



ECONOMY

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## THE HEALTHCARE INDUSTRY IN THE PARIS REGION: A POWERFUL SECTOR FACING STRATEGIC CHALLENGES

**Twice**

AS MANY NEW JOBS  
IN BIOTECHNOLOGY R&D  
OVER TEN YEARS IN THE PARIS REGION

**56,000**

EMPLOYEES IN THE PARIS REGION  
CORE HEALTHCARE INDUSTRY IN 2019

**No. 1**

IN EUROPE IN TERMS OF THE NUMBER  
OF "PHARMACEUTICAL" COMPANIES

HEALTHCARE PLAYERS IN THE PARIS REGION BENEFIT FROM A VERY FAVOURABLE ENVIRONMENT, FEATURING: INTERNATIONALLY RECOGNISED SCIENTIFIC RESEARCH; STATE-OF-THE-ART HOSPITALS; BUSINESS INCUBATORS AND INSTITUTIONAL SUPPORT. THE NUMBER OF R&D PERSONNEL HAS DOUBLED IN KEY SECTORS SUCH AS BIOTECHNOLOGY. IN THE RAPIDLY EXPANDING FIELD OF ARTIFICIAL INTELLIGENCE APPLIED TO HEALTHCARE, THE REGION HAS MAJOR STRENGTHS TO TAKE UP THIS ECONOMIC CHALLENGE AND DEAL EFFECTIVELY WITH THIS FACTOR OF SOVEREIGNTY.

**T**he Paris Region is ranked among world leaders in the fields of life and economic sciences as it is home to many corporate headquarters, SMEs, start-ups and support facilities (business centres, start-up centres and corporate incubators). The core of the healthcare supply chain comprises medical wholesale industries, technologies and trades, as well as biotechnology R&D (see the "healthcare sector" inset). In a study to be published at the end of 2019, the main lessons of which are indicated herein, L'Institut Paris Region provides a detailed and original economic description that makes it possible to estimate the number of jobs at the heart of this sector and their localisation within municipalities.

### THE PARIS REGION'S VERY FAVOURABLE ECOSYSTEM

The region features a high concentration of world-famous academic research institutions in all scientific fields, including several major healthcare institutions that also play a key role in the sector's economic development.

#### *Internationally recognised academic research essential to innovation and technology transfer*

L'Institut national de la santé et de la recherche médicale (Inserm)<sup>1</sup>, covers the whole field of research and is the second player on the world market behind the National Institutes of Health (United States)<sup>2</sup>. Its portfolio counts 1,800 patent families and is the top European patent-holder in the biomedical sector and the fourth in the biotechnologies sector<sup>3</sup>. It brings together an academic approach and a focus on industrial strategies, notably through its private affiliate Inserm Transfert.

**medicen**  
PARIS REGION

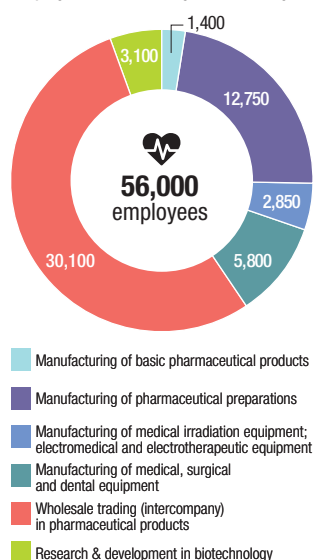
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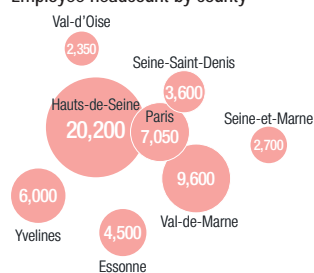
1. The biopark biocluster in Villejuif.
2. Laboratoire Servier's research institute under construction in Paris-Saclay.

## The core healthcare industry in 2019

Employee headcount by work activity



Employee headcount by county



© L'INSTITUT PARIS REGION 2019  
Source: processing by the Institut Paris Region of Sirene (2018-2019) and Acoess data



L'Assistance Publique-Hôpitaux de Paris (AP-HP) is also a world-renowned university-affiliated medical teaching institution. It is the largest employer in the Paris Region. Its 39 hospitals treat over 10 million patients per year. AP-HP are currently conducting nearly 4,500 research projects for promoters of all kinds including 1,800 industrial companies as well as managing 825 portfolios of active international patents<sup>4</sup>.

