



THE ECONOMIC IMPACT OF HUAWEI IN EUROPE

NOVEMBER 2020



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HUAWEI'S ECONOMIC IMPACT THROUGHOUT EUROPE

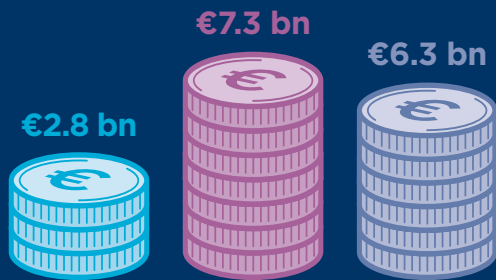


TOTAL EUROPEAN ECONOMIC IMPACT

● Total ● Direct ● Indirect ● Induced

Total contribution to Europe's GDP in 2019

€16.4 billion



Average annual growth rate, 2015-2019 (in real terms)

19%

Total jobs supported in 2019

224,300

13,800

112,000

98,500

Average annual growth rate, 2015-2019

17%

Total tax revenues raised in Europe in 2019

€6.6 billion

Average annual growth rate, 2015-2019 (in real terms)

17%



This equates to the average salaries of around **151,200** teachers.

RESEARCH & DEVELOPMENT



23 R&D institutions across Europe

Global R&D budget in 2018/19 of **€12.7 billion**, making Huawei the fifth-largest R&D investor in the world that year, having ranked in the top 10 each year since 2016.

Note: Totals may not sum due to rounding

1. European Commission (2019) The 2019 EU Industrial R&D Investment Scoreboard



EXECUTIVE SUMMARY

At the heart of the European Commission’s growth agenda is the goal to create a “Europe fit for the digital age”. The enormous social and economic disruption caused by the coronavirus pandemic in 2020 has re-emphasised this focus, with the Commission recognising that *“new technologies have kept our businesses and public services running, and made sure that trade could continue flowing”*.¹

The Commission has identified its digital growth initiatives as key to relaunching the European economy, not least as a motor for innovation and job creation. Artificial intelligence has been identified as an area of strategic priority, and the Commission has acknowledged the crucial role digital technologies will play in achieving the carbon-neutrality commitments that are set out in the European Union’s Green Deal. The digital strategy requires better connectivity, world-leading digital service provision, and cyber security. Huawei’s goods and services, as well as its large-scale investment in Research and Development (R&D), mean it plays an important role in helping Europe build this digital future.

HUAWEI’S CONTRIBUTION TO THE EUROPEAN ECONOMY

In this study, commissioned by Huawei and carried out by Oxford Economics, Huawei’s total economic impact is measured in terms of its annual contributions to European GDP, jobs, and taxes. These are stimulated by Huawei’s operations within Europe, as well as the company’s spending on European suppliers from other parts of the world.

We find that in 2019, **Huawei supported a total contribution to European GDP of €16.4 billion**. This total is made up of three channels of impact:

- A **direct contribution** of €2.8 billion—generated by Huawei’s own European operations, which (for the purposes of this study) include the EU-27, the United Kingdom, Iceland, Switzerland, and Norway.
- An **indirect contribution** of €7.3 billion—stimulated through the procurement of European goods and services by Huawei’s worldwide operations.
- A further **induced contribution** of €6.3 billion—generated by Huawei staff and all employees in Huawei’s European supply chain, as they spend their wages in the wider economy on activities such as retail, leisure, and healthcare.

€16.4 billion

Huawei’s total contribution to European GDP in 2019 through its direct, indirect, and induced channels.



€6.3 billion

Total European tax revenues supported by Huawei activities in 2019.



Of this total, Huawei itself contributed around €1.6 billion.

¹European Commission (2020) Communication from the Commission to the European Parliament, The European Council, The Council, The European Economic and Social Committee and the Committee of the Regions Europe’s moment: Repair and Prepare for the Next Generation (COM/2020/456 final). p.8

As part of this large economic footprint, we estimate that **Huawei supported around 224,300 jobs in Europe in 2019**. This includes some 13,800 jobs directly supported by Huawei's own operations, 112,000 people employed indirectly in its European supply chains, and a further 98,500 jobs supported by the economic activity induced by all employees' wage-related expenditure.

Huawei also generated €6.6 billion in tax revenues for European authorities in 2019. Of this total, some €1.6 billion was paid directly by Huawei, while €2.5 billion and €2.5 billion were generated through the company's indirect and induced contributions, respectively. The total tax contribution in 2019 equates to the average salaries of around 151,200 teachers in Europe.

Huawei's impact in Europe has grown markedly over the last five years. Its contribution to GDP increased by an average of 19.1% per year, in real terms, between 2015 and 2019. The total employment and real tax contributions associated with Huawei's activities in Europe grew by an average annual rate of 17.1% and 16.8% over the same period.

224,300

Total number of European jobs that were supported by Huawei in 2019.



HUAWEI'S ROLE IN RESEARCH AND DEVELOPMENT

The European Commission has recognised R&D as a vital component for realising both sustained economic growth and wider improvements to European quality of life. The Commission recently announced €100 billion of public funding for research and innovation in the science and technology fields, via its *Horizon Europe* programme.²

Huawei has established itself over the past decade as a world leader in R&D, investing a global R&D budget of €12.7 billion in 2018/19.³ This made Huawei the fifth-largest R&D investor in the world that year, having ranked in the top 10 each year since 2016. The company also topped the ranking for patent applications to the European Patent Office in 2019.

Huawei currently operates 23 research sites across Europe, and has invested more than \$1 billion in its Innovation Research Programme, which was established in Europe in 2010. Over 100 research institutions and universities have been involved, with funding allocated across a diverse range of disciplines. Huawei also supports the *Horizon 2020* initiative (a precursor to *Horizon Europe*), in research areas such as 5G, autonomous vehicles, and cloud computing. Huawei has stated that it sees Europe as its second home-base, and that it wants to "contribute to Europe's technology leadership in the world".⁴

² European Commission (2017) *Horizon Europe The Next EU Research & Innovation Programme (2021-2027)*. Available from https://ec.europa.eu/info/sites/info/files/research_and_innovation/strategy_on_research_and_innovation/presentations/horizon_europe_en_investing_to_shape_our_future.pdf [Accessed 09 June 2020]. €100 billion is in 2019 prices.

