chain. Based on this underlying principle and the initiative's above analysis of challenges and resources, Uppsala BIO defined four focus areas that would best help it move towards its vision (figure 2):

- 1) To promote cross-disciplinary biotech research with a strong product focus through the establishment of Uppsala BIO-X, a cross-disciplinary center for research on methods, models, and tools
- 2) To strengthen the region's innovation system
- 3) To ensure a long-term supply of relevant competence to the region
- 4) To improve the region's visibility both nationally and internationally in order to attract investment and competence.

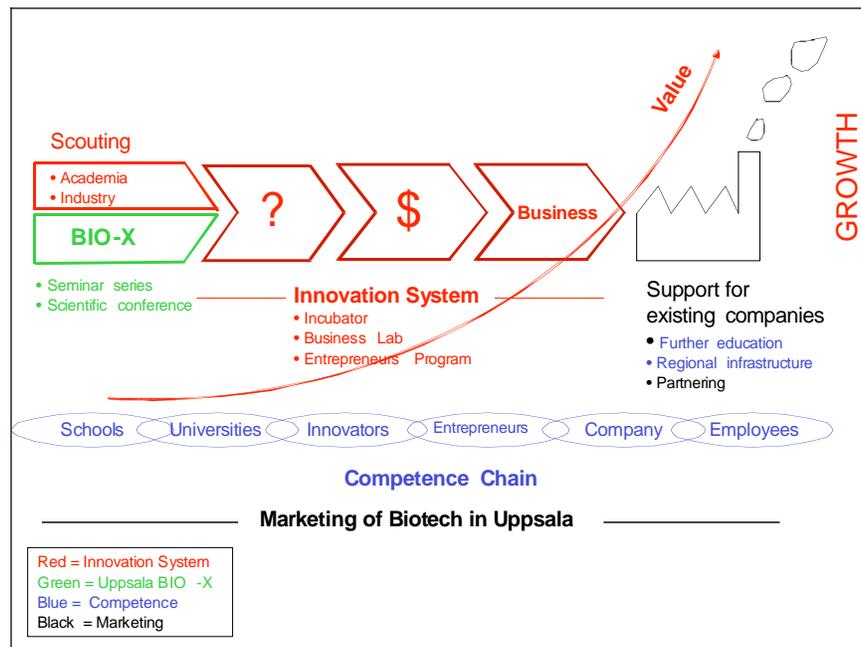


Figure 1. Four Focus Areas and Their Relationships

Below we discuss the goals, strategy, and initial activities of each of these four areas.

1. To promote cross-disciplinary biotech research with a strong product focus through the establishment of Uppsala BIO-X, a cross-disciplinary center for research on methods, models, and tools

As mentioned above, Uppsala BIO-X is the cross-disciplinary research effort focused on "Tools for Life Science". Its projects are based on cutting-edge science with the potential to generate new product opportunities for today's and tomorrow's life science industry.

Goals

The overriding goal of Uppsala BIO-X is to initiate and support ambitious, world-class, cross-disciplinary research projects in the region by making available supplementary funding and resources. In line with this is the goal of developing a working model for a viable interface between research and industry. This relies in turn on developing a mindset amongst researchers that involves understanding the principles of market needs and product development as well as increasing the opportunities for contacts between industrialists and researchers. A long-term strategic goal is to work for the establishment of a physical location for Uppsala BIO-X.

Strategy

The strategy of Uppsala BIO-X involves funding a small number of cross-disciplinary research projects. In addition to being cross-disciplinary, potential projects must also 1) engage in problems of relevance to society, industry, and research, 2) be commercially viable, and 3) reflect areas of strengths in the region. Uppsala BIO's management selects the projects with support from a scientific advisory board, comprising five internationally recognized scientists from both academia and industry.

The Swedish University of Agricultural Sciences and Uppsala University constitute the foundation of the effort. Local life science companies also lend their active support by making industrial researchers and infrastructure available to Uppsala BIO-X projects. The strategy for the future development of Uppsala BIO-X includes building upon the base that already exists, for example by organizing research seminars and conferences with a focus on market need, by publicizing progress and activities and by extending networks of collaborators.

