

# Top R&D investors recovering fast from the Covid-19 crisis: Preliminary insight to the 2022 EU Industrial R&D Investment Scoreboard

## HIGHLIGHTS

- In 2021, global industrial R&D returned to pre-crisis levels of investment.
- R&D increased in most sectors, especially in ICT, Health, and Automotive industries.
- EU companies increased R&D investment significantly but at a lower pace than their US and Chinese counterparts.
- Most financial indicators of companies recovered from the COVID-19 crisis, in particular net sales and profits.
- The continued deepening of the global competition in key industries poses a challenge for the EU and its industry, especially with regard to R&D investments and competition in ICT and health industries, the uniquely high share of transport industries in the EU landscape of R&D investing companies and EU leadership in the context of the digital and green transitions.

## Introduction

This policy brief presents preliminary insight in the 2022 EU Industrial R&D Investment Scoreboard (the *Scoreboard*). It is based on a subsample of companies with available published accounts for the year 2021. The subsample consists of 678 companies representing 66.5% of the global R&D in the previous year's *Scoreboard*. It includes 274 companies based in the EU, 198 in US, 112 Chinese companies, 16 Japanese companies and 78 from the rest of the world (see details of the subsample and methodological considerations in the Annex).

### In 2021, global business recovered to pre-COVID-19 levels of R&D investment

In 2021, global industrial R&D investment continued to increase significantly for the twelfth consecutive year. The 678 companies invested EUR 723.9 billion in R&D, on average 12.7% more than in 2020. These companies also showed good results for most performance indicators, especially in terms of net sales, which increased by 21.2%, much more than the R&D investment increase of 12.7% (see Chart 1).

R&D increased across the board worldwide with most sectors showing double-digit R&D growth. The main sectors driving global R&D growth were ICT services (18.8%), ICT producers (10.5%) and Health (12.4%). The two sectors most affected by the crisis in 2020 showed different performance in 2021: Automotive increased R&D considerably (12.0%) whereas Aerospace & Defence maintained a practically unchanged level of R&D investment.

By world region, the patterns of R&D continue to reflect the ongoing global technology race among big tech companies, as observed in

the *Scoreboard* over several years. Chinese companies had an average R&D increase of 21.1%, driven by considerable R&D growth in most sectors and particularly in ICT industries. US companies increased R&D by 13.1%, mainly due to substantial growth in ICT, Health, and Automotive industries. EU companies followed with a more modest R&D increase of 8.1%, driven by the sectors Automotive, Health and ICT producers (see Chart 2).

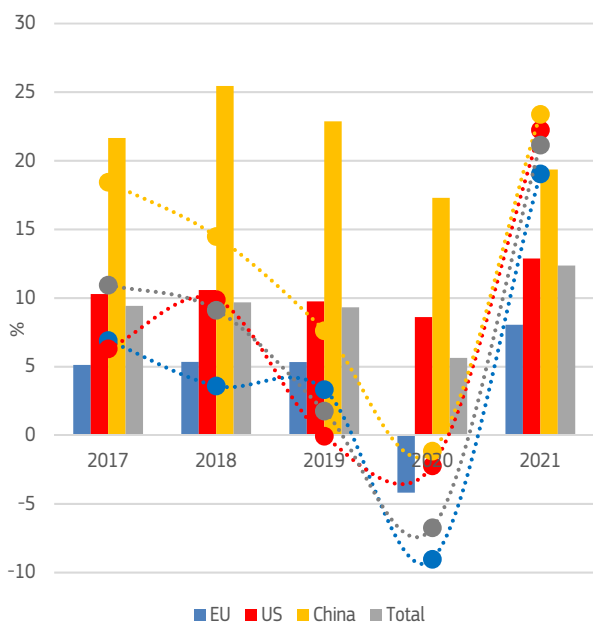
The comparison of EU companies against their US and Chinese counterparts shows an increasing EU R&D investment gap in ICT industries, especially in ICT Services, where US and Chinese companies continued sharply increasing their R&D investments in line with recent years.

In Automotive industries, US and Chinese companies increased R&D by more than 20%, compared with 8.9% by EU companies which lead this sector with almost twice R&D investment than the US and Chinese companies together.

In Health, EU companies continued to significantly increase R&D investments (10.8%) but at a lower rate than in the US and China (12.7% and 19.4%, respectively).