³ European Commission (2019) *The 2019 EU Industrial R&D Investment Scoreboard*

⁴ Huawei (2020) *The Win-win Relationship Between the EU and Huawei*. Available from <https://www.huawei.eu/story/win-win-relationship-between-eu-and-huawei> [Accessed 09 June 2020]

1. INTRODUCTION

One of the core objectives of the new European Commission is creating “Europe fit for the digital age”. This is a Europe which citizens and businesses benefit from technology, the digital economy is both fair and competitive, and society operates in an open, democratic and sustainable manner.⁵ In particular, the Commission’s digital strategy prioritises excellence in Artificial Intelligence (AI). It recognizes AI’s potential to bring many benefits, from better healthcare, safer and cleaner transport, more efficiency in production and more sustainability in resource consumption.

Integral to this vision is a deeper and more digital single market, that will boost productivity and raise living standards in a more digitalised society. The disruption caused by the coronavirus pandemic in 2020 has in some ways slowed its progress, but in other ways has served to further emphasise its importance.

The Commission identified several factors as central to a successful digital transition in Europe.⁶ **Better connectivity** will increase the scope of the digital economy and digital society, allowing businesses and individuals to operate effectively online, everywhere. **Technology security** will need to improve and keep pace with an ever larger and more complex digital infrastructure. **Access to data** will enable businesses to grow, and to understand their markets

better. A **fairer digital business environment** will promote competition and boost productivity. And **research and development** in core areas, including AI, communications technology and cybersecurity will enable European companies to remain globally competitive.

Digital solutions are also seen as pivotal to delivering the *European Green Deal*, which commits the EU to climate-neutrality by 2050. The Commission sees digital technologies playing a supportive role in environmental policies such as waste management and recycling, and possibly reducing net CO2 emissions.

Delivering on the Commission’s digital agenda will require the input and assistance of digital technology leaders. Huawei makes a very significant contribution to the European economy through the goods and services it provides to businesses and households, the investment it makes in innovation and skills and the economic activity it stimulates in the European economy.

1.1 STRUCTURE OF THIS REPORT

This report provides an estimation of Huawei’s economic contribution to the European Union (27 member states), Iceland, Norway, Switzerland and the United Kingdom. This is done using a standard analytical framework, known as an economic impact

assessment. We estimate Huawei’s contribution to the Gross Domestic Product (GDP) of the above European economies, the number of jobs Huawei supports, and the value of taxes generated by Huawei’s activity.

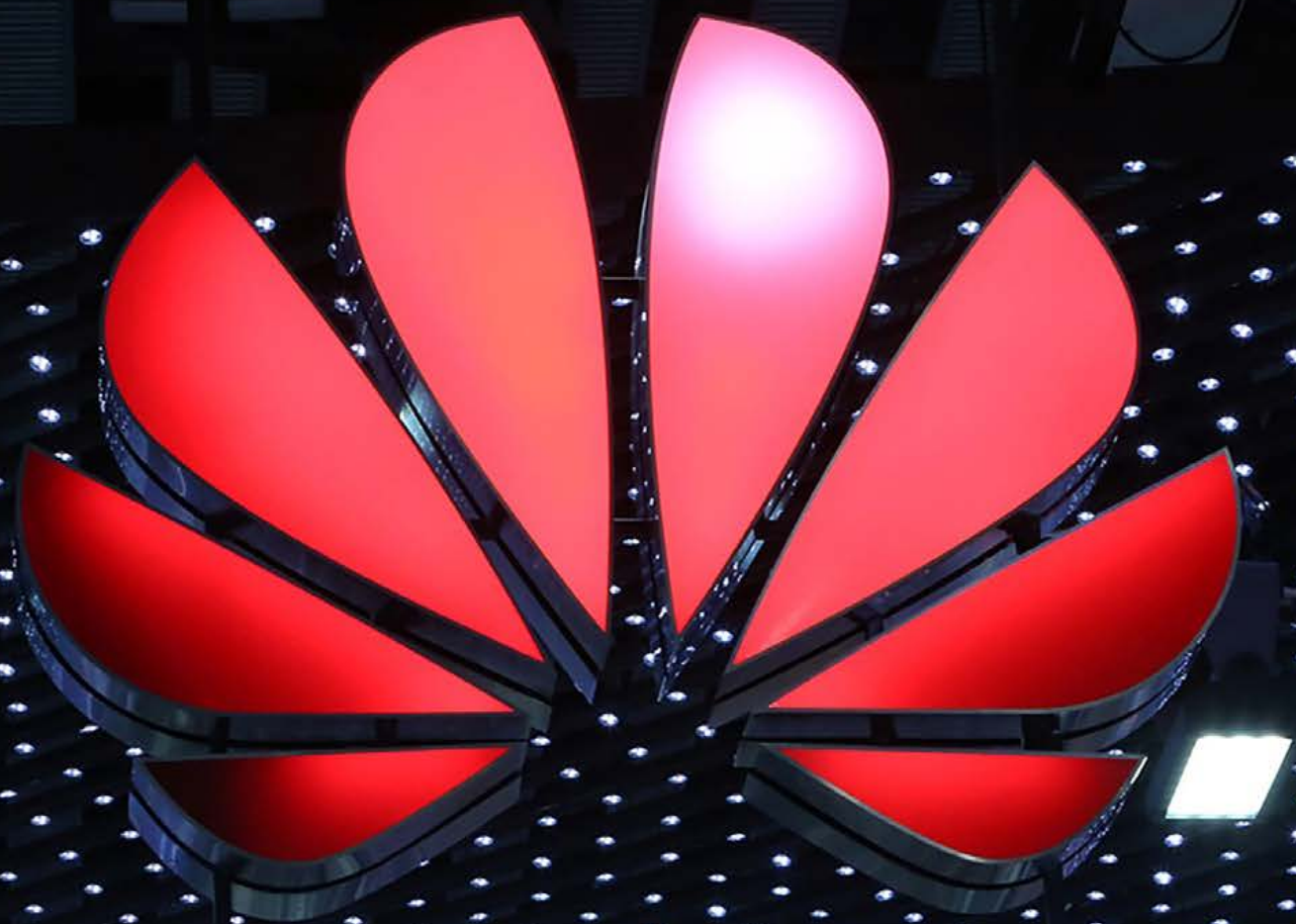
Huawei also makes an important contribution to innovation in Europe, through largescale research and development spending, which is highlighted in this report.