Activities

The first step was for the leader of Uppsala BIO-X, a hired consultant, to develop a strategy and project plan that was based on the original guidelines in the Vinnväxt application. Once this plan was approved and the scientific advisory board was appointed in the first half of 2004, the next step was to run a call for proposals. The first project was initiated in June 2004 (Tools for High-throughput Analyses of Microbial Communities). Thereafter considerable time was spent on developing routines between Uppsala BIO-X and the universities such as budgeting, follow-up, etc. The second project was then chosen in the late fall of 2004 (Lab on Chip - Point of Care), and this process was much quicker since the majority of routines were already in place. One indicator of

success for this focus area is that there were nine applicants for the first project; however, this number increased to 26 applications received for the second call. More information on the first two projects can be found at www.uppsalabio.com.

One of the most important factors in the ability of this activity to run so smoothly was the fact that the original project leader had a very strong network both within industry and research within the Uppsala region. However, while one of the main goals of Uppsala BIO-X is to fund new cross-disciplinary projects that traditionally have difficulty receiving funding because they often fall between departments and universities, UB has been struggling with whether these two new projects really are something novel and cross-disciplinary or are they just “more of the same”.

2. To Strengthen the Regional Innovation System

An innovation system is a chain of support for business ideas (figure 3), and it includes the transfer of knowledge from experienced individuals and organizations (right-hand side of the figure) and the possibility of financing (left-hand side) at each stage of a “value chain”.

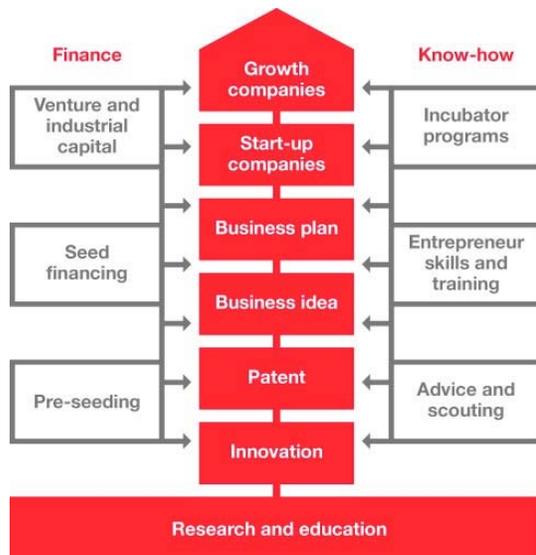


Figure 3. The Innovation System

Goals

The goal of the innovation system focus area is to develop a complete, unbroken chain of support for business projects, from a professional and thorough analysis of their potential, to a stage where they can be valued and commercialized (as either a new company, a

project within an existing company or an out-licensing). Ideas may emerge from research (Uppsala BIO-X is one such source) or from private individuals, or they may be ideas or projects which cannot be supported within local industry. Individuals with business ideas and entrepreneurial ambitions should then be directed to an appropriate instance of support and advice to develop their idea.

Strategy

Uppsala BIO's role in the innovation system is to be a central coordinator. Uppsala has traditionally had a significant number of organizations and individuals involved in scouting for and supporting business ideas. The sheer variety and number of these prevents the system from being transparent and causes the dilution of valuable resources. Thus, Uppsala BIO needed to find points of symbiosis and gather critical mass in support, advice, and financing.

Activities

During the spring of 2004, Uppsala BIO conducted several activities all directed at the initial steps of the innovation system: 1) execution of a benchmarking study of scouting in several areas of Sweden, 2) patent strategy advising, and 3) designing the contents of a Business Lab and Entrepreneurs Program together with CEF of Uppsala University (the Centre for Entrepreneurship and Enterprise Development, www.cef.uu.se). The scouting project was commissioned to CIND and was designed to improve the ability to scout for new ideas at universities and in industry that are worthy of commercializing in Uppsala. The purpose of the Business Lab was to improve the early business development processes in start-ups with a focus on developing complete business plans, and the first group of Business Lab companies was accepted in November 2004. Additionally, the Entrepreneurs Program was directed at individuals interested in starting companies yet unsure as to the commercial viability of their ideas. The first group of students entered in the spring of 2005.