Apart from scientific universities and faculties of medicine, the other major academic research institutions include the CNRS, l'Institut Curie, l'Institut Pasteur, l'Institut Gustave-Roussy, the CEA (Biomedical Imagery Institute, l'Institut François-Jacob-National Institute of Sequencing/Genoscope), the Vision Institute, the Généthron, the Stem Cells Institute for treating and studying single gene-related diseases (I-Stem), the Myology Institute, the Cardio-metabolism and nutrition Institute (ICAN), the Imagine-Institute for genetic diseases and the Brain & Spine Institute (ICM). Finally, the European Institute for Innovation & Technology for Health (EIT Health) has established its French headquarters in Paris. It is part of the EIT, a European Union body designed to strengthen Europe's innovation capacity in various fields including healthcare. In September 2019, the European Investment Fund (EIF) and EIT Health signed a memorandum of understanding designed to deploy a co-investment programme to attract private investment in healthcare and life science businesses (MedTech, Digital Health, BioTech). The team known as Venture Centre of Excellence EIF-EIT Health in charge of managing this major investment programme could soon be locating to Paris.

## Businesses at the heart of the sector in 2019

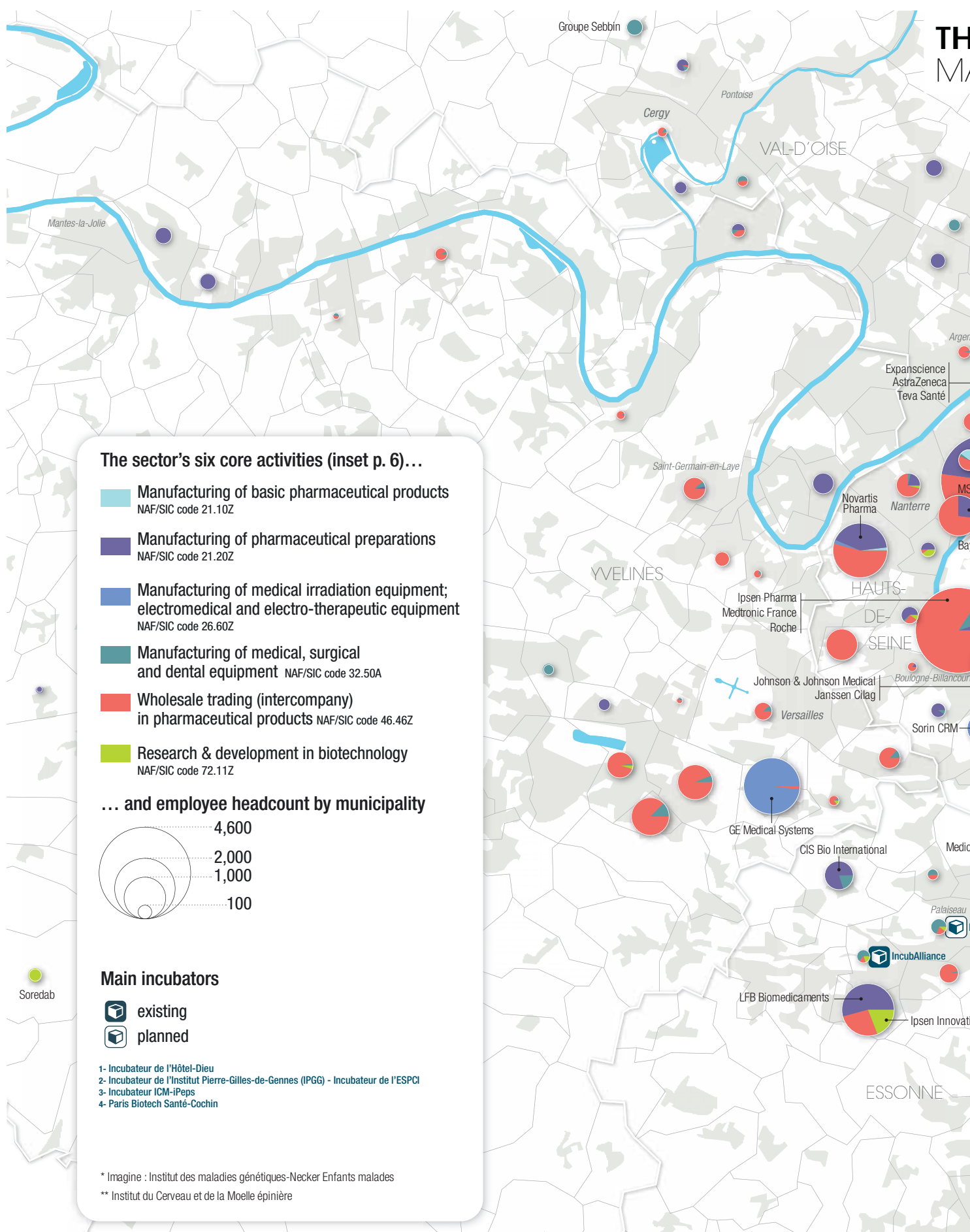
At a European level, the Paris Region has achieved excellent rankings<sup>5</sup>: first, in terms of the number of "pharmaceutical" sector companies; second, in terms of medical equipment companies; and third, in terms of biotechnology companies (nearly 150). Aware of its strengths and needs, the Paris Region has selected healthcare as a sector of excellence to be supported under its economic development