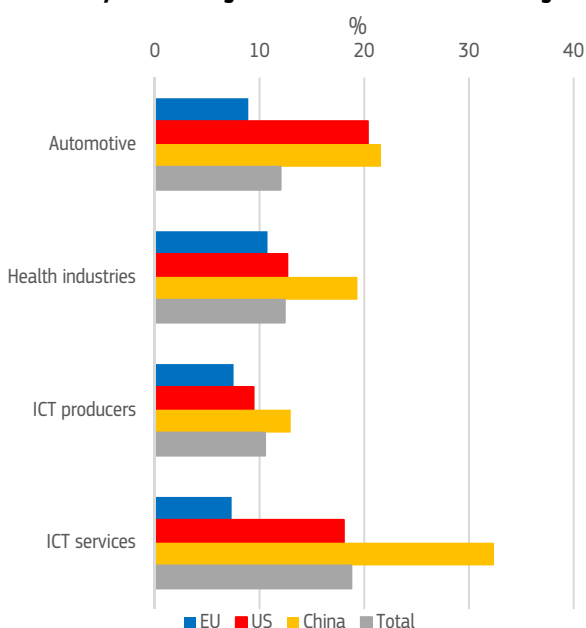
Regarding the financial results of companies, as mentioned above, most financial indicators that have been hit hard by the COVID-19 crisis improved in 2021. In particular, companies' net sales and operating profits increased more than R&D investment. For EU companies, net sales increased by 18.8% and, for US and Chinese companies, by 22.5% and 23.0%, respectively. The trends in R&D and net sales over the past five years for the main world regions are shown in Chart 1.

**Chart 1 - yearly % change R&D (bars) and net sales (dots) – 5-year trends (region)**



Source: The 2022 EU Industrial R&D Investment Scoreboard (forthcoming) – first sample.

**Chart 2 - 1-year % change R&D – selected sectors and regions**



Source: The 2022 EU Industrial R&D Investment Scoreboard (forthcoming) – first sample.

### Company highlights in the global sample

The composition of the top companies in the global R&D ranking reflects the concentration of industrial R&D in a few sectors. The top

<sup>1</sup> Several top R&D investors, e.g., Airbus, Stellantis, STMicroelectronics, are headquartered in the Netherlands but have most of their operations in other countries.

20 companies, accounting for one third of total R&D in the sample, comprise eight companies from ICT industries, seven from Health and five from Automotive industries. Of these companies, twelve showed a double-digit R&D growth in 2021.

Other ICT industries companies showing remarkable R&D growth in 2021 were Nvidia (US, 34.3%) and Advanced Micro Devices (US, 43.5%). In the Health sector, other companies showing outstanding R&D growth were Novavax (US, 224.5%) and Vertex Pharma (US, 66.8%), and, in Automotive industries, Tesla (US, 73.9%) and Stellantis (EU, 52.3%). Apart from companies operating in the largest R&D sectors, companies such as China State Construction Eng. and Kuaishou Tech (media sector) showed a notable R&D increase (35.2% and 128.6% respectively).

It should be recalled that growth in R&D investment may be organic or driven by company mergers, acquisitions, divestments or accounting practices.

**Table 1 – Top 20 companies by R&D investment in the sample**

Company	Country	Sector group	RD 2021		Net sales 2021	
			(€ bn.)	1 year growth rate (%)	(€ bn.)	1 year growth rate (%)
ALPHABET	US	ICT ser	27.9	14.5	227.5	41.2
META	US	ICT ser	21.8	33.7	104.1	37.2
HUAWEI	CN	ICT prod	19.5	0.7	121.8	-1.4
APPLE	US	ICT prod	19.3	16.9	323.0	33.3
SAMSUNG	KR	ICT prod	16.8	6.5	208.0	18.1
VOLKSWAGEN	DE	Automotive	15.6	12.2	250.2	12.3
INTEL	US	ICT prod	13.4	12.1	69.8	1.5
ROCHE	CH	Health	13.3	12.8	60.8	7.7
J&J	US	Health	13.0	21.0	82.8	13.6
PFIZER	US	Health	10.2	20.6	71.8	95.2
BMS	US	Health	9.3	1.9	41.0	9.1
MERCK US	US	Health	9.1	1.2	43.0	17.3
MERCEDES-BENZ	DE	Automotive	9.0	6.3	168.0	8.9
NOVARTIS	CH	Health	8.0	3.6	46.7	6.0
TENCENT	CN	ICT ser	7.2	33.1	77.6	16.2
ASTRAZENECA	GB	Health	7.1	34.0	33.0	40.6
GENERAL MOTORS	US	Automotive	7.0	27.4	112.1	3.7
BMW	DE	Automotive	6.9	9.4	111.2	12.4
FORD MOTOR	US	Automotive	6.7	7.0	120.4	7.2
QUALCOMM	US	ICT ser	6.3	20.1	29.6	54.5

Source: The 2022 EU Industrial R&D Investment Scoreboard (forthcoming) – first sample.