In December 2004, the local incubator, Uppsala Innovation Centre (UIC), succeeded in obtaining four years of financing. As a result, the above three activities were handed over to UIC's management, and Uppsala BIO decided to focus its resources on further strengthening and building upon UIC's structure. It is important to note that the Uppsala Bio / UIC relationship is a typical one, one in which Uppsala BIO collaborates with and supports an established regional actor through the providing of resources in return for a

the ability to place certain demands on the actor's activities. More information on UIC can be found at www.uic.se.

3. To Ensure a Long-term Supply of Relevant Competence to the Region

Ensuring a supply of relevant competence to the Uppsala region involves the entire chain of competence supply - from primary schools to higher education.

Goals

Securing the availability of suitably trained, skilled people for the biotech industry as well as for the academic sector is a long-term strategic goal of Uppsala BIO. This involves the entire chain of competence supply from attracting young people to science subjects in grammar schools to offering state-of-the art, education programs at the universities as well as providing leadership programs and further education vital both for existing and budding biotech companies.

Strategy

In line with its overall operating strategy, Uppsala BIO decided to provide services for networking and coordination as well as to offer financing for well-planned and effective activities to facilitate collaboration and communication between the important players, e.g., schools, universities, industry.

Activities

Uppsala BIO has identified several activities within this area.

- **Attracting students and pupils to science.** To provide a continuous supply of competence, individuals of all ages need to be attracted to science. One of the first places to start is primary education, and it is of fundamental importance to educate primary school teachers in creating useful, inspiring education in biotechnology. UB supported such a biotechnology week for primary school teachers in October 2004. Additionally, it cooperated with Uppsala University in organizing activities for attracting youngsters to university education. Industry also plays a very important part both in attracting youngsters to select the natural sciences in school as well as providing input into the content of university courses, and one of UB's activities is thus to coordinate many of the active contacts and activities that occur today.
- **Empowering entrepreneurship and leadership.** As an important part in building the industry of the future, Uppsala BIO supports and stimulates budding entrepreneurs primarily through UIC-organized training courses (see above

section) but also through drawing attention to activities organized by others. Uppsala BIO will also conduct a project-leadership training program in the autumn of 2005 in response to the acute need for experienced project leaders by the region's biotech companies.

- **Supporting infrastructure development.** Through a co-financing agreement with the City Council in Uppsala, a number of resources have been reserved for representing the needs of the biotech sector in developing the infrastructure in Uppsala. Issues include local transportation, accommodation and development of a local high school.
- **Promoting gender management as a tool for improving competitiveness.** An important issue for the success of companies is to empower employees to achieve the very best. Uppsala BIO will take part in a government funded gender initiative that is built on the premise that an active gender management program can contribute to a company's overall profitability.

This set of activities has proved to be challenging since there is no clear line as to what responsibilities Uppsala Bio should have while the initiative's limited resources can easily be consumed in such activities. Thus, Uppsala BIO has had to ask itself consistently how it should prioritize between this category of activity and the three others.

4. To Improve the Region's Visibility Both Nationally and Internationally to Attract Investment and Competence

One important aspect of a region's competitiveness is the visibility and reputation of the region in national, European, and global outlets.

Goals

The overall goals of Uppsala BIO's visibility program involve marketing Uppsala as an internationally attractive and leading Biotech region to 1) attract investment in the form of capital and competence to Uppsala's Biotech sector, 2) support existing Biotech companies and organizations so that they stay in Uppsala, particularly foreign-owned companies, and 3) secure long-term, local support of Uppsala BIO's action plan by communicating Uppsala BIO's activities to our partners

Strategy

The strategy for achieving these goals begins with identifying the relevant target group(s) for each of the goals and defining the specific and unique strengths and competitive advantages of Uppsala.