strategy (Schéma régional de développement économique, d'innovation et d'internationalisation/ SRDEii). Launched in 2005 to stimulate innovation, the role of Medicen, the Paris Region health competitiveness cluster, and its partners is to provide key players – start-ups, SMEs, major economic players, research centres, practitioners – with regional economic leadership in the development and outreach of the Paris Region's skills.

Thus, the nucleus of the healthcare supply chain (six lines of business) now comprises 56,000 employees, half of whom, i.e. 30,000, are involved in the wholesaling of pharmaceutical products<sup>6</sup>. Almost three quarters of this workforce (nearly 40,500 workers) are in the Greater Paris metropolitan area. Over one third of the Paris Region's total healthcare workforce is concentrated in Hauts-de-Seine county (92), followed by Val-de-Marne county (94), which accounts for close to one fifth of the workforce. On another scale, it is possible to distinguish between areas of varying sizes: first, Paris (75), with a high concentration of incubators, start-ups and R&D centres extending downstream along the Seine as far as the Villejuif bio-cluster and the town of Kremlin-Bicêtre; next, even further downstream, the Evry Genopole bio-cluster; and finally the Paris-Saclay cluster.

- **The Genopole biocluster:** this world-famous facility specialised in genomics, genetics and biotechnologies was established in 1998 in the new town of Evry. It brings together 29 scientific platforms, 16 academic laboratories, 96 businesses and 2,500 jobs including 800 researchers. In May 2019, the US Food & Drug Administration (FDA) authorised the marketing of a gene therapy drug developed by Novartis, with the decisive help of Généthron. Généthron's spin-off, YposKesi<sup>7</sup>, which is expanding its facility in Corbeil-Essonnes, was selected in June 2019 by Servier to develop and produce a gene therapy drug for cancer treatment.