The report structure is as follows:

- Chapter 2 sets out the methodology of our economic impact assessment.
- Chapter 3 presents the results of the assessment, highlighting contributions to GDP, employment and taxes between 2015 and 2019.
- Finally, Chapter 4 highlights the contributions that Huawei makes to innovation, through the company’s investment in R&D.

⁵ European Commission (2020). Shaping Europe’s Digital Future. Available from https://ec.europa.eu/commission/presscorner/detail/en/fs_20_278 [Accessed 4 July 2020]

⁶ European Commission (2020) Communication from the Commission to the European Parliament, The European Council, The Council, The European Economic and Social Committee and the Committee of the Regions Europe’s moment: Repair and Prepare for the Next Generation (COM/2020/456 final).



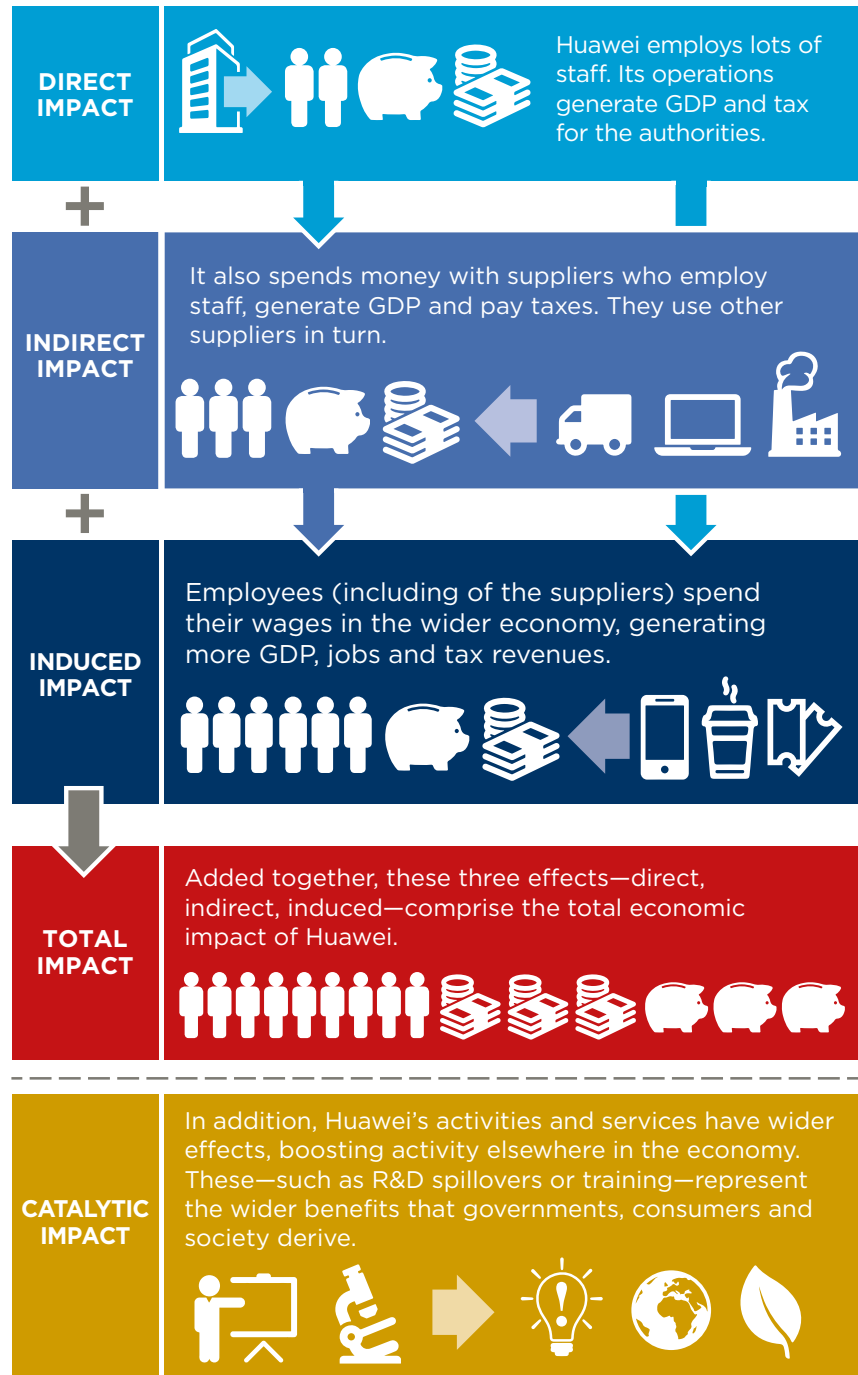
HUAWEI

2. OUR METHODOLOGY

The impact of Huawei’s operations in Europe is assessed using a standard analytical framework, known as an economic impact assessment. This involves quantifying the impact of three types of expenditure associated with Huawei’s activities in Europe (also summarised in Fig. 1):

- **Direct impact** relates to the operational expenditure that Huawei undertakes in running its own activities. It encompasses the economic activity and employment generated at its sites across the EU, Iceland, Norway, Switzerland and the United Kingdom.
- **Indirect impact** is the economic activity and employment stimulated by the supply chain spending on European goods and services by Huawei’s European and global operations.
- **Induced impact** comprises the wider economic benefits that arise from the payments of wages by Huawei and the businesses in its supply chain to their own employees, who spend their earnings in retail, leisure and other outlets. This impact also captures the economic activity stimulated in the supply chains of those outlets.

Fig. 1: Schematic of Huawei’s economic contribution to the European economy



The sum of these channels makes up the total of Huawei’s expenditure impacts. The results are presented on a gross basis, meaning they do not control for any displacement of activity from Huawei’s competitors or other firms. Nor do they consider what the resources currently used in supporting Huawei’s economic footprint could otherwise be productively diverted towards. Huawei’s economic contribution is measured using three metrics:

- **GDP**—or more specifically, the gross value added (GVA) contribution to GDP. This contribution to GDP is defined as *the value of the output produced, minus the expenditure on inputs of bought-in goods and services used up in the production of*

that output. GDP measures the total economic output of the country and is used to measure the rate of economic growth. GDP equals the sum of GVA and taxes minus subsidies on production.

- **Employment**, as measured on a headcount basis.
- **Tax** revenue flowing to national governments.