- **Attracting capital and competence to Uppsala's biotech sector.** The target groups are investors, industry leaders, and key researchers in Europe, the US, and to some extent in Asia.
- **Supporting existing biotech activities – making them stay.** A number of biotech companies have owners in other countries as a result of mergers and acquisitions. To retain companies in Uppsala, Uppsala BIO needs to empower them to demonstrate that the region provides superior resources for their economical stability and growth.
- **Securing partners' long term interest in and support of Uppsala BIO's activities.** To ensure continued financing and local support and to inform all interested parties of Uppsala BIO's strategies and progress, a continuous flow of information to co-financers and other players in the region, particularly those who are interested in financing the project in the future, must be ensured.
- **Increasing general awareness of biotechnology in Uppsala.** Uppsala in the eyes of its inhabitants is not known for its biotechnology industry. Few are aware of how important this sector is for Uppsala and know what the companies and research provide every day. Politicians, responsible for the city's development, need to be aware of how dependent the region is on the biotech sector.

Activities

One of the primary activities in this area included improving the internal information to the co-financers of Uppsala BIO. This activity proved to be quite time-consuming initially since the project had to develop the proper meeting and communication form with almost 90 organizations. One major event organized for the co-financers was a strategy day in January 2004 in which co-financers were invited to discuss the operational strategy of Uppsala BIO.

Table 1 provides an overview of the other activities conducted by Uppsala BIO related to its visibility focus area. These included working with skilled sub-contractors and partners such as Invest in Sweden Agency (ISA), Invest in Uppsala, CONNECT, and Business Arena Stockholm (BAS), supporting local meetings and activities of high quality that in turn support the local biotech sector and Uppsala, and providing high

quality presentation material to organizations and individuals who have opportunities to present the region as part of their own marketing messages.

Goal	Target Groups	Activities
- Attracting capital and competence to Uppsala's biotech sector	- Investors - Industry leaders - Key international researchers	- PR and media - Exhibitions, trade shows, e.g., Biotech Forum - Partnering with ISA, BAS, Invest in Uppsala - BIO-X Science Conference - Website, www.uppsalabio.com - Newsletter, subscription available through website - Brochure "Biotech Hotbed? Uppsala BIO!"
- Supporting existing biotech activities – make them stay	- Investors - Industry leaders - Uppsala biotech customers - Research groups' partners - Key international researchers	- PR and media - Partnering with ISA, BAS, Invest in Uppsala - Information kits - Website
- Securing partners' long-term interest in and support of Uppsala BIO's action plan	- Co-financers - Other biotech parties in Uppsala	- PR and media - BIO-Pubs, monthly informal gatherings based on a theme, e.g., risk, the deal of the year, together with CONNECT - Website - Newsletter
- Increasing general awareness of biotechnology in Uppsala	- Uppsala locals - Politicians	- "Biotech in Town", a one day open house activity for people of all ages

Table 1. Summary of Types of Activities for Specific Visibility Goals

Several questions raised during these first 18 months revolved around what kind of information the different region's actors wanted and how it should be communicated as well as for whom the webpages should be designed. In addition, several valuable learnings were gained.

- When communicating Uppsala's strengths, *examples* were found to be very powerful and numbers of less interest. The strategy was to highlight interesting and successful individuals who had learned valuable lessons and had an interesting story to tell.
- While research at Uppsala's universities is well known in many parts of the world, the long history of outstanding discoveries from Uppsala is little known outside the city. Uppsala BIO found that it should present not only the continuing long tradition of a world-class standard in research but also an image of a city with dynamic and modern, front-line developments.

- Focusing attention on the message is more important than focusing on the messenger, Uppsala BIO. The name of a provider or the appearance of a product is meaningless if the product itself and its benefits are not clearly understood.

Creating an Effective Regional Initiative – Reflections and Observations from Uppsala BIO

Having presented Uppsala BIO and its first 18 months of activities, we now turn to our reflections on the effectiveness of Uppsala BIO that we gathered during our role as participant observers during this time. This section is divided into two parts: 1) An effective organization – an internal perspective and 2) An effective initiative – an external perspective.

