The interplay of regional systems of innovation, strategic alliances and open innovation

Jean-Pierre SEGERS

Modern biotechnology is a driving force and a full grown industry in the international economy with ongoing and rapid innovations. The emphasis of this dissertation is on the valorization of red biotech, i.e. pharmaceutical and healthcare applications. Belgium has firmly established itself as an international red biotechnology country, with a world class biotechnology industry in the Flanders and Wallonia bioRegions.

Developing a domestic biotechnology industry - and hence new biotechnology firms - can be influenced by regional policy. The pharmaceutical-biotechnology regional and sectoral innovation system is characterized as an international and dynamic network architecture involving numerous players engaged in drug discovery. Regional governments and dedicated public and private network organizations have supported emerging new biotechnology firms by providing critical resources and by promoting an institutional environment that has enabled partnerships between universities, highly specialized research centers, small science based academic spin-offs and corporate spin-outs and large global pharmaceutical companies. Both policy and big firms look at the new biotechnology firms from a strategic point of view. The policy objective is the emergence of new and sustainable firms in the region; the big firms objective is the filling or renewal of the pipelines of products.

New biotechnology firms are both beneficiaries and targets of strategic partnering alliances with large and global (bio)pharmaceutical companies. A number of the Belgian new biotechnology firms hold a nodal position as "most preferred partner" with multiple alliances in dynamic R&D networks. They have a high degree of integration into global technological networks through strategic alliances. Strategic alliances and open innovation are commonly leveraged. Despite their small size and relative immaturity, some of the new biotechnology firms are able to adopt innovative business models by providing R&D and services to large biopharmaceutical companies and by cooperating with them through open innovation.

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He is a regular speaker and invited workshop expert at international conferences, presenting his research and publications in the field of small business management, entrepreneurship, entrepreneurship education, startup ecosystems, new biotechnology firms (new technology based firms), open innovation, regional systems of innovation and public-private partnerships. He is also member of the review boards of a number of national and international journals.

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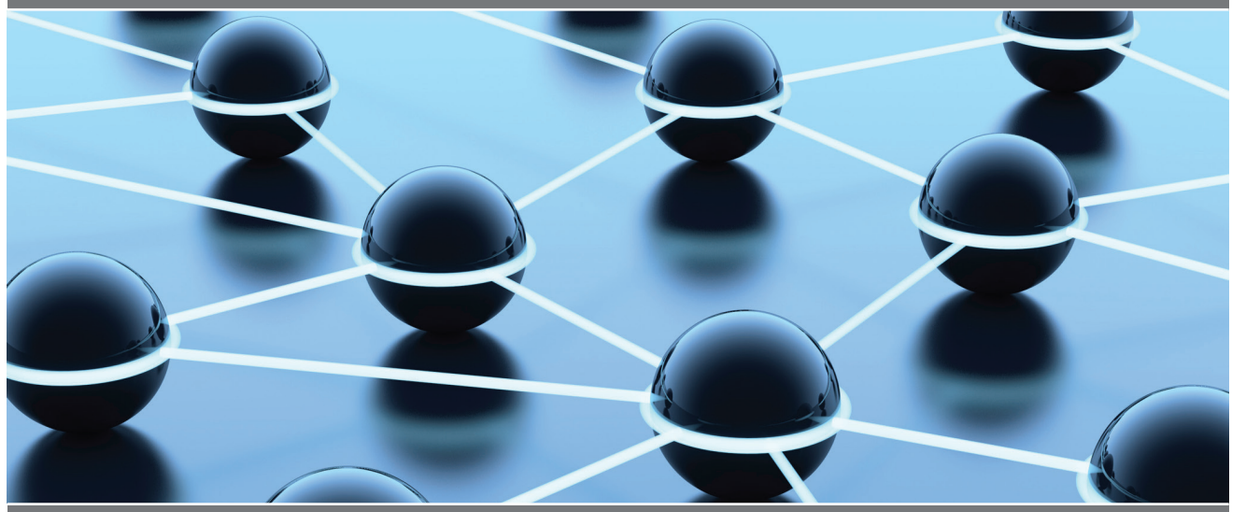

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The interplay of regional systems of innovation, strategic alliances and open innovation

The Case of New Biotechnology Firms in the bioRegions of Flanders & Wallonia (Belgium)

Thèse présentée en vue de l'obtention
du grade de Docteur en Sciences
Économiques et de Gestion

Jean-Pierre SEGERS

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Résumé

Les startups belges en biotechnologie occupent une place de choix au niveau européen.

