

THE RISE OF THE GHENT (BE) INNOVATION DISTRICT: THE CASE OF THE BIOTECHNOLOGY INDUSTRY

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Abstract. Belgium has firmly established itself as a world-class international player in red and green biotechnology - i.e. pharmaceutical and healthcare applications, medtech and plant biotechnology, with a fast evolving (bio)pharmaceutical industry in the Flanders and Wallonia bioRegions. It is a complex network of large corporate players with strong marketing capabilities and new biotechnology firms that focus on research and development.

This contribution explores the evolution of the red and green biotechnology cluster in the bioRegion of Flanders (Belgium), in particular in the Ghent innovation district - Tech Lane Ghent - building on

(1) the economywide country study by Segers (2017) on the interplay between new and innovative biotechnology firms, the influence of strategic alliances (interfirm partnerships) with large (global) pharmaceutical companies and the role that open innovation might play in the further reinforcement of these relationships within regional biotechnology clusters (bioRegions);

(2) the methodology on innovation districts provided by Katz and Wagner (2014) and Wagner, Katz and Osha (2019), defining the innovation district as an urban geography of innovation that sits at the intersection of economy-shaping, place-making, and network-building and as a geographic area where anchor institutions and companies cluster and connect with small firms, start-ups, business incubators and accelerators.

In this contribution, the Ghent innovation district is highlighted. It shows that triple helix and public private frameworks provide good practices for new biotechnology entrepreneurial ventures in conjunction with the strategic alliances with big pharma. Fruitful collaborations with top level university research institutions and major publicly-funded cluster organizations enhance R&D-investments and result in new spin-offs.

Keywords: *Belgium; bioRegions; Biotechnology; Innovation districts; Pharmaceuticals;*

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Biotechnology in Belgium

The global biotechnology economy is knowledge-based and a major engine for regional economic growth with clusters of biotechnology companies situated around major publicly-funded research universities and institutions.

The biotechnology and pharmaceutical industry is one of the driving forces of the Belgian economy. According to the OECD reports, Belgium is among the leading countries for performance in innovation and industry development as measured by patent applications, the number of drugs in the pipeline, the growing financing scene (public and private equity, initial public offerings/stock exchange listings) and the number of new biotechnology firms. The Belgian pharmaceutical industry is highly R&D-intensive. The bioRegions of Flanders and Wallonia host a large number of global players in pharmaceutical research and development and also with respect to green and agro-technology.

Belgium – with Flanders in the North and Wallonia in the South - has firmly established itself as a world-class international player in red and green biotechnology and as the life sciences frontrunner in Europe, the latter is supported by Belgium accounting for 23% of the total European aggregated market cap in 2018. During the last 30 years, the biotechnology industry in Belgium has mainly developed around red and green biotech, in particular:

- pharmaceutical and healthcare applications (leading edge drug development), medtech and diagnostics, big data (RED);
- plant biotechnology (plant genetic engineering), agro-food biotech, crop protection, hybrid seed technology, bio-based economy (GREEN).

As the economywide country study by Segers (2017) showed, there has been a fast evolving (bio)pharmaceutical industry in the Flanders and Wallonia bioRegions, with in addition a world-class green agro-tech industry in the Flanders bioRegion. In his recent research, Segers (2015; 2016; 2017) focused on the interplay between new biotechnology firms, the portfolio of strategic alliances with big (global) pharmaceutical companies and the role that open innovation might play in the further reinforcement of these relationships within the regional innovation system, more in particular in the bioRegions.

The research results showed the 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.

The regional systems of innovation led to the creation and growth of the bioRegions of Flanders and Wallonia, characterized by “a complex network of corporate players, dominated by large firms with strong marketing capabilities and start-up firms that focus on research and development” (Pereira, 2006).

The Belgian biotechnology model was clearly created as a university spin-off model. Strong collaboration between research institutions, universities, financiers and existing companies has resulted in many university spin-offs. Networked research centers and interuniversity poles of excellence were created to provide a strategic orientation for biotechnology research. In Flanders as well as in Wallonia the biotechnology and life sciences industries are represented by a number of regional government and private sector network organizations that actively participate in the biotechnology clustering activities.

