BIOTECH in FLANDERS
A Stunning Story

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When bright minds work together, the results follow suit

It's no coincidence that Flanders is home to one of the world's most vibrant life sciences & health ecosystems. This book offers an inside look at how the region positions itself as a leading hub for life sciences and biotech research and innovation in Western Europe through a deliberate and strategic approach.

The region's recipe for success includes some well-known ingredients. Think, for example, of its strategic location and its vivid network of global life sciences players and scientific institutions. There's also the fact that Flanders provides proactive support, financial incentives and top-notch talent. By highlighting these unique opportunities, Flanders Investment & Trade (FIT) plays a vital role in attracting biotech and life sciences firms to Flanders. But one other element stands out as particularly convincing. It's the glue that holds everything together: collaboration.

After all, innovation doesn't happen in a vacuum. It requires uniting the right people and organizations to create the right synergies at the right time. True to this spirit, Flanders has implemented a comprehensive and integrated approach to developing a knowledge-based innovation ecosystem. How? By attracting and retaining talent, promoting open innovation, focusing on key industries, forging international partnerships, investing in research infrastructure, and more.

This has helped create a collaborative ecosystem that unites academia, businesses, civil society and government entities. It also enabled Flanders to leverage R&D for economic development and innovative competitiveness. The figures tell the tale. In 2020, 3.60% of Flanders' GDP was spent on R&D by the private, public and academic sectors combined. This makes Flanders number 1 among all EU member states. Secured by FIT, foreign direct investment (FDI) only added – and continues to add – to the sustainable progress of Flanders' innovative ecosystem. To highlight just one example, 1 in 4 new jobs created through FDI in 2022 was connected to R&D.

When bright minds think and work together, the results follow suit. FIT walks the talk in this regard as well. As such, we work closely with biotech cluster flanders.bio and VIB, Flanders' strategic research center for life sciences & biotech. In addition, we strive to identify and multiply innovative opportunities across national borders. To this aim, we have expanded our international network with ten Science & Technology Offices for health, digital and climate tech: in New York, Palo Alto, Paris, London, Copenhagen, Munich, Mumbai, Singapore, Guangzhou and Tokyo.

What ties all these efforts together is a firm belief in the power of research, innovation and internationalization for our global economy and prosperity – and vice versa. As you read through this book, I am confident you'll join us in this vision.

May it inspire your plans as you discover the unique story of biotech in Flanders.

Joy Donné
CEO of Flanders Investment & Trade (FIT)

Preface by the authors

In 2023, it will be exactly forty years since the first Flemish biotech company saw the light of day. In those forty years, a lot has happened and many tales have been written, which today form the basis of the so-called Flemish biotech 'ecosystem'.

In those forty years, Flemish researchers and pioneers have made discoveries that have resulted in seventeen drugs, which affect the lives of more than two million patients per year. In addition, numerous discoveries have been made that are used daily in agriculture, in our labs and medical cabinets, which only few know have come from Flanders. Entrepreneurs and their teams have had hundreds of meetings to convince investors to support these Flemish innovations and choose them over all other investment proposals that land on their desks. With success. More than 10 billion euros found its way through Euronext, Nasdaq, Easdaq or through private investment to Flemish biotech companies. Every euro invested in the sector is worth at least four euros ten years later. Every euro the Flemish government invested in VIB's research is worth eleven euros today. In 2023, sixty thousand people work directly or through supporting jobs in the Flemish biotech sector. That is a stunning story, without question. It is a story of people and teams. Of perseverance, of trial and error and of chance discoveries and encounters.

The idea for this book came about during a conversation at Knowledge for Growth (the annual high mass of Flemish biotech) between the undersigned, when we reflected on the fact that some of the giants and iconic pioneers of the Flemish biotech story were quietly retreating and became less visible. While retrieving anecdotes and memories of achievements of companies of the past, it immediately became clear that a lot of knowledge would be lost if we did not carefully put it down in a book. We could make this book coincide with the milestone of at least forty years of biotech history in Flanders.

Instead of proceeding chronologically and describing history step by step, we looked for similarities between these remarkable stories and what we found in terms of information about the (bio) technology, the innovations and the companies.