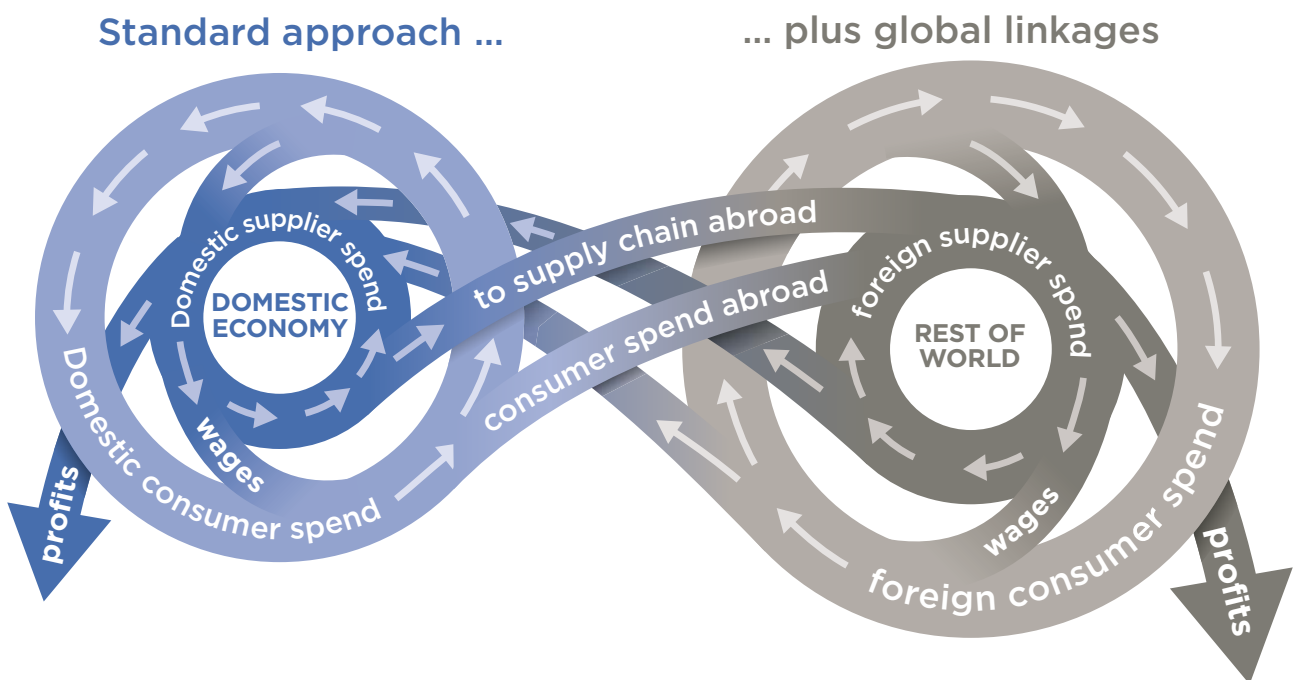
While most economic impact studies assess these effects based only on spending that occurs within the country of interest, this report goes further by assessing the impact of Huawei’s global activities on European economies. This is a more comprehensive approach that is suited to

companies with a global footprint, such as Huawei, and highlights the international nature of its supply chain (as illustrated in Fig. 2). A detailed methodology discussion is in the Appendix to this report.

It should also be noted that this report only assesses the economic activity that is supported by the expenditure Huawei makes in Europe.

Of course, the products and services Huawei provides to businesses and customers also play a role in each country’s digital infrastructure—and their provision will therefore have an economic effect, potentially increasing the overall productivity of Europe’s economy. This report does not attempt to quantify the scale of these dynamic impacts.

Fig. 2: Our Global Impact Model captures how Huawei’s contribution spans economies



3. THE ECONOMIC IMPACT OF HUAWEI

This chapter analyses Huawei's economic contribution in Europe, which we assess through three channels. We first estimate the direct contribution that Huawei makes through its European operations. We then consider the money the company spends with its Europe-based suppliers of goods and services, which itself stimulates further spending in the wider supply chain. The third channel is the consumer spending this activity supports in the European market, funded by the wages paid to Huawei's employees and those employed along its supply chain.

The results are presented firstly in aggregate, for the whole of Europe, split into separate sections for GDP, employment and tax contributions. We then move on to break down the country-by-country distribution of that impact in 2019.

3.1 HUAWEI'S CONTRIBUTION TO GROSS DOMESTIC PRODUCT

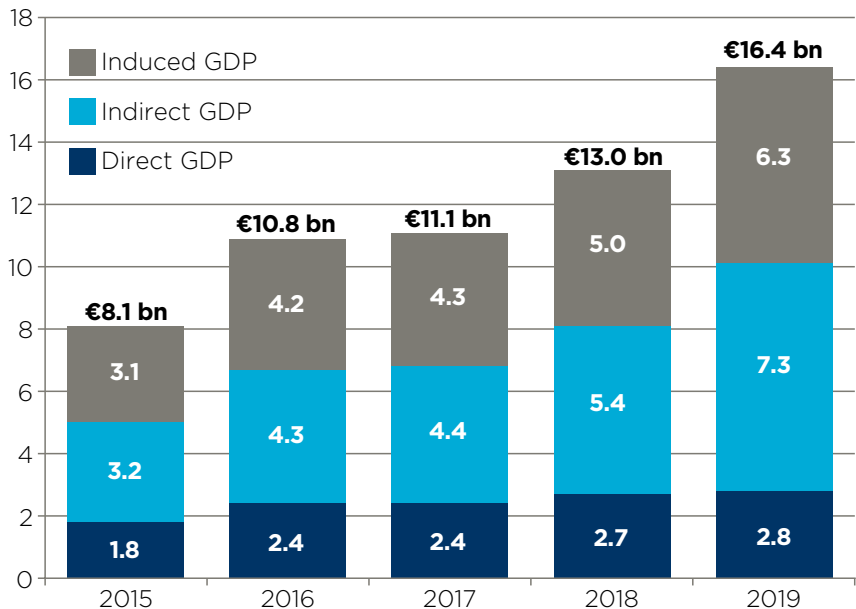
Huawei has made an impact on the European economy in a variety of ways. Its contribution to GDP has grown sharply since 2015, from €8.1 billion in 2015 to €16.4 billion in 2019 (Fig. 3). This rise of €8.2 billion (in real terms) corresponds to an average growth per year of 19.1%.⁷