An Effective Organization – An Internal Perspective

Within the organizational development and leadership literatures, there are a number of factors that are necessary in order to ensure the long-term effectiveness of a multidimensional project organization, i.e., an organization that has many different types of actors that successfully fulfills both its strategic and operational goals as well as satisfies the demands of the actors involved within a limited time frame.³ In brief, these include the following:

- An open and trusting culture
- Shared language and values
- An appropriate legal organizational form
- An appropriately staffed organization
- Strong leadership
- A well formulated work plan
- An effective decision process
- A long-term communication strategy

³ E.g., Katzenbach, J.R. & Smith, D.K. (1993). *The Wisdom of Teams: Creating the High-Performance Organization*. Boston: Harvard Business School Press, Mankins et al., (2004). *What Makes a Decisive Leadership Team*. Boston: Harvard Business School Press.

- Relevant performance indicators

Below we use these nine points to structure our discussion on some of the factors for success for an effective regional initiative. Our intention is not to provide a “how to” list, rather to provide a few points for consideration. To do so, we highlight our discussion with some examples from Uppsala BIO as well as to pose one or more questions at the end of each point that regional initiatives similar to Uppsala BIO should consider.

An Open and Trusting Culture

For any project organization to be successful, it is important that there is an environment where different opinions can be raised and discussed. While discussions in Uppsala BIO’s steering committee were open and included many different actors, a number of decisions appeared to already have been made in closed, informal situations before the meetings began. This can be seen as an indicator of the strong social network of which many, but not all, of UB’s steering committee members are members. As a result, the challenge was for those who were not members of this network to make their opinions heard.

Thus, there is a danger that a strong informal network may dominate the formal management of such regional initiative, especially when the purpose of such an initiative is to bring together people from different organizations who might not have worked together previously.

⇒ *How can an initiative ensure that the pre-existing social network among different actors does not hinder openness in the management of a regional initiative?*

⇒ *How can the initiative ensure that “new blood” and new opinions are incorporated into the initiative’s management?*

Shared Language and Values

Regional development projects that are successful often are well anchored in both the industry (e.g., biotech) and with the region’s key opinion leaders before they begin. Uppsala BIO fulfilled both these criteria and this enabled the project to quickly get started. However, once the project was initiated, it was discovered that the members of the steering committee differed in their understandings of several things. Interestingly,

one of these areas was in terms of the time perspective of the project. Generally speaking (and perhaps unexpectedly), the industry representatives had a “longer” time perspective than the public sector representatives. The public sector actors were interested in seeing more immediate results, such as increased employment. Additionally, different actors had different definitions of the same concept, e.g., a work plan. In this case there was some confusion as to whether a work plan should be a living document with room for changes underway or a document in which activities are “set in stone”. These different definitions and time perspectives led to time consuming discussions and activities sometimes heading in different directions.

⇒ *Do the different members of the initiative have a common understanding of the initiative’s strategy as well as of the time perspective and central terminology?*

An Appropriate Legal Organizational Form

STUNS – the Foundation for Collaboration between Uppsala’s Universities, the Business Community, and Society is project owner of Uppsala BIO. In this manner, Uppsala BIO differs from other regional initiatives in Sweden since it is not a legal entity, rather just one project within a larger organization. As a result, STUNS is responsible for Uppsala BIO’s management and is the employer of the project’s personnel. However, STUNS has delegated the strategic operations of the project to Uppsala BIO’s steering committee and the day-to-day operations to Uppsala BIO’s management. While this legal arrangement works fine in terms of Uppsala BIO’s management, an unforeseen taxation issue unrelated to its legal organizational form has arisen. The government questions whether Uppsala BIO is really providing a commercial service or if it is just working for the common good of the region. To date, the government maintains that Uppsala BIO is the latter and thus not entitled to deduct the sales tax (25%) that it pays on a number of expenses that it has, e.g., external consulting, supplies. This is an issue that is still not resolved despite several discussions with the tax authorities and unfortunately, one that can have a considerable negative effect on the already limited resources of the project.

⇒ *What form of legal organization is the most appropriate for the initiative’s activities?*

⇒ *What taxation and other financial issues need to be considered?*

An Appropriately Staffed Organization

A long-term perspective and continuity in Uppsala BIO are ensured through involving leading companies and other key players with significant resources in the region. Experiences from several other regional initiatives in Sweden have shown that local heroes, top executives, and key opinion leaders are often necessary initially in order to raise awareness of the initiative as well as ensure its longevity. However, these individuals may not be able to fulfill the day-to-day needs of an initiative due to considerable demands on their time. Thus, one criterion for success is also to recruit one or more middle level managers from industry and involve them in both the strategic as well as operational activities. These individuals should have both the knowledge as well as the energy and legitimacy to drive the process forward.