### Focus on the EU sample of companies

The 274 EU-based companies invested EUR 159.6 billion in R&D in 2021, an amount equivalent to 81.0% of total R&D for EU companies in the 2021 *Scoreboard*. With respect to 2020, EU companies increased their R&D investment by 8.1%, bouncing back from the previous year's drop of 2.2% due to the COVID-19 crisis. Other financial indicators of EU companies showed mixed results. The growth of net sales and profits were remarkable (18.8% and 112.5%) whereas capital expenditures showed a modest increase of 4.3% and the number of employees remained basically unchanged (0.1%). The contrasting results of EU companies reflect the recovery of the activity of transport- and energy-related sectors that were severely affected by the crisis.

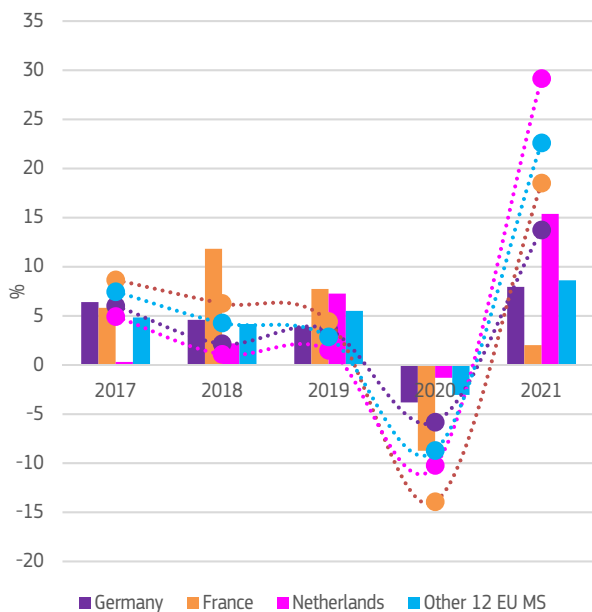
In terms of countries, companies based in most Member States showed a significant increase in R&D investment. The EU's R&D growth was driven by companies based in Germany (8.1%), the Netherlands<sup>1</sup> (15.2%), Denmark (15.8%), Sweden (7.1%) and Ireland<sup>2</sup>

<sup>2</sup> Some top R&D investors are headquartered in Ireland but have most of their operations in the US.

(14.1%). Other countries whose companies showed high R&D growth were Hungary (13%), Luxembourg (12%), and Austria (3.4%).<sup>3</sup>

The trends for R&D and net sales over the past five years for selected Member States are presented in Chart 3.

**Chart 3 – yearly % change R&D (bars) and net sales (dots) – 5-year trends (selected EU Member States)**



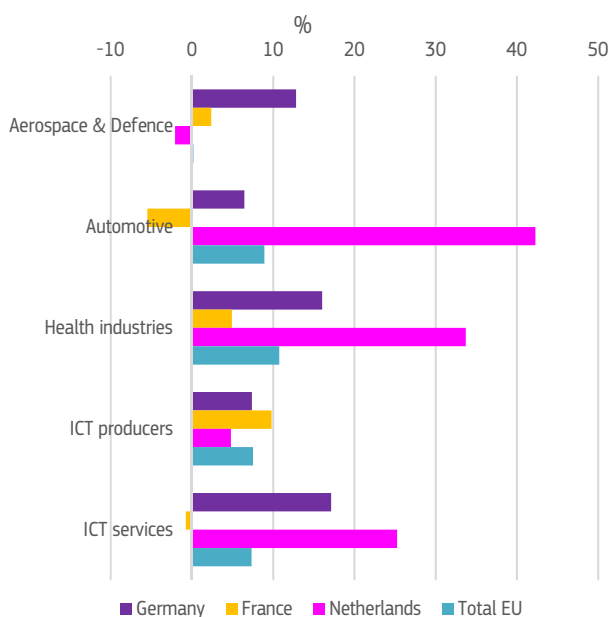
Source: The 2022 EU Industrial R&D Investment Scoreboard (forthcoming) – first sample.