Thus, the book is structured around information about antibodies, nanobodies or small molecules rather than around companies or people or timelines. It was not to be a book that would focuse on particular individuals because that would probably not recognize others. Moreover, we especially wanted to keep ourselves from making mistakes caused by the not always verifiable nature of certain anecdotes and storylines surrounding certain events. It had to be an objective book, without the inherent obligation to overload it with references. It had to focus on the key events, companies and milestones that have determined the growth of the Flemish biotech 'ecosystem' and what it now offers. The book had to be accessible to the experienced biotech researcher, the investor and manager, as well as to their family members and acquaintances and the interested reader. It had to be a book that could be used to tell the story to foreign friends and colleagues. It is up to the reader to judge whether these goals have been too ambitious or not.

The book is based on interviews with several privileged witnesses and on a great many public documents and reports. It would never have come about without the efficient collaboration with Peter Raeymaekers and Geerdt Magiels and access to their memory and fluent pen. The teams from Kempen, IQVIA, KBC, VIB and flanders.bio also provided critical support and materials. We also thank, of course, the many private sponsors and the companies that gave this project their unconditional support on the basis of nothing but a brief summary.

Belgium and Flanders have a worldwide reputation for products like chocolate and beer. With this book we want to convince the reader that in recent decades another quality product has been added namely the Flemish biotech 'ecosystem'.

Jo Bury, Johan Cardoen and Dirk Reyn

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Introduction

Biology is everywhere … and technology follows in its footsteps

Our lives are permeated by an intimate connection between biology and technology. The products and processes that make our lives pleasant, exciting, tasty and comfortable are very often the result of applied biological knowledge. Washing powders that break down dirt at low temperatures thanks to enzymes, vaccines based on the genetics of pathogens, beer, cheese and bread made with yeasts, immunotherapies against cancer, bacteria that purify waste water, the wide variety of fruit, vegetables and animals, DNA traces that help solve crimes, genetic tests that detect diseases … the list is long.

Knowing the biology of genes, proteins, molecules, cells and organisms helps to make our world safer, healthier and more sustainable. The life sciences, which try to understand all aspects and forms of life, are a young discipline. In half a century they have evolved from the first tentative sketch of the DNA molecule to in-depth insights into the role of genes, proteins, sugars and fats in the health and disease of humans, animals and plants. Many of these complex processes of life are not yet fully understood, but science continues to search for causes and effects in the complex networks of biological systems, from the smallest to the largest, from the derailed cell division in an individual cancer cell to the conversion of carbon dioxide that plays a role in climate change.

Life sciences and biotechnology are indispensable to meet the challenges of the future, on a planet with more than eight billion human inhabitants, where biodiversity and ecological capacity are under increasing pressure and pandemics, hunger and poverty are taking their toll. We are on the threshold of new developments whose outcome is difficult to predict. What we do know is that over the past century, Belgian and Flemish researchers and entrepreneurs have made significant contributions to them, creating a rich breeding ground on which a diverse landscape of life science research, development and entrepreneurship now flourishes and where products are created that help millions of patients worldwide. This book tells that history. It is a story of local events and global dimensions, of serendipity and tenacity, of human, financial and material capital, and above all of curiosity and daring, but also of trial and error.

That history does not stop here and now, but points to the future. More than ever, and thanks to life sciences, we realize how much man holds the fate of himself and all life in his hands. The challenges of the coming decades are great, and science and entrepreneurship will be indispensable in ensuring a safe, healthy and sustainable future for all that lives.

A landscape of science

Flanders is a world player in life sciences, or the study of all life forms, and in particular in biotechnology, the practical application of that knowledge using technology. Thanks to a fruitful cross-fertilization between high quality health care, excellent scientific research, bold entrepreneurship, high-risk financing and a supportive government, an academic and industrial network has emerged in recent decades, building on the pioneers of the 1980s, that is perceived as unique in Europe.

This is not promotional talk but speaks from the reality of the 'Flanders biotech valley', between Meuse and North Sea. Belgian biotech and pharma companies together employ more than forty thousand people directly, more than double the European average per capita. The supporting industry and supply companies employ at least another one to two times as many people.

