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MEASURING THE ECONOMIC FOOTPRINT OF THE PHARMACEUTICAL INDUSTRY

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KEY FINDINGS



THE PROJECT

The research project¹ “Measuring the Economic Footprint of the Pharmaceutical Industry” set out to examine the feasibility of quantifying the global economic importance of the pharmaceutical industry². As a first substantive result of our feasibility study, we assessed the industry’s direct economic effects in the period 2006 to 2011.

MACROECONOMIC INDICATORS TO ASSESS THE ECONOMIC FOOTPRINT

Relevant macroeconomic ratios include:

- GROSS VALUE ADDED
- PRODUCTION VALUE
- JOB CREATION
- R&D EXPENDITURES
- EMPLOYEE COMPENSATION

Using these ratios, we can answer the following questions:

- » What is the global gross value added of the pharmaceutical industry? How important is the sector for the world economy?
- » How many jobs does the pharmaceutical industry account for worldwide? How has hiring behaviour changed over the period under review?
- » How much is employee compensation in the global pharmaceutical industry? How much is the average employee compensation per person?
- » How has the value of production of the global pharmaceutical industry changed over the period under review?
- » What does the pharmaceutical industry spend on research and development?

KEY RESULTS

The most important results can be summarized as follows:

- » At approximately USD 441 billion, the direct gross value added of the pharmaceutical sector roughly corresponds to the economic strength of Argentina; it rose by nearly 44 percent in the years 2006 to 2011, equivalent to growth of 7.5 percent a year on average.
- » The value of pharmaceutical industry production was roughly USD 941 billion in 2011.
- » In 2011 the pharmaceutical industry employed more than 4.2 million people worldwide. Between 2006 and 2011 more than 600,000 new jobs were created, representing a 3.3 percent annual increase in employment.
- » Worldwide employee compensation in the pharmaceutical industry amounted to USD 93.3 billion in 2011, an increase of 38.4 percent since 2006. This represents average per capita employee compensation of USD 22,100, up by 18.2 percent since 2006.
- » In 2006 and 2007, data for 23 selected OECD countries show a research and development intensity of 19.7 percent. In other words, nearly every fifth dollar of value added was spent on research and development (R&D).

These results may help to change perceptions of the pharmaceutical industry – from a cost driver to a motor for value added and employment.

1 The full report can be downloaded at <http://www.wifor.de/ifpma.pdf>.

This project was undertaken with the financial support of the International Federation of Pharmaceutical Manufacturers and Associations (IFPMA)

2 The pharmaceutical industry is considered in its entirety, i.e., including both research-based and generic companies.

GROSS VALUE ADDED EFFECTS

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In 2011 the pharmaceutical industry accounted for 3.9 percent of the gross value added in manufacturing worldwide. The economic strength of the sector roughly corresponds to the GDP of Argentina

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Gross domestic product (GDP), the most important economic indicator, serves as a measure of a national economy’s performance and is calculated as the sum of the gross value added generated by all domestic companies.

Gross value added is the value of the products manufactured by a company less the value of its purchased materials and services. Gross value added thus reflects the additional value generated by the production process. We can use this measure to show the contribution of an industry to GDP. We can also compare the industry’s development with national GDP growth rates.

Between 2006 and 2011, gross value added in the pharmaceutical industry increased by USD 134.5 billion to reach USD 441 billion (table 1).

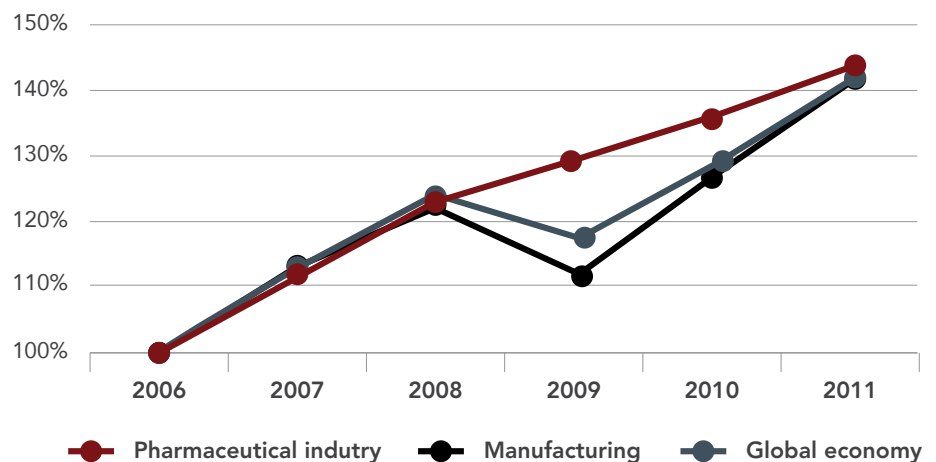
TABLE 1: GROSS VALUE ADDED IN THE PHARMACEUTICAL INDUSTRY IN USD BILLION.