La thèse se concentre sur les bioRégions de Flandre et de Wallonie et ce, dans un contexte global où les sciences de la vie et l'industrie biotechnologique (biopharma) jouent un rôle primordial dans la recherche et le développement, la santé publique, la recherche de nouvelles thérapies et de médicaments pour de nombreuses familles de maladies, la proximité du patient et enfin et ce n'est pas des moindres, l'emploi. Au niveau mondial, la Belgique occupe une place enviable par son nombre et la qualité de ses petites startups biotechnologiques d'une part et, d'autre part, la présence de grands groupes pharmaceutiques internationaux. « Les secteurs publics régionaux participent activement à l'élaboration et au développement de cet écosystème » ajoute Jean-Pierre Segers, dans sa plaidoirie pour une plus ample et plus solide collaboration interrégionale (megaclustering).

Selon dr. Jean-Pierre Segers, pas mal d'alliances stratégiques dans ce secteur sont à mettre en rapport avec les principes d'innovation ouverte, principes de plus en plus reconnus et présents. Les deux sont – à côté du capital risque nécessaire– d'une très grande importance pour les jeunes entreprises biotechnologiques belges (flamandes et wallonnes). On assiste à une évolution constante et tangible qui en fait pratiquement les partenaires privilégiés du réseau international d'entreprises biopharmaceutiques comme Johnson & Johnson, AbbVie, etc. Des entreprises telles que Ablynx, Galapagos, Argenx, ThromboGenics et Mithra Pharmaceuticals et d'autres encore travaillent dur à leur croissance et à celle de leur région. Le revers de la médaille est le risque bien présent qu'un grand groupe pharmaceutique ne tente de les reprendre ou de les absorber (étant donné le niveau élevé et performant des recherches sur lesquelles elles travaillent, les nouveaux médicaments, diagnostiques). Une bonne gestion d'alliance est donc indispensable.

Le coeur du projet de thèse doctorale est lié au start-ups technologiques dans le secteur des biotechnologies et les approches partenariales, c'est à dire, des questions de recherche par rapport aux enjeux stratégiques du secteur pharmaceutique et biotechnologique et à l'innovation ouverte.
Des recherches antérieures montrent que les performances en matière d'innovation sont associées au système, à la collaboration et à la mise en réseau. L'intérêt pour l'innovation ouverte est croissant. Il manque des études qui explorent l'interaction entre les systèmes régionaux d'innovation, la formation de grappes technologiques, les nouveaux modèles économiques parfois disruptifs, les partenariats stratégiques et les pratiques d'innovation ouverte.

Nous observons que les entreprises de biotechnologie se sont lancées dans l'innovation ouverte en se regroupant et en formant des partenariats de manière intensive pour innover à partir des connaissances existant à l'intérieur et en dehors de leur périmètre. L'accent de cet étude est mis sur l'interaction entre les nouvelles entreprises de biotechnologie en Belgique dans les bioRégions Flandres et Wallonie, les alliances stratégiques et l'innovation ouverte, dans un contexte de renforcement par le système régional d'innovation et grappes biotechnologiques.
La structure industrielle est dominée par les plus grosses entreprises pharmaceutiques mondiales, qui capitalisent plutôt sur des liens éphémères avec des sociétés de biotechnologie innovantes pour avoir un accès permanent à de nouveaux produits ou actifs (technologies, process, prototypes, produits) où qu'ils soient. L'innovation est diffusée en mondial et la dynamique contractuelle est très forte pour la capter et faire face à la compétitivité globale.

Les grands groupes pharmaceutiques mondiales bénéficient de la flexibilité, de l'agilité et du dynamisme des nouvelles entreprises de biotechnologie pour accélérer leur innovation dans un contexte concurrentiel et technologique mouvant et pour étoffer leur portfolio avec des solutions innovantes et souvent complémentaires (Alcimed, 2016b). Les nouvelles entreprises de biotechnologie s'appuient quant à elles sur les grosses entreprises pharmaceutiques pour accélérer leur croissance.

ABSTRACT

Modern biotechnology is a driving force and a full grown industry in the international economy with ongoing and rapid innovations. Belgium has firmly established itself as an international red biotechnology - i.e. pharmaceutical and healthcare applications - country, with a world class biotechnology industry in the Flanders and Wallonia bioRegions.

