

3 Industry overview

The pharmaceutical industry is an important and growing sector for many economies. This chapter charts its growth and importance, and describes the geographical distribution of the major companies. It then outlines the trends in international trade in pharmaceuticals, and finishes by highlighting the high intellectual property intensity of the sector.

The pharmaceutical sector is a multi-billion dollar industry, with global sales estimated at USD 1.2 trillion in 2018, a USD 100 billion increase over 2017 (IQVIA Institute, 2019). Growth in sales, which averaged 6.3% during the 2014-18 period, are expected to average 3-6% per year to 2023, reaching more than USD 1.5 trillion. Growth is seen as being driven by the United States, which is expected to account for 40% of the market by 2023. Growth in emerging markets is also expected to be strong, with sales in China approaching the combined sales of the five major European markets (France, Germany, Italy, Spain and the United Kingdom) by 2023.

The industry also represents a significant share of total employment (between 0.8 to about 1%) in countries such as Switzerland, Slovenia and Denmark. Many of these jobs are in research and development activities (IFPMA, 2017). In the United States, with around 480 000 people in the sector, the pharmaceutical industry represents 0.3% of total employment (OECD, 2018b).

While there are many firms in the industry, the largest companies command an important share of the total market. The 50 largest firms accounted for USD 653 billion in sales in 2017, which represented slightly more than half the global sales of all companies (Christel, 2018; IQVIA Institute, 2019). Most of the largest 50 companies were headquartered in OECD countries, 16 were headquartered in the United States, and 10 in Japan). Importantly, 27.8% of sales was associated with the firms headquartered in the EU countries (Table 3.1)

Table 3.1. Largest 50 pharmaceutical companies, by country of headquarters, 2017

Country	Total sales, including exports		Number of companies
	Millions USD	% of total	
United States	291 543	44.7	16
Switzerland	83 607	12.8	2
Japan	55 938	8.6	10
United Kingdom	48 450	7.4	2
Germany	45 104	6.9	5
France	38 644	5.9	2
Ireland	21 059	3.2	3
Israel	18 261	2.8	1
Denmark	16 971	2.6	1
Australia	7 522	1.2	1
India	6 491	1	2
Canada	5 053	0.8	1
Belgium	4 663	0.7	1
Spain	3 876	0.6	1
Italy	3 072	0.5	1
South Africa	2 591	0.4	1
Total	652 815	100	50

Source: Christel, M. (2018), "2018 Pharm Exec 50", http://files.pharmtech.com/alfresco_images/pharma/2018/09/19/b7bd929d-df36-462d-93ce-bcd8a8237e06/PharmExec_%20Regular%20Issue%20_June2018.pdf.

The top 50 companies varied significantly in size, ranging from less than USD 3 billion in sales, to over USD 40 billion (Table 3.2). The 10 largest companies accounted for more than 50% of sales of these 50 pharmaceutical companies. Importantly production of pharmaceuticals by these companies does not necessarily takes place in the economy, in which they are domiciled.

Table 3.2. Size of the largest pharmaceutical companies, 2017

Level of sales (billions USD)	Number of companies	% of total sales
41-50	3	19.8
31-40	3	15.9
21-30	4	15.9
11-20	12	29.4
1-10	28	19.0
Total	50	100.0

Source: Christel, M. (2018), "2018 Pharm Exec 50", http://files.pharmtech.com/alfresco_images/pharma/2018/09/19/b7bd929d-df36-462d-93ce-bcd8a8237e06/PharmExec_%20Regular%20Issue%20_June2018.pdf.

International trade in pharmaceutical products

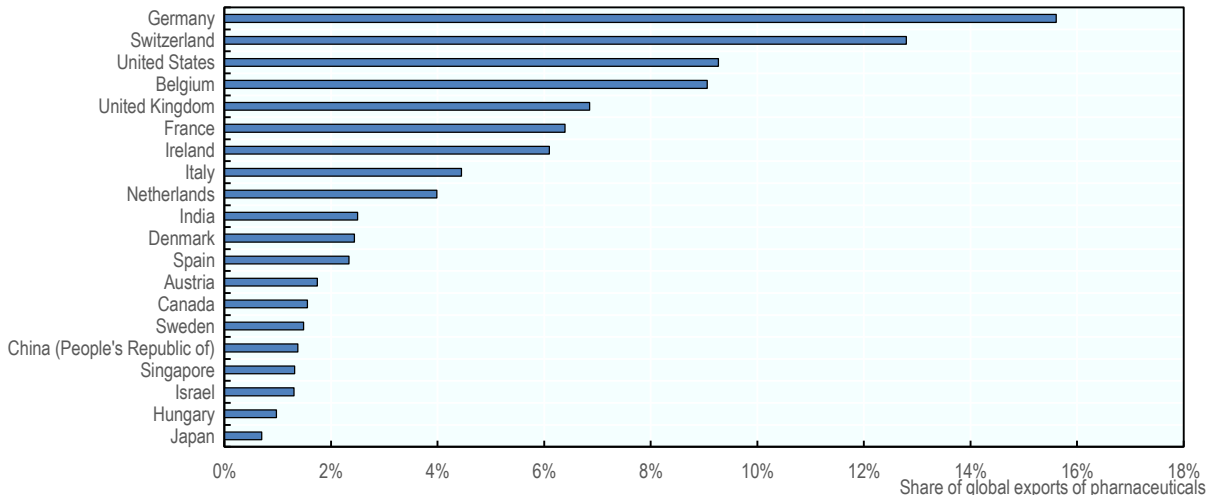
With respect to trade, the pharmaceutical products are classified under product category 30 of the Harmonized System.¹ This category includes in particular medicines, either in measured doses or packed for retail sale; and other pharmaceutical goods, such as sterile surgical catgut, suture materials, first aid boxes and kits, and dental cements and fillings. All goods classified in this category are listed in detail in Annex B.