Belgium is specializing in subsectors of red and green biotechnology, i.e.:

- Flanders bioRegion: nano- and antibodies (llama); immuno-oncology, Rheumatoid arthritis, molecular diagnostics; plant biotechnology.
- Wallonia bioRegion: (stem) cell therapy; women’s health; molecular diagnostics.

Innovation District

A cluster is “a geographical concentration of actors in vertical and horizontal relationships, showing a clear tendency of cooperating and sharing their competencies, all involved in a localized infrastructure of support” (Zechendorf, 2011). They include government agencies, public organizations, higher education and research institutions, cooperating companies, suppliers and financial structures. They compete and cooperate simultaneously within the same industry sector. Geographical proximity provides a platform for strong cooperation and the flow of knowledge and expertise between research institutions, companies and policy makers.

For the purpose of this contribution, a bioRegion is defined by the definition of the European Commission (PwC, 2011; Zechendorf, 2008; 2011): “Any

geographically meaningful entity which can, but has not necessarily, to be a political or administrative entity for which the promotion of biotech and/or life sciences has been defined as a priority. Such a bioRegion can, but need not, contain one or several bioclusters and biotech, bioscience, life sciences parks, which are supposed to interact in order to enhance their efficiency”.

One of the most fashionable ideas in regional economics - next to regional innovation systems and clusters – are the so-called “innovation districts”. Typically high density, mixed live/work/play areas in larger cities, centred around tech firms and R&D/education facilities, they are designed physically and functionally to encourage interaction and open innovation (Green, 2016). Driven by broad economic and demographic trends, cities around the world are witnessing their emergence (GIID, 2019) as powerful economic engines advancing city and regional prosperity. These cities to a large extent meet the three preconditions that matter to the development of successful districts:

- (1) economic assets, e.g. research-intensive companies, universities;
- (2) physical assets, e.g. coworking spaces, close proximity among buildings, shared lab facilities; Research and innovation driven universities and industries are likely to rely on density and proximity because tacit knowledge is exchanged through close connections and is difficult to translate and transfer over long distances (Wagner, 2018);
- (3) networking assets, that refer to the relationships between actors to generate and accelerate development of ideas (Tercanli, 2019).

Innovation districts are a new strategy for urban economic development. The benchmark methodology is provided by Katz and Wagner (2014) and Wagner, Katz and Osha (2019), defining the innovation district as follows:

- a geographic area where leading-edge anchor research institutions and mature companies cluster and collaborate with small firms, start-ups and scale-ups, labs, business incubators and accelerators;
- an urban geography of innovation that sits at the intersection of economy-shaping, place-making and network-building;
- they are zones designed to attract and support innovative companies and workers, by clustering startup firms and entrepreneurs along with programming and services such as incubators, mentoring and networking events (Drucker, 2019);
- innovation districts are dense hubs of economic activity where innovation, entrepreneurship, creativity, and placemaking intersect (GIID, 2019);

- innovation districts embrace the attributes of density and proximity to facilitate collaborative, “open” innovation and strong social networks.

The innovation district actors include amongst others:

- top anchor institutions, such as advanced research universities, shared lab facilities, hospitals and medical centers;
- national, regional and local government;
- anchor and growth companies, particularly those with research and development strengths;
- start-ups, spin-offs, and scale-ups;
- public and private equity investors; venture capitalists.

Tech Lane Ghent

Ghent in the Flanders bioRegion is home to one of the world’s largest concentrations of biotechnology activities. Tech Lane Ghent is made of two interconnected biotechnology clusters with unique specializations and niches within the respective domains of biotech, i.e.:

1. the (bio)pharmaceutical cluster (red biotech), i.e. therapeutic research and technology platforms in leading edge drug development with blockbuster potential;
2. the agro-tech cluster (green biotech), with an historical focus on leading edge plant biotechnology.

Drawing on the methodology on innovation districts developed by Katz and Wagner (2014) and Wagner, Katz and Osha (2019), the question is raised here whether Tech Lane Ghent can be categorized as an innovation district (see Fig. 1 below).