	2006	2007	2008	2009	2010	2011
Gross value added (USD billion)	306.5	342.1	378.3	398.5	421.1	441.0
Global share	0.62%	0.61%	0.62%	0.68%	0.66%	0.63%

Source: SNA, INDSTAT4, ESA, STAN Database, own calculation.

The increase corresponds to an average annual growth rate of 7.5 percent, 0.3 percentage points faster than the 7.2 percent average annual growth in world GDP. Figure 1 shows the development of the pharmaceutical industry’s gross value added in comparison with overall manufacturing and the global economy.

FIGURE 1: DEVELOPMENT OF THE GROSS VALUE ADDED.



Source: SNA, INDSTAT4, ESA, STAN Database, own calculation.

In 2011 the pharmaceutical industry accounted for 3.9 percent of the gross value added in manufacturing worldwide. The economic strength of the sector roughly corresponds to the GDP of Argentina (USD 448.2 billion) [UN Statistics Division (2013)]. From 2006 to 2011, the pharmaceutical industry generated 0.6 percent of global gross value added.

EMPLOYMENT EFFECTS

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The number of people employed worldwide in the pharmaceutical industry is roughly equivalent to total employment in a country like Austria

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The pharmaceutical industry employs approximately 4.2 million people worldwide. The number of employees increased by 630,000 between 2006 and 2011 (table 2).

TABLE 2: EMPLOYMENT IN THE PHARMACEUTICAL INDUSTRY IN MILLION.

	2006	2007	2008	2009	2010	2011
Employment	3.60	3.62	3.81	3.89	4.06	4.23

Source: INDSTAT4, ILOSTAT, ESA, STAN Database, own calculation.

This growth corresponds to an average annual employment increase of 3.3 percent, although the largest increase in employment – 5.2 percent – occurred in 2008. For comparison, the number of people employed worldwide in the pharmaceutical industry is roughly equivalent to total employment in a country like Austria, where about 4.1 million people were employed in 2011 [Eurostat (2013)].

EMPLOYEE COMPENSATION

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Wages and salaries per employee rose by USD 3,400 to USD 22,100 between 2006 and 2011, an increase of 18.2 percent

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In 2011 the pharmaceutical industry paid wages and salaries totalling USD 93.3 billion. Compensation rose by 6.7 percent a year on average from 2006 (table 3).

TABLE 3: EMPLOYEE COMPENSATION IN THE PHARMACEUTICAL INDUSTRY IN USD BILLION.

	2006	2007	2008	2009	2010	2011
Wages & salaries (USD billion)	67.4	75.9	82.9	80.4	85.7	93.3
Growth rate		12.7%	9.3%	-3.1%	6.6%	8.9%
Wages & salaries per employee	18,700	21,000	21,800	20,700	21,100	22,100
Growth rate		12.3%	3.8%	-5.0%	1.9%	4.7%

Source: INDSTAT4, ESA, STAN Database, own calculation.

Moreover, it should be noted that employee compensation increased much more strongly than the number of employees. Hence, wages and salaries per employee rose by USD 3,400 to USD 22,100 between 2006 and 2011, an increase of 18.2 percent.

PRODUCTION VALUE

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The production value of the pharmaceutical industry increased by an average of 8.2 percent annually or by more than USD 300 billion in the years from 2006 to 2011, when it amounted to USD 940.8 billion

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In addition to measuring the growth and job-creating impact of the pharmaceutical industry, we estimated the sector-specific production value (table 4).

TABLE 4: PRODUCTION VALUE OF THE PHARMACEUTICAL INDUSTRY IN USD BILLION.

	2006	2007	2008	2009	2010	2011
Output (USD billion)	634.2	718.7	793.5	831.9	884.4	940.8
Growth rate		13.3%	10.4%	4.8%	6.3%	6.4%
Value added rate	48.3%	47.6%	47.7%	47.9%	47.6%	46.9%

Source: INDSTAT4, ESA, STAN Database, own calculation.

This increased by an average of 8.2 percent annually or by more than USD 300 billion in the years from 2006 to 2011, when it amounted to USD 940.8 billion.

The value added rate – the share of value added in the production value – fell 1.4 percentage points to 46.9 percent between 2006 and 2011, averaging 47.7 percent over the period.

EXPENDITURES FOR RESEARCH AND DEVELOPMENT

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With an average R&D intensity of 19.7 percent in 2006 and 2007, the pharmaceutical industry far outclasses other sectors of the economy

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A large part of the value added by the pharmaceutical industry flows into research and development (R&D) of innovative products.

TABLE 5: RESEARCH AND DEVELOPMENT INTENSITY OF THE PHARMACEUTICAL INDUSTRY.