Additionally, Uppsala BIO's recruitment of its management was for the most part based on using existing local networks. While these tight networks support trusting and open relationships as we mentioned above, there is a risk, however, that these relationships may close out individuals not in these networks and as a result, the introduction of new ideas may be hindered.

- ⇒ *What mix of individuals should be incorporated in the initiative's management – key opinion leaders vs. people who have time to involve themselves?*
- ⇒ *How should individuals be recruited for the initiative?*

A second point for discussion is the role that external consultants play. Uppsala BIO was heavily dependent on external consultants with several going in and out of the project's management team in the initial phases. On the whole this arrangement did provide some value in terms of management being able to accomplish several activities initially. However, it is important to question how this turnover affected the knowledge accumulated by the project over time since when these consultants left, they took their knowledge with them. Additionally, this turnover might have affected the impression that other actors in Uppsala had of Uppsala BIO, i.e., is Uppsala BIO just a temporary organization?

- ⇒ *Which initiative activities should be kept in-house such that knowledge remains with the organization?*

⇒ *If external consultants are to be used, how can an initiative ensure that their knowledge is retained by the initiative?*

Strong Leadership

Due to the often conflicting goals of the initiative's supporters (academia, industry, and government), management must be strong enough to follow its own lines while ensuring that all stakeholders' demands are adequately handled. Additionally, the management's members should be able to work together in a team. These teams should not be seen, however, as static, rather they should be flexible in order to accommodate the development or discontinuation of initiative activities. Finally, as in the start-up of almost any organization, it is important that management has a broad network and is able to command the required resources from this network.

⇒ *What is the right profile of the initiative's management?*

A Well Formulated Work Plan

A project plan should not be "set in stone" – a significant part of the dynamics of an effective organization is the ability to take a step back and make the necessary changes. Uppsala BIO's work plan was continuously under construction during the first 18 months. At one point, however, it hired an external consultant to perform some of this work because there was a feeling that a final document needed to be produced. This proved to be unproductive since this external person had not been involved in the project's activities. As a result, Uppsala BIO now understands that it is necessary to have someone on the management team to complete this task since it is not necessarily the document itself but the process that is the most important.

⇒ *What purpose should a work plan serve?*

⇒ *What format should it have, e.g., how often should it be updated, who should be involved?*

An Effective Decision Process

Both the overarching management, e.g., steering committee or board, and the daily management fill important roles for any initiative. However, to ensure an effective

decision process, strategic issues and operational issues should be discussed separately. In the case of Uppsala BIO, many operational issues were discussed in the steering committee meetings, which often led to very long and inefficient meetings. For example, project leaders would inform the steering committee in detail of their daily activities and as a result, the steering committee members would often ask detailed low level questions. Thus, it is important to ensure that the right questions and topics are presented in the right fora.

⇒ *What questions are the appropriate ones for the steering committee or board?*

A Long-term Communication Strategy

As discussed above, it is important that management focuses its communication efforts on actively marketing and making visible the initiative both internally within the region as well as to the outside world. In this manner, the initiative can both gain support from local actors as well as to encourage investment from organizations in other areas of the world.

⇒ *What efforts should the initiative make to market itself internally as well as externally and what is the appropriate balance between the two?*

⇒ *How can the initiative ensure that realistic expectations are communicated without risking a decline in external interest in the initiative?*

Relevant Performance Indicators

A further important principle of Uppsala BIO's operating strategy is to develop a means of measuring progress in its key activities since measurable project goals are a critical part of assessing progress and success. In its original strategy document, Uppsala BIO designated a few quantitative goals: 1) doubled employment in biotech related positions from 4000 to 8000 employees, 2) an increase in the number of biotech researchers at Uppsala University and at SLU from 900 to 1500, and 3) an increase in the region's gross regional product of 6% on average per year. However, while these may be relevant performance indicators for the region as a whole, it is difficult to determine what effect Uppsala BIO has on the numbers being measured by this type of indicator. Thus, the challenge is to develop the relevant performance indicators. These may not necessarily

be only based on results, but they might also be based on Uppsala BIO activities, thus they may measure progress in areas that do not normally lend themselves to metrics. One action Uppsala BIO did take was to create a baseline set of data through conducting a survey of the region's actors, which was designed to look both at results as well as the process. More information on this survey can be found in an article at www.cind.se.