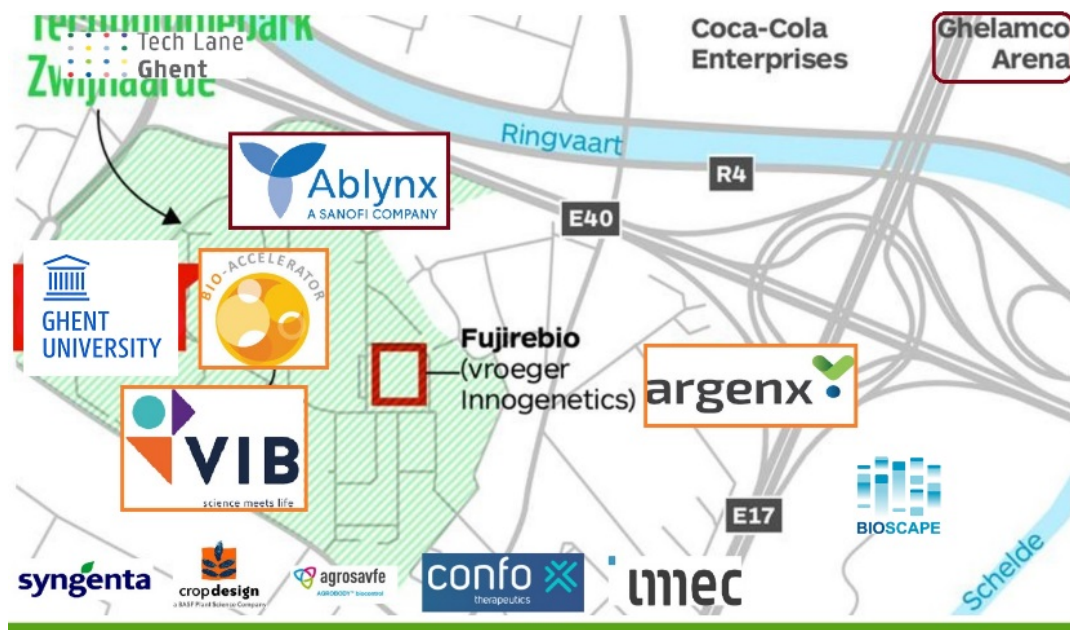


Fig. 1: Tech Lane Ghent

Tech Lane Ghent was created in 1986 as a science park and is owned and managed by highly ranked Ghent research university in Belgium. It has three major innovation clusters, i.e. life sciences, materials and digital technologies. The main domains of world-renowned expertise within life sciences are antibody therapeutics, inflammation research, plant biotechnology (agrotech) and food technology.

The anchor institution within the innovation district is the life sciences research institute FIB/VIB, i.e. the Flemish Institute for Biotechnology (VIB: Vlaams Instituut voor Biotechnologie). Also present is IMEC, the Interuniversity Micro-Electronics Center. Both organisations are regional government funded centers of research excellence.

FIB/VIB (2014) focuses on translating basic research results into pharmaceutical, agricultural and industrial commercial applications. It has a diverse portfolio of spin-offs in red or green biotechnology. The proximity of leading research centers like the Ghent Center for Plant Systems Biology create a unique synergy. Commercial exploitation of scientific results is achieved by means of a substantial patent portfolio and a vast number of R&D and licensing agreements worldwide. FIB/VIB also enables an open innovation strategy.

Some of the current corporate ventures in Tech Lane Ghent are:

Red biotech

- Ablynx-Sanofi: nanobody platform (llama antibodies) across a range of therapeutic indications including hematology, inflammation, infectious disease, autoimmune disease, oncology and immunoncology;
- Argenx (alliances with Janssen Pharmaceuticals; AbbVie): antibody platform (llama); immunology and orphan diseases;

Green biotech

- BASF Crop Design (+ takeover of Bayer Crop Science);
- Syngenta (with the former DevGen acquisition) and now ChemChina;
- Agrosavfe (llama antibodies).

Conclusions

The main question raised in this contribution was whether Tech Lane Ghent in the Flanders bioRegion can be categorized as an innovation district.

The real world evidence shows that this is the case, given the multiple red and green biotechnology ventures that have arisen from the triple helix framework (small and large business – regional government and cluster organizations – academia and top level research) in conjunction with multiple strategic alliances.

Future research might focus on developing a deeper insight into:

- the impact on the regional economy;
- firm performance within the innovation district;
- the internal and territorial resources (see e.g. the work by Wilmotte and Halleux, 2018).

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