From a sector perspective, the R&D growth of Automotive (8.9%) is the most significant of the EU sample, given this sector accounts for 37.5% of its total R&D investment. Other sectors driving EU R&D growth in this sample were Health (10.8%), ICT producers (7.5%) and Financials (19.6%). Sectors holding back EU R&D growth in 2021 were Aerospace & Defence (0.1%) and Construction (2.1%).

The net sales of EU companies showed a solid recovery, increasing by 18.8%. Net sales growth was driven by the Energy (41.3%), Chemicals (29.3%) and Automotive (16.8%) sectors. Operating profits of EU companies showed a strong recovery across the board, bouncing back from the significant losses of 2020. Capital expenditures of companies showed a modest growth (4.3%), hampered by a significant drop in capital expenditures by the Automotive sector (-11.6%). The number of employees of EU companies remained practically the same as in the previous year.

Chart 4 shows the R&D one-year growth for selected sectors and Member States of the EU sample of companies.

**Chart 4 – 1-year % change R&D – selected EU Member States and sectors**



Source: The 2022 EU Industrial R&D Investment Scoreboard (forthcoming) – first sample.

## Company highlights in the EU sample

The composition of top companies in the EU ranking is different from the global ranking, reflecting the concentration of EU companies in the Automotive sector. The top 20 EU companies comprise nine from Automotive, six from ICT industries, three from Health and one each from Chemicals and Aerospace & Defence.

As shown in Table 2, the performance of the top R&D investors was mixed. In the Automotive sector, the strong R&D increase of Stellantis<sup>4</sup> (52.3%) was partially offset by the R&D drop in Continental<sup>5</sup> (-25.8%) and Renault (-14.1%). In Health, the substantial R&D increase of Novo Nordisk (18.8%) contrasted with the modest R&D growth of Sanofi (2.9%). In ICT producers, the top companies based in the Netherlands, NXP Semiconductors and ASML Holding, also showed opposing R&D growth (14.8% vs. -10.5%, respectively). In the Aerospace sector, the leading company, Airbus, has dropped further by 2.1%.

Apart from the top 20 R&D investors in the EU, other companies showed remarkable R&D growth in 2021. These included: Infineon Tech (ICT producers, DE, 30.2%); BioNTech (Health, DE, 86.6%); CNH Industrial (Automotive, NL, 27.9%); Accenture<sup>6</sup> (Support services, IE, 28.5%); and AMS-OSRAM (ICT producers, AT, 44.8%).

Companies not in the top 20 that held back the R&D performance of the EU sample were: Philips (Industrials, NL, -7.5%); Telefonica (ICT services, ES, -12.9%); Amadeus (ICT services, ES, -10.6%); DSM (Chemicals, NL, -15.7%); and TotalEnergies (Energy, FR, -7.9%).

<sup>3</sup> Few *Scoreboard* parent companies are based in these countries (Austria – 7, Luxembourg – 3, and Hungary – 1).

<sup>4</sup> Due to its merger with Peugeot in 2020/2021, mostly.

<sup>5</sup> Most of this R&D reduction is due to a change in accounting practice in 2021, i.e. disclosure of ‘income from R&D’ that is deducted from its R&D investment.

<sup>6</sup> US company, based in Ireland.

**Table 2 – Top 20 EU companies by R&D investment in the sample**

Company	Country	Sector group	RD 2021		Net sales 2021	
			(€ bn.)	1 year	(€ bn.)	1 year
VOLKSWAGEN	DE	Automotive	15.6	12.2	250.2	12.3
MERCEDES-BENZ	DE	Automotive	9.0	6.3	168.0	8.9
BMW	DE	Automotive	6.9	9.4	111.2	12.4
ROBERT BOSCH	DE	Automotive	6.3	4.7	78.7	10.1
STELLANTIS	NL	Automotive	5.9	52.3	149.4	72.4
SANOFI	FR	Health	5.7	2.9	37.8	4.8
SAP	DE	ICT ser	5.2	16.2	27.8	1.8
SIEMENS	DE	ICT prod	5.1	2.3	62.3	9.0
NOKIA	FI	ICT prod	4.1	7.8	22.2	1.6
ERICSSON	SE	ICT prod	4.0	5.8	22.7	0.0
AIRBUS	NL	Aerospace & Def	2.9	-2.1	52.1	4.5
CONTINENTAL	DE	Automotive	2.6	-25.8	38.2	1.3
ZF	DE	Automotive	2.5	21.8	38.3	17.5
MERCK DE	DE	Health	2.4	6.1	19.7	12.3
RENAULT	FR	Automotive	2.4	-14.1	46.2	6.3
BASF	DE	Chemicals	2.2	4.6	78.6	28.9
NOVO NORDISK	DK	Health industries	2.2	18.8	18.9	10.9
ASML HOLDING	NL	ICT prod	1.9	-10.5	18.6	33.1
VOLVO	SE	Automotive	1.8	13.6	36.4	10.0
NXP SEMICONDUCTORS	NL	ICT prod	1.7	14.8	9.8	28.5