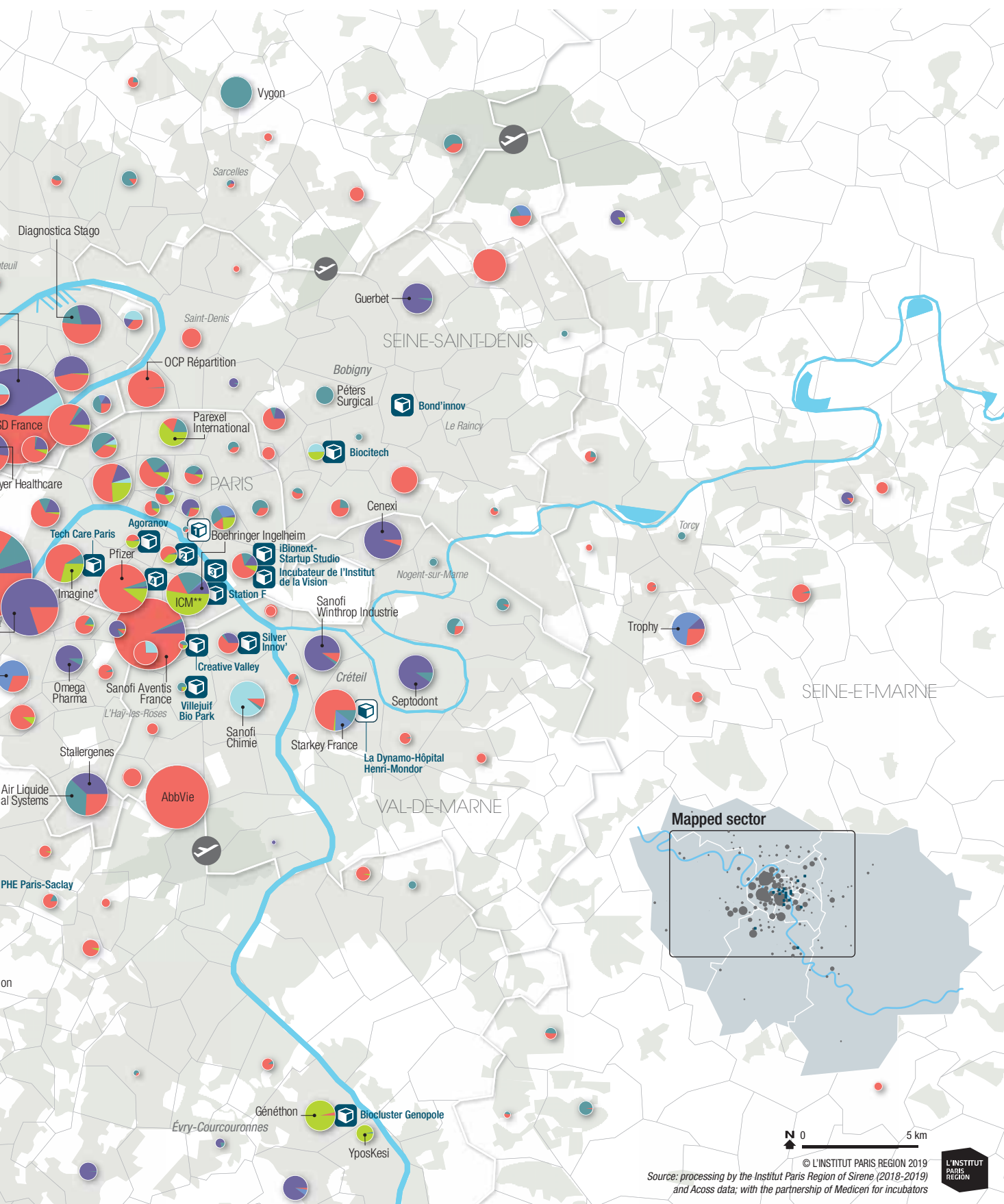
- **The Paris-Saclay cluster:** it brings together 15,000 employees and 130 companies (including some companies whose core businesses go beyond the six economic activity codes (NAF/SIC) that make up the sector's core companies)<sup>8</sup>,





# THE CORE OF THE HEALTHCARE INDUSTRY IN THE PARIS REGION

## MAJOR COMPANIES AND INCUBATORS





including Sanofi, Ipsen, LFB, GE Healthcare, Boston Scientific and Baxter. It also features major facilities: NeuroSpin (a brain research unit), Institut Curie, CEA, Paris-Saclay university, the pharmacy faculty Paris XI (due to open in 2022), as well as the Sanofi Aventis research centre. Its attractiveness to healthcare companies will be enhanced in 2022 by the opening of the Servier laboratory research institute (with more than 600 researchers, a start-up incubator) and in 2021 by the opening of the Paris Saclay business centre including an IPHE business incubator, a project jointly implemented by Essonne county, the Paris Region, the Paris-Saclay agglomeration and the Government's General Secretariat for investment.

On the strength of its scientific expertise, the Paris Region has also encouraged the growth of start-ups by developing business incubators and nurseries, as well as business parks often located close to large hospitals. This dynamic support continues, notably to meet the need for capitalising on the industrial applications of research conducted in key sectors such as biotechnologies.