In 2013, the global value of export of pharmaceutical products amounted to USD 487 billion, around 2.6% of total world trade in that year. In 2016, it amounted to USD 500 billion, or around 3.2% of total world trade

in that year. This means that global trade in the pharmaceutical sector increased both in absolute and relative terms between 2013 and 2016.

Over the 2014-2016 period, the largest exporters of pharmaceuticals were EU28 countries,² as well as Switzerland, the United States, India, China, Singapore, Israel and Japan (see Figure 3.1). Together, these economies represented more than 92% of the total value of global exports of pharmaceuticals.

Figure 3.1. Top 20 exporters of pharmaceuticals, 2014-2016

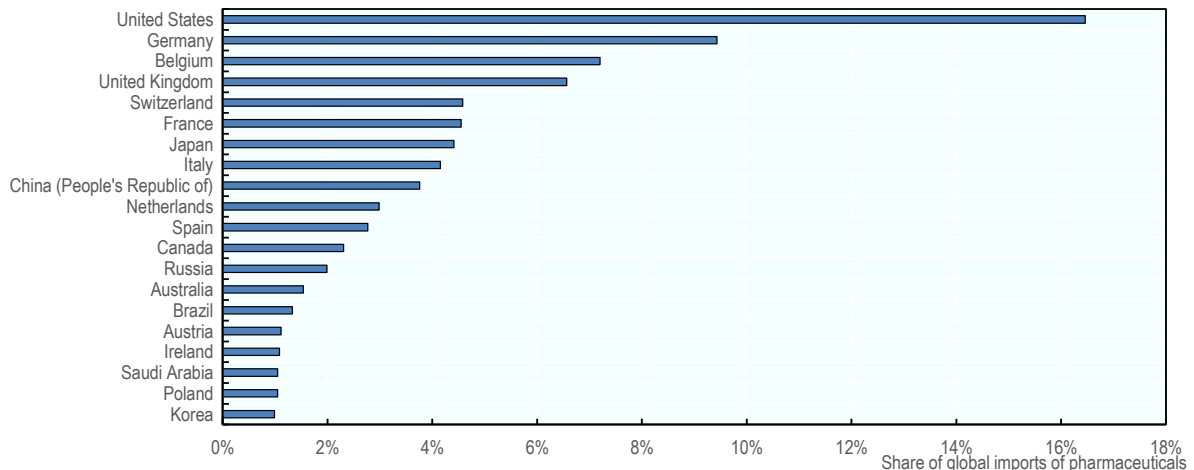


Notes: Pharmaceutical products refer to the HS 30 product category as defined by the UN Trade Statistics Division (2019). All goods include in this product category are presented in detailed in Table C.1 of Annex C.

Source: UN Trade Statistics Division (2019), *UN Comtrade Database*, United Nations Trade Statistics Division, New York, <https://comtrade.un.org>.

In the same period, the United States was the leading importer of pharmaceutical products, importing more than 16% of the total value of global imports of pharmaceutical goods (Figure 3.2). It was followed by several EU28 economies (in particular Germany, Belgium, UK, France and Italy), Switzerland, Japan, and China.

Figure 3.2. Top 20 importers of pharmaceuticals, 2014-16



Notes: Pharmaceutical products refer to the HS 30 product category as defined by the UN Trade Statistics Division (2019). All goods include in this product category are presented in detailed in Table C.1 of Annex C.

Source: UN Trade Statistics Division (2019), *UN Comtrade Database*, United Nations Trade Statistics Division, New York, <https://comtrade.un.org>.

Regarding trade balances, one-third of OECD countries are net exporters of pharmaceuticals. In 2015, Switzerland, Germany and Ireland were the biggest net exporters of pharmaceuticals, with trade surpluses of USD 41 billion, 28 billion and 27 billion respectively (OECD, 2018b).