Source: The 2022 EU Industrial R&D Investment Scoreboard (forthcoming) – first sample.

## Summary and policy observations

In 2020, EU companies were particularly hit hard by the pandemic, due to the concentration of the EU's R&D in transport-related industries that were severely affected by the crisis. In 2021, the preliminary sample for the *Scoreboard 2022* shows a solid recovery of EU companies' financial indicators in most industries and a return to pre-crisis levels of R&D investment (except in the Aerospace sector).

However, as the pandemic recedes, the main challenges that EU companies face vis-à-vis their global competitors remain; these are exacerbated by the ongoing tech race among big tech companies. As observed in the *Scoreboard* editions over the past years, EU companies are being outperformed in key industries, namely in ICT and Health, and are challenged in the Automotive sector. The 2021 R&D figures from the preliminary data confirm these trends: see R&D

growth in ICT services (EU 7.3%, US 18.0%, CN 32.4%) and in Automotive industries (EU 8.9%, US 20.3%, CN 21.6%).

This poses a major challenge for EU industry and policy. Indeed, industrial R&D plays a fundamental role in ensuring the competitiveness of these industries, and it is a key factor for the strengthening of their innovation ecosystems as proposed by the forthcoming Innovation Communication, which is crucial for achieving the digital and green transitions.

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### DISCLAIMER:

This brief is based on a partial sample. Final trends and figures will be included in the 2022 EU Industrial R&D Investment Scoreboard to be published in December 2022. The contents of this brief do not necessarily reflect the position or opinion of the European Commission.

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## Annex - EU Industrial R&D Investment Scoreboard

The EU Industrial R&D Investment Scoreboard has been published annually since 2004. It aims to raise awareness of the importance of R&D for businesses and to encourage firms to disclose information about their R&D investments and other intangible assets. The data for the *Scoreboard* are taken from companies' publicly available audited accounts. In more than 99% of cases, these accounts do not include information on the place where R&D is actually performed. Therefore, the company's whole R&D investment in the *Scoreboard* is attributed to the country in which it has its registered office. This should be borne in mind when interpreting the *Scoreboard's* country classifications and analyses.

This brief is based on an early subsample of 678 companies with available accounts as of 6 June among the sample for the forthcoming December 2022 full *Scoreboard*. This comprises 2 500 top investors and 1 000 headquartered in the EU (with available accounts as of 1 August 2022). The data for the 2022 *Scoreboard* have been collected from companies' annual reports and accounts by Bureau van Dijk – A Moody's Analytics Company. The source documents, annual reports and accounts are documents in the public domain and so the *Scoreboard* is transparent and reproducible. In order to maximise completeness and avoid double counting, the consolidated group accounts of the ultimate parent company are used. Companies that are subsidiaries of any other company are not listed separately. Where consolidated group accounts of the ultimate parent company are not available, subsidiaries are included. In the case of a demerger, the full history of the continuing entity is included. To avoid double counting of figures, the history of the demerged company can only go back as far as the date of the demerger. In the case of an acquisition or merger, pro forma figures for the year of acquisition are used along with pro forma comparative figures if available.

The R&D investment included in the *Scoreboard* is the cash investment that is funded by companies themselves. It excludes R&D undertaken under contract for customers, such as governments or other companies. It also excludes a company's share of any associated company or joint venture R&D investment when disclosed. However, it includes research contracted out to other companies or public research organisations, such as universities. Where all or part of R&D costs have been capitalised, the additions to the appropriate intangible assets are included to calculate the cash investment and to remove any amortisation.

The *Scoreboard* data are nominal and expressed in euro, with all foreign currencies converted at the exchange rate of the year-end closing date (31.12.2021). Users of *Scoreboard* data should take into account the methodological limitations summarised in the annexes to the yearly [Scoreboard](#) publication, especially when performing comparative analyses.