Huawei's direct contribution to GDP is the value added through its own operations. Between 2015 and 2019 Huawei contributed an average of €2.4 billion (in real terms) per year to the European economy. This contribution grew from

€1.8 billion in 2015 to €2.8 billion in 2019, a growth rate of around 11.4% annually, in real terms. To put this in comparison, the comparable annual growth rate for the European economy for this same period was around 2.0%, and the corresponding figure for the manufacturing sector was 2.1%. The hi-tech manufacturing sector and telecommunications equipment manufacturing sector both grew more quickly over the period, at 5.2% and 4.4% per year respectively, in real terms, but were still by far outstripped by Huawei's growth rate.⁸

Fig. 3: Contribution to GDP by Huawei, 2015-19

€ billion (2019 prices)



Source: Oxford Economics

⁷ All figures throughout this report are presented in 2019 prices.

⁸ "Hi-tech" equipment includes computers and computer-related equipment, electronic components and boards, consumer electronics, technical testing equipment, clocks and watches, photographic equipment, and optical equipment.

In conducting its operations, Huawei purchased goods and services from a large and complex global supply chain. The ‘indirect’ economic impact this has on the European economy relates to both the procurement spending of Huawei’s European operations and the share of its global procurement spending that goes to European suppliers.⁹ This amounted to €30.7 billion between 2015 and 2019, with €9.1 billion, or 30% of the total, occurring in 2019.¹⁰

This procurement resulted in an average, annual indirect impact on the European economy of €4.9 billion, between 2015 and 2019. This included a €7.3 billion contribution to GDP in 2019, up from €3.2 billion in 2015 (in 2019 prices), representing a real average annual growth

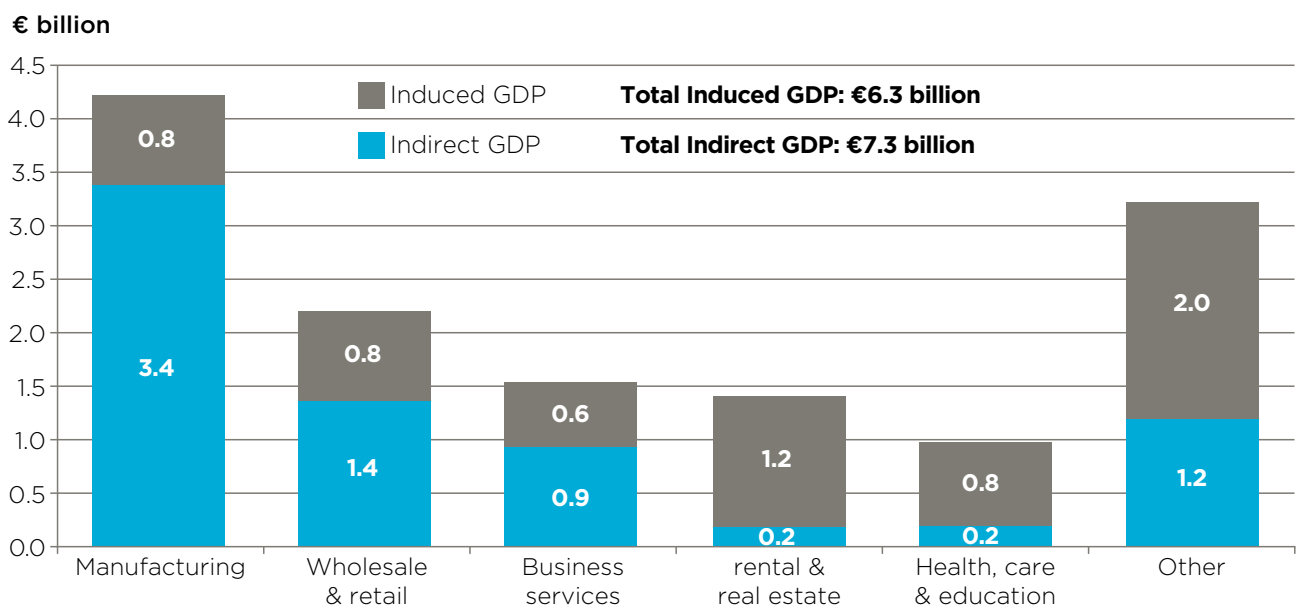
rate of 22.8%. The largest impact in 2019 was seen in the manufacturing sector, which accounted for 47% of Huawei’s total indirect impact in 2019, equivalent to €3.4 billion (see Fig. 4). The next largest contributions were made in the wholesale & retail sector (€1.4 billion, or 19% of the total) and business services (€0.9 billion, or 13% of the total).¹¹

The final channel of economic impact is generated by workers spending the wages they earned from Huawei and in its supply chain. These wages are spent on goods and services, including rents, leisure and retail, and this spending adds value, supports jobs and generates taxes in those sectors too. Between 2015 and 2019, we estimate Huawei paid its staff €7.3

billion in wages; we also estimate that an additional €15.4 billion was paid to workers who were employed in firms along Huawei’s European supply chain.

The induced GDP contribution has risen from €3.1 billion in 2015 to €6.3 billion in 2019, which is an average annual growth rate of 19.2%. The average contribution over that five-year period was €4.6 billion, in 2019 prices. Of the €6.3 billion induced contribution to GDP in 2019, 20% was generated in the rent & real estate sector. The next largest recipients were the wholesale & retail sectors, manufacturing and the health, care & education sector, all of which accounted for around 13% of the total.¹²

Fig. 4: Breakdown of indirect and induced GDP by sector, 2019



Source: Oxford Economics

⁹ For the purpose of analysis, we estimate only the global procurement spending in Huawei’s 12 largest European markets.

¹⁰ This estimate of procurement for the wider industry is based on data from the OECD.