The focus of this study is on the interplay between new and innovative biotechnology firms, the influence of strategic alliances with large global (bio)pharmaceutical companies and the role that open innovation might play in the further reinforcement of these relationships within regional biotechnology clusters (bioRegions).

The research is addressed from the point of view of :
① the policy governance level (i.e. regional systems of innovation);
② the firm level (i.e. new biotechnology firms and their large counterparts, the big pharmaceutical companies). It provides a longitudinal perspective to the biopharma industry.

This dissertation takes a closer look at the strategic alliances portfolios of these small and large firms, together with the fairly new open innovation practices, through a set of four related research papers.

The first paper on strategic links between high-tech firms in the biotechnology and micro-electronics industries sheds considerable light on the networking process. It was published in Small Business Economics (Segers, 1993). A large body of literature was reviewed with respect to new technology based firms. The paper builds on the strategic regional technology policies that have been adopted in Belgium since the beginning of the 1980s. The regional dimension of technology policy raises the question whether a relationship can be established between strategic technology policy and the emergence of new technology based firms in Flanders and Wallonia. The key research questions are closely linked to the technological and marketing relationships between large and small firms by means of interfirm technology partnerships, i.e. strategic alliances. In addition, the potential pitfalls were identified. A multiple case study design was chosen to develop an understanding of the impact of strategic partnering on new technology based firm-survival and growth. To improve the reliability of conclusions, a small number of cases on Belgian new technology based firms in the biotechnology and micro-electronics industries were analyzed for the construction of a theoretical model.

The second paper (Segers, 1996) covers the role of regions and the policy incentives of regional governments in supporting technology-based entrepreneurship by means of the strategic regional technology policies that were adopted in Belgium since the beginning of the 1980s: THIRF/DIRV in 1983 in Flanders and the Opération ATHENA in 1982 in Wallonia. It was published as a book chapter in Gomez-Mejia et al. (1996). A large sample of literature and definitions on new technology based firms and strategic technology partnering was presented. A survey and case study design were used to highlight the characteristics of and differences between common starters and high tech entrepreneurs in the biotechnology and micro-electronics industries. One of the principal conclusions was that the combination of a small firm's know how with a larger firm's resources opens opportunities for synergies that can contribute to both firm's competitive advantage and to the creation of a regional growth potential.

In the third paper – published in Journal of Global Entrepreneurship Research (Segers, 2015) – new technology based firm survival and growth are connected with strategic partnering alliances and open innovation within technology clusters. Strategic alliances in the biotechnology industry allow new technology based firms to gain a foothold in this high-cost, high-risk industry. The impact of strategic alliances and open innovation on the success of new biotechnology firms in Belgium is examined by developing multiple case studies of firms in regional biotechnology clusters. A longitudinal follow up of the Belgian biotech startup ecosystem is presented. The main conclusion is that the future of new biotechnology firms in Belgium lies in the effective establishment of strategic alliances.

Finally, the fourth paper (Segers, 2016) elaborates on the interplay between regional systems of innovation, biotechnology clustering, closed and open business models and open innovation. The paper was published in Journal of Small Business & Entrepreneurship. The survival and growth of Belgian new biotechnology firms is put in perspective with their involvement in strategic alliances and the emerging attention for open innovation within biotechnology clusters (bioRegions). With regard to the concept of bioRegions, a comparison is made between Belgium and Germany. The focus of the case study design is on a sample of 30 new biotechnology firms. An overview of good practices and benchmarks with respect to open innovation is added to supplement the case-based evidence.

In conclusion, developing a domestic biotechnology industry - and hence new biotechnology firms - can be influenced by regional policy. The pharmaceutical-biotechnology regional and sectoral innovation system is characterized as an international and dynamic network architecture involving numerous players engaged in drug discovery. Regional governments and dedicated public and private network organizations have supported emerging new biotechnology firms by providing critical resources and by promoting an institutional environment that has enabled partnerships between universities, highly specialized research centers, small science based academic spin-offs and corporate spin-outs and large global pharmaceutical companies. Both policy and big firms look at the new biotechnology firms from a strategic point of view. The policy objective is the emergence of new and sustainable firms in the region; the big firms objective is the filling or renewal of the pipelines of products.

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