Knowing, being able, doing

With 12 universities (two of which are in the Reuters top 100 list of most innovative universities) and seven university hospitals, Belgium has an enormous pool of knowledge, expertise and skill in healthcare. Within the European Union, Belgium and Flanders rank in the top three in terms of the number of clinical trials per capita and held for a long time the number one spot in terms of the speed with which early clinical trials can be set up. This gives patients access to the most innovative treatments and medicines. In addition, three thousand young people graduate each year from Belgian universities with a degree in life sciences, a solid reservoir of future talent.

The strength of the innovative Flemish cluster in life sciences is supported by research centers such as the Flemish Institute for Biotechnology (VIB) or imec, the research center for nanoelectronics and digital technology that is increasingly focusing on e-health applications. The presence of incubators for pioneering start-ups, science parks and cluster organizations such as flanders.bio, MEDVIA or Catalisti, catalysts of value creation through innovation, also provide a rich breeding ground.

Moreover, Belgium and Flanders have a solid base for research and development and a strong focus on innovation. As a small country and region, we are among the leaders as far as innovation is concerned. In terms of absolute value of investments in biotechnological and pharmaceutical research, we are among the top in Europe. Moreover, investments grew by 14% per year between 2015 and 2020.

Top global biopharmaceutical companies, such as JNJ (with Janssen), Pfizer, GSK or UCB, have important company sites in Belgium. Some of them were created and rooted here. Belgium has become an incubator for the development and production of vaccines and different types of drugs, both in terms of research, development and production. We are number one in vaccine exports and rank third worldwide in per capita drug exports. We exported more than 50 billion euros worth of vaccines and medicines in 2020. Many dozens of home-grown drugs, from the labs of small start-ups and large pharma houses, help more than two million patients worldwide, with common conditions to rare diseases.

Flanders is also an important player in agro-biotech, not least because of and thanks to the foundation of green gene technology with which researchers from Ghent helped to initiate the genetic modification of plants in the 1970s and also pioneered the creation of university spin-offs.

In addition, Belgium has a diverse and growing landscape of biotech companies, from young start-ups to established local companies. Some have grown into publicly traded multinationals. Belgium is home to an impressive proportion of lifescience companies listed on the Euronext exchanges.

Beginning entrepreneurs can raise support and financial resources from an extensive local and international network of investors to give their plans concrete form and turn their dreams into a valuable and, hopefully, successful product. Moreover, they find a benevolent Flemish government that supports budding companies in their development and growth.

All this has led to a large number of drugs – seventeen to date – and diagnostic tests that would never have come about without the Flemish biotech ecosystem. In agriculture, too, a range of new crops and protectants are the fruit of this ecosystem.

A rich ecosystem

This biotech landscape can also be described as an ecosystem, biologists' word for the totality of life and non-life, of organisms, soil, water and minerals interwoven in a complex network of interdependence, connected by the flows of matter and energy that nourish and guide the whole.

That image is an imaginative metaphor to describe the whole of biotechnological activity in (Belgium and) Flanders. In experimental models, test tubes, pilot plants, test batteries, animal and computer models, greenhouses, growth mediums, laboratories, computer models and hospitals, scientists from dozens of disciplines gather and test knowledge, interact, refine and pass it on, develop it into biological building blocks and techniques that can be converted into useful products and services.

An ecosystem exists by grace of interaction in a multi-layered network of information and energy in which various actors enrich and reinforce each other. In this respect, the lifescience cluster in our country is an integrated ecosystem: the result of a layered interplay of various (f)actors that has led to a dynamic environment, a living web of interconnected people and organizations, in networks through which knowledge, material and financial resources flow. It is a network of universities, hospitals, research centers, biotech, pharma, food and manufacturing companies, funders, government, support and logistics organizations. An ecosystem also in which people with inspiration and courage are the engine of innovation, running on the fuel of ideas and money. That system did not happen overnight. In nature, too, a natural ecosystem begins with pioneering vegetation in virgin territory. In the life sciences, the first seeds fell in fertile Flemish and Belgian soil early into the previous century.