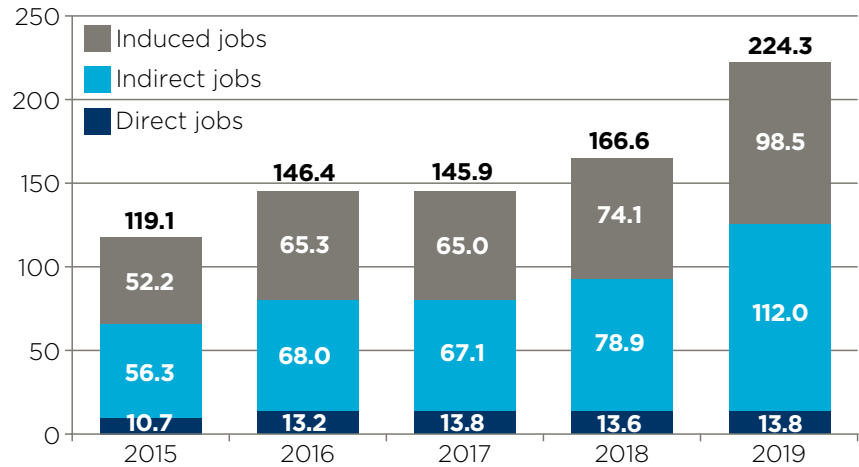
¹¹ “Business services” include some aimed at individuals as well as businesses, such as legal services, or travel and reservation services. In addition, the induced channel includes business-to-business transactions further “up” the supply chain, not just the final round of business-to-consumer transactions.

¹² As tax-funded activity is excluded from the induced channel, the figure for health, care and education relates to private provision only.

3.2 CONTRIBUTION TO EMPLOYMENT

Huawei supports a large number of jobs in Europe, both directly and through its supply chain. In 2019, Huawei directly employed 13,800 workers across Europe (see Figure 5). This was up from 10,700 in 2015, a rise of 3,100 or 29% over five years. The corresponding average annual growth rate was 6.5%; around five times the average growth rate for employment in Europe, which was around 1.3% per annum over the same period.

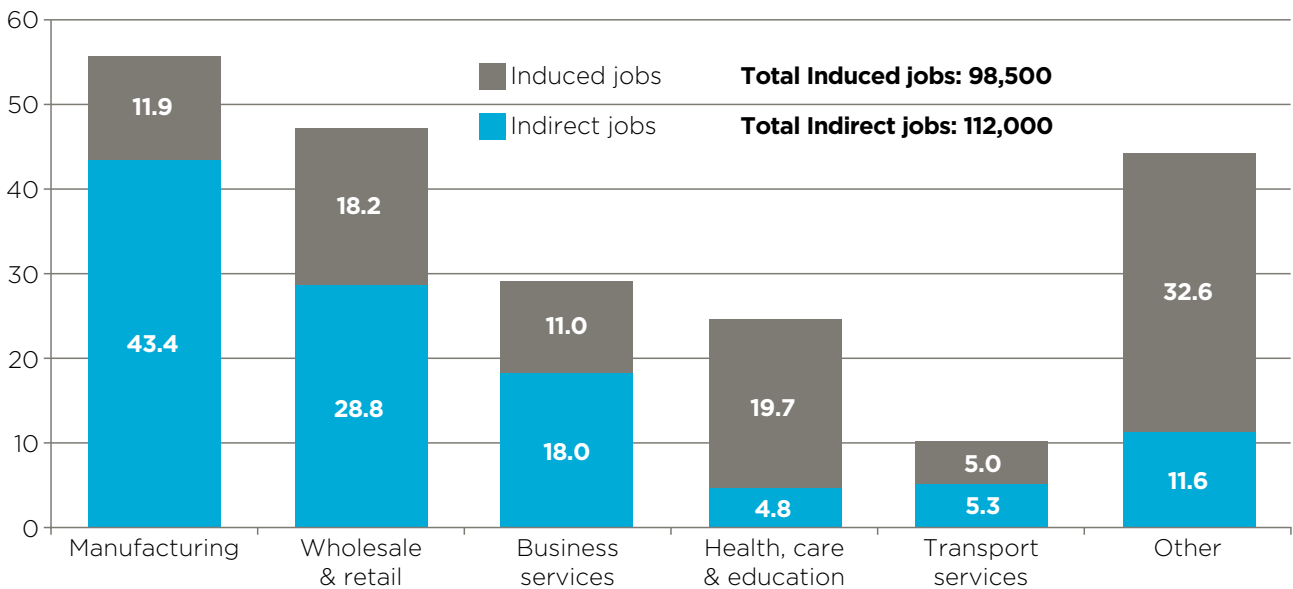
Fig. 5: Contribution to employment by Huawei, 2015-19
Headcount, thousands



Source: Oxford Economics

Fig. 6: Breakdown of indirect and induced employment by sector, 2019

Headcount, thousands



Source: Oxford Economics

Looking down through Huawei's supply chain, we estimate 112,000 jobs were supported indirectly in 2019, up 98.9% from 56,300 in 2015. The average annual growth rate in jobs supported via the indirect impact between 2015 and 2019 was 18.8%. With a similar sectoral distribution to Huawei's indirect impact on GDP, the majority of these jobs supported in 2019 were in Manufacturing (39% of the total, or 43,400), followed by Wholesale & Retail (26% of the total, or 28,800) and Business Services (16% of the total, or 18,000) (see Fig. 6).

The number of jobs supported by Huawei's induced impact on the European economy has also grown substantially over our period of analysis. In 2019, this totalled 98,500 jobs, up from 52,200 in 2015, which represent an average annual growth rate of 17.2%. More than half of these jobs were in three sectors of the economy: health, care & education, wholesale & retail and manufacturing.

Combining the above channels, the total number of jobs supported by Huawei has risen from 119,100 in 2015 to 224,300 in 2019, a growth rate of 88.2% or 17.1% per annum.