Country	2006	2007
Median – Pharmaceutical Industry (23 countries)	22.3%	17.0%
Median – Manufacturing (23 countries)	6.6%	6.2%
Median – Total Economy (23 countries)	1.2%	1.3%

Source: OECD, own calculation.

In fact, with an average R&D intensity of 19.7 percent in 2006 and 2007, the pharmaceutical industry far outclasses other sectors of the economy.

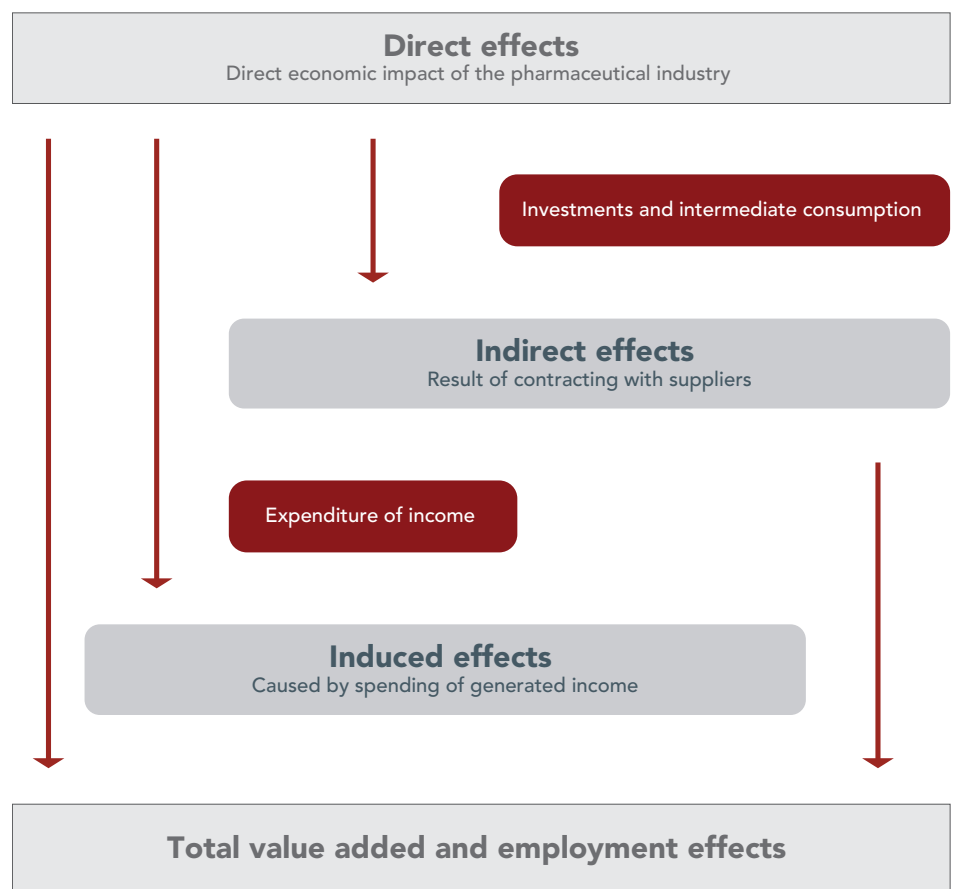
As table 5 shows, the R&D intensity of manufacturing industry averaged 6.4 percent in the two years while that of the overall economy averaged 1.2 percent. Consideration of research and development expenditures thus supports the view of the pharmaceutical industry as a motor for innovation.

BEYOND DIRECT ECONOMIC EFFECTS: THE SPILLOVER EFFECTS

In addition to its direct impact, an industry's economic importance reflects often underestimated spillover effects that arise from its business activity. Spillover effects for the pharmaceutical industry – schematically represented in figure 2 – manifest themselves throughout the global economy and could be identified with an input-output analysis that would illustrate the industry's overall economic impact.

They can be divided into indirect effects, which develop within the supply chain of purchased materials and services, and induced effects, which result from spending of the incomes generated through direct and indirect effects.

FIGURE 2: DIMENSIONS OF THE ECONOMIC FOOTPRINT.



Source: Own research.

In the light of looming regulatory efforts of governments worldwide, the pharmaceutical industry is concerned to clarify the extent of its economic footprint and its interdependencies with other sectors. Therefore, the next research step should consist of a comprehensive empirical analysis of the economic footprint, including spillover effects. This undertaking would help illustrate the complete value added chain of the global pharmaceutical industry.



ABOUT WIFOR

WifOR is an independent economic research institute which emerged as a spin-off from the Department of Public Economics and Economic Policy at Darmstadt University of Technology (TU Darmstadt). TU Darmstadt and TU Berlin are official partners of WifOR. The institute's research focuses on economic footprint and value added analyses, labor market research, the health care industry as well as the security industry.

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