⇒ *What are the relevant performance indicators – both based on results as well as process?*

⇒ *How can the initiative ensure that its activities are in line with these performance indicators?*

An Effective Initiative – An External Perspective

Finally, we discuss below three areas that are interesting in terms of regional innovation systems in general.

Intellectual Property

While programs such as Vinnväxt encourage the development of intellectual property through promoting basic research, it is important for each region to have a strategy in terms of the commercialization of its intellectual property. In some instances, the intellectual property may be commercialized within a firm in the region; however, it might be just as likely that a patent be sold or licensed to a firm outside of the region or even the nation altogether. Recently, a considerable amount of intellectual property has left Uppsala, bought by firms outside of Sweden. One of the most recent events is the sale of NeoPharma to Solvay Pharmaceuticals and the subsequent decision to move NeoPharma's operations to Belgium. The question thus remains as to whether this exodus of intellectual property is beneficial for the Uppsala region in terms of value creation through increased employment.

⇒ *Does the region/initiative have a clear strategy for what the different commercialization routes are for patents developed using regional funds?*

Regional Boundaries

Regional boundaries are difficult to define and Uppsala is no exception to this. Only 65 kilometers to the north of Stockholm, Uppsala could be considered to be a part of the greater Stockholm area if one were to think in “Silicon Valley” terms. In addition to the Uppsala BIO initiative, there is also a biotech initiative in Stockholm as well as in Mälardalen, the region just east of Stockholm. Thus, a matter for discussion is to what degree and how these different regional initiatives should cooperate.

⇒ *To what degree and how should regional initiatives cooperate to gain critical mass?*

⇒ *What actors are the most appropriate ones for cooperation and how does an initiative ensure that a trusting relationship can be built?*

Creating New Innovation Structures

As mentioned above, Uppsala BIO is embedded in an environment characterized by strong local networks and a very traditional academic culture. While on the one hand, this may lead to openness and trust between the actors, these networks may leave to core rigidities, or inappropriate knowledge sets that preserve the status quo and limit new insights, resulting in gaps between the knowledge of the region and changing market conditions. Additionally, it is important to note that the resources that Uppsala BIO has been granted, while large in the regional development perspective, are small relative to the research budgets of the universities. Thus, a long-term question is to what degree Uppsala BIO can really affect the region.

⇒ *How can a regional initiative ensure that it changes and not reinforces the old structures that might work against developing a dynamic regional innovation system?*

⇒ *How can a regional initiative ensure the promotion of its own regional development while at the same time maintain an open attitude towards actors outside the region?*

Conclusion

In conclusion, the objective of this chapter was to present the initial activities of one regional competitiveness initiative, Uppsala BIO – the Life Science Initiative, as well as a set of reflections on these activities made by a group of participant researchers through a longitudinal study. As the number of these regional initiatives continues to grow, it is important that the learning from ongoing initiatives is disseminated to others such that valuable resources are not wasted through the “reinvention of the wheel”. In the case of Uppsala BIO, the initiative’s management decided to focus on using its limited resources to *primarily initiate regional activities in collaboration with existing regional actors as opposed to initiating and leading its own activities*. Through an analysis of the challenges and resources in the region’s innovation and commercialization value chain, Uppsala BIO defined four focus areas: 1) promoting cross-disciplinary biotech research with a strong product focus through the establishment of a cross-disciplinary research center, 2) strengthening the region’s innovation system through the development of an incubator to provide operative support for the commercialization of research findings, 3) ensuring the long-term supply of relevant competence to the region, and 4) improving the region’s visibility both nationally and internationally in order to attract investment and competence. Thus, our hope was that this chapter was relevant to both practitioners and policy makers involved in regional initiatives as well as researchers working to understand the dynamics of such initiatives.

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