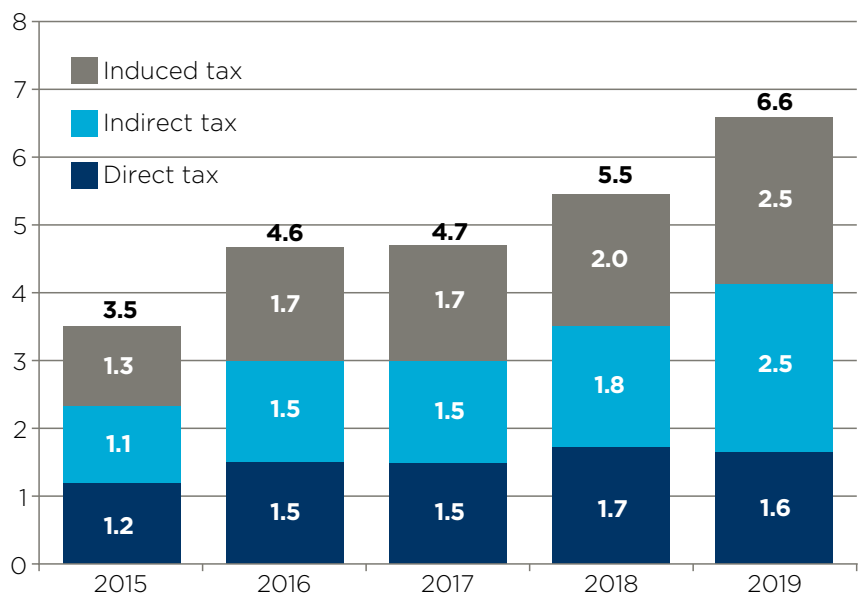
3.3 CONTRIBUTION TO TAXES

Huawei's economic activity generates a range of tax revenues for European authorities, from corporation tax paid directly by Huawei to sales taxes generated by consumer spending. The total amount of tax supported by Huawei's activities between 2015 and 2019 totalled around €25.0 billion, an average of about €5.0 billion per year. The yearly amount paid has nearly doubled from €3.5 billion in 2015 to €6.6 billion in 2019. (see Fig. 7)

Huawei paid an estimated €1.6 billion in direct taxes to European authorities in 2019.¹³ The taxation generated by the indirect and induced channels was even larger at €2.5 billion each. Huawei's direct taxes contribution alone is equivalent to the average salaries of around 40,600 teachers; if the taxes generated through the indirect and induced channel are also included the number rises to around 151,200 teachers.¹⁴

Fig. 7: Contribution to taxes by Huawei, 2015-19

€ billion (2019 prices)



Source: Oxford Economics

¹³ Identifiable corporate and employee taxes as reported by Huawei.

¹⁴ Based on OECD data on lower secondary teachers for 21 countries and ONS data for secondary teachers for the United Kingdom. For countries with no available data, we estimated teachers' salaries using the relationship between teachers' salaries and GDP per capita.

3.4 CONTRIBUTION ACROSS EUROPE

Huawei's economic footprint spreads across every country in Europe. Germany was the largest beneficiary in 2019, with a €3.7 billion contribution. It was followed by the United Kingdom, with €3.6 billion, and France with €1.8 billion (see Fig. 8). In 18 of the 31 countries analysed, contributions to national GDP were greater than €100 million.

Relative to the size of GDP, Huawei's largest impact was in Hungary, where its contribution was equivalent to 0.49% of GDP in 2019. This was followed by Switzerland, with a contribution equivalent to 0.22% of GDP and the United Kingdom at 0.16%.

Huawei's employment footprint across Europe is distributed differently to its GDP impact. The top three beneficiaries in absolute terms were the United Kingdom, with 51,100 jobs supported in 2019, Germany (44,800) and Hungary (21,500). These three countries accounted for more than half of all jobs supported by Huawei in Europe that year (Fig. 9).

In relative terms, Hungary benefited most from Huawei's employment footprint. The jobs supported by Huawei accounted for 0.45% of Hungary's total employment in 2019. Switzerland was the second largest beneficiary, where Huawei accounted for 0.22% of total employment. The United Kingdom saw 0.16% of all employment associated in some way with Huawei's operations.

Fig. 8: Huawei's total contribution to Europe's GDP by country, 2019

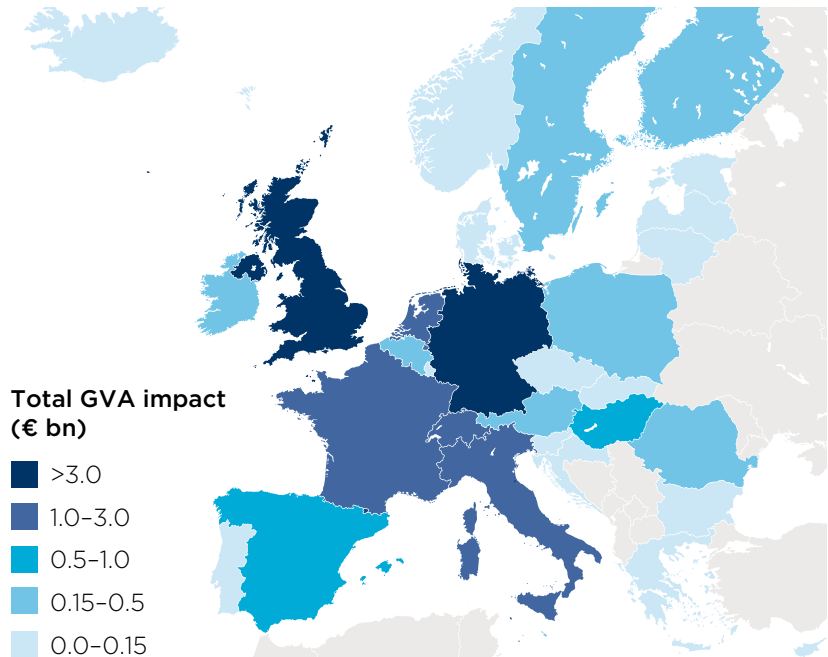
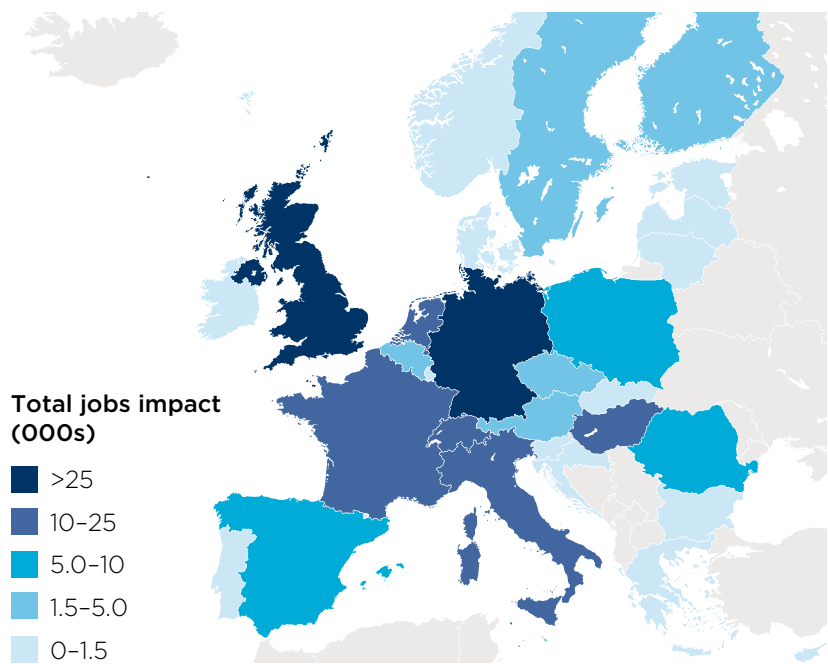