### *Deindustrialisation, but growing biotechnological R&D*

In spite of this entrepreneurial momentum, the number of facilities and the headcount of workers in the core healthcare sector declined almost continually between 2007 and 2017<sup>9</sup>, in conjunction with the radical change in the sector concerned. Thus, some 4,500 jobs, i.e. 7.5% of the total headcount, were lost during this period and 87 facilities (close to 5%) were closed. Excluding wholesaling, the losses are even greater, with over 6,300 jobs lost, i.e. 18% of the headcount in 2007 and 8% of facilities.

During these 10 years, the sector's geography also changed. Hauts-de-Seine county and Paris each lost 1,700 jobs and Yvelines county lost nearly 2,300 jobs. By contrast, Essonne and Seine-et-Marne counties recorded limited but continual gains over the period. Val-de-Marne county stood out by an increase of nearly 800 jobs, thereby strengthening its regional positioning in these activities.

At the same time, in the biotechnology R&D sector, the number of salaried workers more than doubled (by around +2,100 jobs), as did the number of facilities, which has reached 200 today. Numerous organisations and institutions have risen to the challenge of biotechnology development. Their localisation and durable presence in the Paris Region ensure the localisation and durable presence of production units, whose presence close to the laboratories is indispensable.

### **ARTIFICIAL INTELLIGENCE BUSINESSES: PROMISING BUT CONSTRAINED ECONOMIC PROSPECTS**

Another booming area is that of businesses that are developing artificial intelligence (AI) solutions in healthcare. They are being developed by the sector's large companies, but also by numerous businesses that do not fall within the scope of the six activities studied by means of their economic activity codes (see the inset on "the healthcare sector"). Performance levels in AI truly took off after the year 2010, and the healthcare sector has become one of its key areas of application. In France, the stated objective of AI applied to healthcare is to provide "uses that help to enhance our economic performance for the benefit of the common good: early detection of pathologies, 4P medicine<sup>10</sup>, the disappearance of medical wastelands [...]" [Villani *et al.*, 2018]. In both economic and sovereignty terms, the challenge is to allow the development of French AI services, bearing in mind that the Paris Region has all the cards in hand to assert its position, develop its businesses and attract foreign investments.

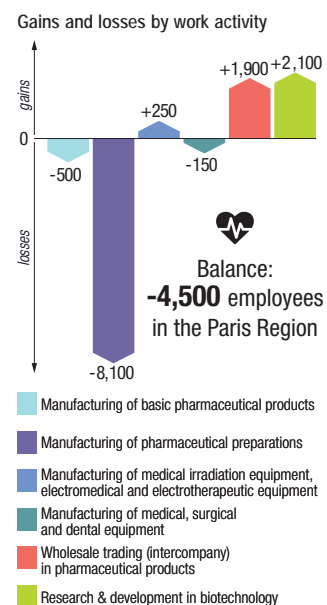
### *Multiple fields of application, provided there is access to high-quality data*

All fields of medicine, all healthcare facilities and all stakeholders including patients are being researched for the development of AI-based tools. For AI applied to radiology, one of its major fields of application, innovative solutions are being developed, for example, by Agfa HealthCare in Ivry-Sur-Seine, and by start-ups like Gleamer (in

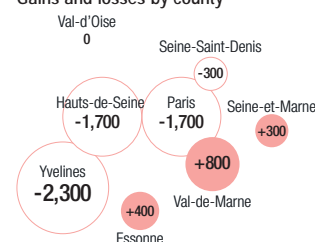
3. Sanofi France in Gentilly.

4. The Genopole biocluster in Évry.

### **The core healthcare industry: change in employee headcount between 2007 and 2017**



### Gains and losses by county



the Agoranov incubator), which benefited in 2019 from the support of the Paris Region's Innov'up programme. The Owkin start-up uses AI to improve the prediction of patients' responses to their treatments. It was awarded the AI prize of 1.5 million euros at the 2019 Health Challenge launched by the Region to finance collaborative work with l'Institut Gustave-Roussy. Another key challenge in the field of AI and healthcare is to ensure that access to data, imagery and related information is achieved under conditions that respect people's privacy. France is reputed to be one of the most reliable countries in the world for providing such guarantees. The DrData start-up, which forms part of the Ile-de-France Innovation healthcare laboratory, has positioned itself in relation to these issues.