IP intensity of the pharmaceutical industry

The pharmaceutical industry is relatively IP-intense, which can be measured in terms of both trademark and patent-intensity. According to the data provided by WIPO (2019), the number of trademark applications for the goods covered by the Nice product classification 05³ was 390 888 in 2016 (compared to 282 311 in 2013). This represents around 4.3% of all world trademark applications registered that year, and made pharmaceuticals (class 05) the 4th most intense industry in terms of trademark applications out of the 34 goods classes covered in the Nice product classification.⁴

The Chinese intellectual property office received the largest share of trademark applications in the pharmaceutical sector in 2016 (32%), followed by India (13%), the United States (5%) and the European Union Intellectual Property Office (3.4%).

The number of patent applications for technology classes related to the pharmaceutical industry was 108,964 in 2016 (compared to 80,214 in 2013).⁵ This represented more than 4% of all world patent applications and made technologies related to the pharmaceutical industries the 7th most intense in terms of patents out of 35 fields of technology recorded by the WIPO (2019).

The industry has a keen interest in protecting its intellectual property rights as investment in the development of new products is an expensive undertaking, but key to their long-term success. The cost and importance of new products is reflected in the relatively high level of spending on research and development (R&D), which amounts to nearly USD 150 billion per year (IFPMA, 2017). The R&D process itself is a lengthy one, as it can take 10 to 15 years to develop a new medicine or vaccine.

Overall, the pharmaceutical sector is one of the most research intensive, accounting for an estimated 22% of all total R&D across all industries in 2018, only slightly less than the computer and electronics sector.⁶ The pharmaceutical industry invests up to around 40% of its gross value added (GVA) in R&D in Japan and the United States. The industry R&D accounts for 30% of all private R&D in countries like Switzerland and Belgium, and 24-25% in Slovenia and Denmark (OECD, 2018b). The importance of R&D is also reflected in the high ratio of R&D expenditures to total sales (Table 3.3.).

Table 3.3. R&D intensity in the 50 largest pharmaceutical firms, 2017

Firm	Sales	R&D expenditures	Ratio of R&D expenditures to sales
	Billions of USD	Billions of USD	%
Pfizer	45 345	7 627	16.8
Novartis	41 875	7 823	18.7
Roche	41 732	9 181	22
Merck & Co	35 370	7 563	21.4
Johnson & Johnson	34 397	8 360	24.3
Sanofi	34 078	6 184	18.1
GlaxoSmithKline	28 668	4 978	17.4
Abbvie	27 743	4 829	17.4
Gilead Sciences	25 662	3 523	13.7
Amgen	21 795	3 482	16
AstraZeneca	19 782	5 412	27.4
Bristol-Myers Squibb	19 258	4 823	25
Eli Lilly	18 532	4 973	26.8
Teva Pharmaceutical Industries	18 261	1 848	10.1
Bayer	17 544	3 624	20.7
Novo Nordisk	16 971	2 129	12.5
Allergan	14 906	1 599	10.7
Shire	14 449	1 565	10.8
Boehringer Ingelheim	14 262	3 067	21.5
Takeda	13 577	2 937	21.6
All others ¹	142 945	26 677	18.7
Total ¹	647 152	122 204	18.9

Note: ¹Excluding two firms, for which data on R&D were unavailable

Source: Christel, M. (2018), "2018 Pharm Exec 50", http://files.pharmtech.com/alfresco_images/pharma/2018/09/19/b7bd929d-df36-462d-93ce-bcd8a8237e06/PharmExec_%20Regular%20Issue%20_June2018.pdf.

Notes

¹ The Harmonized Commodity Description and Coding System generally referred to as "Harmonized System" or simply "HS" is a multipurpose international product nomenclature developed by the World Customs Organization (WCO). It comprises about 5,000 commodity groups; each identified by a six digit code, arranged in a legal and logical structure and is supported by well-defined rules to achieve uniform classification. The system is used by more than 200 countries and economies as a basis for their Customs tariffs and for the collection of international trade statistics. Over 98 % of the merchandise in international trade is classified in terms of the HS. For more information, see WCO (2019).

² All findings in this study that refer to the EU, were based on data from time periods before January 2020, hence these findings also include United Kingdom.

³ Nice classification system is a of classifying goods and services for the purpose of registering trademarks. It is specified by the World Intellectual Property Organization. This number includes the trademarks applications included in the Nice product classification 05 (Pharmaceutical and veterinary preparations; sanitary preparations for medical purposes; dietetic food and substances adapted for medical or veterinary use, food for babies; dietary supplements for humans and animals; plasters, materials for

dressings; material for stopping teeth, dental wax; disinfectants; preparations for destroying vermin; fungicides, herbicides).

⁴ These data are based on the indicator “Total applications by class (direct and via the Madrid system)”

⁵ Based on the indicator “Patent publications by technology”.

⁶ See <https://www.strategy-business.com/feature/What-the-Top-Innovators-Get-Right?gko=e7cf9>.

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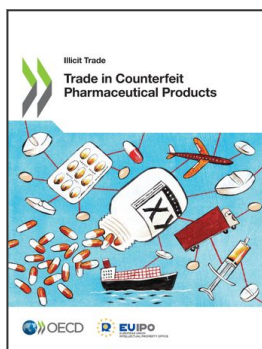
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