### International development

The most buoyant markets for Paris Region businesses are in North America, where sales prices are high, but also in China because of its large investment capacity. Thus, the Medicen Paris Region health competitiveness cluster and its partners have helped several start-ups (such as Milvue, Therapixel, CardioRenal, Ganymed, MYPL and MORPHEE+) to enter the North American market. Competition is stiff to enter the Chinese market. However, this country's clinical knowledge is less mature and Western solutions are not directly replicable.

### The economic and sovereignty challenges

Given the number of businesses that are trying to develop AI tools for the healthcare supply chain, the economic model that start-ups seem to adopt consists of investing in a very specialised area in which they prove their excellence by means of a succession of fund-raising activities before joining a platform that processes data on a massive scale. In the Paris Region, the Philips company with its 50 researchers in Suresnes provides a good example of this type of service. But the international market is dominated by the giant US digital companies such as Google, Apple, Facebook, Amazon and Microsoft (known as the Gafam). Indeed, Philips has formed a partnership with Microsoft to develop interventional IRM Imagery. Even though numerous businesses are developing AI-based tools, several market players believe that the Gafam will ultimately take control of this sector. Even in healthcare, AI is first and foremost an area that requires the skills of mathematicians and IT specialists capable of mobilising huge computing power. Thus, they are probably already the best positioned.

The parliamentary report on AI [Villani, 2018] contains recommendations on how to protect national and European sovereignty in this strategic field. Thus, an excellent Health Data Hub has been set up to centralise the available data: it is an extra and very important factor of the attractiveness of France. Following this report, a mathematician and parliamentarian by the name of Cédric Villani (awarded the 2010 Fields Medal) has insisted on the need for public-sector investments to be complemented by private-sector investments. French businesses should know they can rely on France's very great national expertise in AI, which means they do not have to turn to US players in this field. Support for businesses in the Paris Region throughout their phases of development seems even more relevant as the regional ecosystem is particularly favourable.

Thanks to the existence of a Health Data Hub, France's excellent reputation for preserving data quality and its great expertise in AI, the Paris Region is theoretically well positioned to assume its rightful place in this rapidly growing world market. This is of particular strategic importance given the large investments in this field by the Gafam with the support of proactive Chinese and US policies. The key to benefiting from these opportunities will be the ability of the sector's players to work together. The current ongoing regional consultations aim notably to contribute to this collective work. Thus, the development of the Paris Region's businesses has to rise to meet both economic and sovereign challenges. ■

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1. Source Inserm.
2. In terms of the number of scientific publications in quality media, *ibid*.
3. 2017 ranking by the European Patent Office.
4. Source AP-HP.
5. Source Medicen Paris Region.
6. Wholesaling includes corporate decision-making functions, notably for international companies located in the Paris region in order to distribute their products in France, as well as other types of activity such as R&D.
7. YposKesi is a Contract Development and Manufacturing Organization (CDMO).
8. Établissement public Paris-Saclay, 2015.
9. Analysis based on Acoess source material.
10. Personalised, predictive, preventative, participatory.

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### Useful institutional websites

- <https://www.inserm.fr/>
- <https://www.aphp.fr/>
- <http://www.medicen.org/>

## THE HEALTHCARE SECTOR (ECONOMIC ACTIVITY CODES NAF/SIC)

Six historic areas of activity have been selected to define the core healthcare sector in the methodological note on "SREDii's sectors of excellence". They correspond to medical industries and technologies:

- Manufacturing of basic pharmaceutical products, NAF/SIC Code 21.10Z;
- Manufacturing of pharmaceutical preparations, NAF/SIC Code 21.20Z;
- Manufacturing of medical irradiation equipment, electromedical and electrotherapeutic equipment, NAF/SIC Code 26.60Z;
- Manufacturing of medical, surgical and dental equipment, NAF/SIC Code 32.50A;
- Wholesale trading (intercompany) in pharmaceutical products, NAF/SIC Code 46.46Z;
- Research & Development in biotechnology, NAF/SIC Code 72.11Z.

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