Fig. 9: Huawei's total contribution to Europe's employment by country, 2019





4. HUAWEI'S LONG-TERM INVESTMENT IN R&D

In the previous chapter we assessed the contribution Huawei made to the European economy in 2019, through its operations and supply chain spending. In fact, the company plays a much larger role in the European economy by stimulating its long-term productive potential. Huawei's largescale investment in R&D and its active collaboration with stakeholders in industry and academia to tackle the world's most pressing technological and communications challenges, builds a long-lasting platform for innovation-driven growth. In this chapter we assess Huawei's contribution to European R&D.

4.1 THE IMPORTANCE OF R&D IN EUROPE

R&D comprises a great diversity of activities and disciplines, ranging from basic (i.e. early stage) scientific pursuits in academia to specific, technical problem solving in product development. The knowledge gained through R&D is a cornerstone of innovation and a key driver of economic growth.

The benefits of R&D are often felt through the positive "spillover effects" it creates in an economy, as businesses and individuals that are not involved in R&D investments are still able to reap its rewards. Such spillovers might occur through the sharing of knowledge through academia or skilled personnel, the dissemination of new technology through supply chains, or the competitive imitation and innovation of new technological breakthroughs. For these reasons, R&D investments lead to a general increase in the productive capabilities of an economy and provide a boost to long run growth and improved standards of living.

As such, the social benefits of investment in R&D can outweigh the private benefits.¹⁵ Recent research, looking at historical data from US firms, suggests the wider social benefits resulting from R&D were roughly four times higher than the private benefits that accrue to those making the investment. It also found that spillovers were particularly large during periods of rapid technological innovation.¹⁶

The EU's digital strategy recognises this importance of sustained and broad-based R&D investment to its international competitiveness. The European Commission's flagship R&D programme, *Horizon Europe*, has committed €100 billion of public funding for digital research and innovation between 2021 and 2027.¹⁷ This builds on the success of the Commission's precursor programme, *Horizon 2020*, which invested €80 billion to businesses and individuals between 2014 and 2020.¹⁸

These initiatives will help to counteract the sluggish trends in R&D investment by European organisations over the past two decades. In 2018, total spending on R&D as a percentage of GDP for the EU-28 was 2.03% (Fig. 12), far below the levels seen in South Korea, Japan, the USA and China.

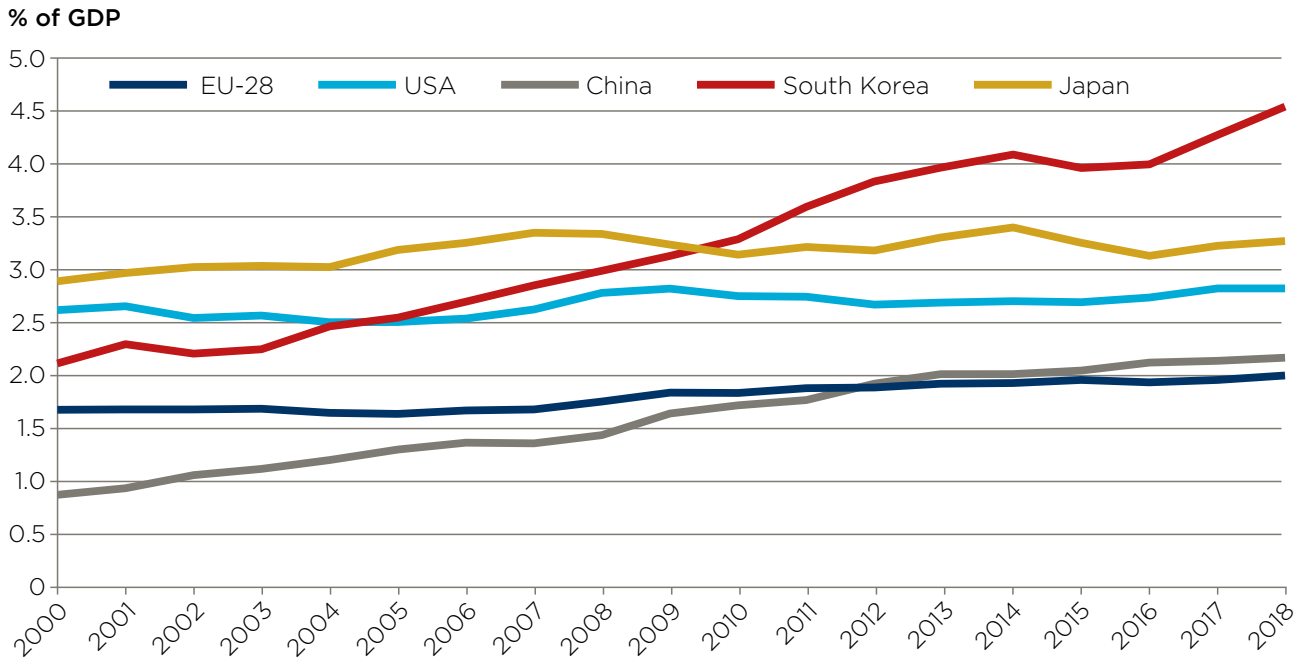
¹⁵ Social benefits are the sum of the private returns and the spillover effects on the economy.

¹⁶ Lucking, Bloom and Van Reenen (2020) Have R&D Spillovers Declined in the 21st Century? Available from: <https://onlinelibrary.wiley.com/doi/10.1111/1475-5890.12195> [Accessed 4 July 2020]

¹⁷ European Commission (2018) EU funding for Research and Innovation 2021-2027. Available from: https://ec.europa.eu/commission/publications/research-and-innovation-including-horizon-europe-iter-and-euratom-legal-texts-and-factsheets_en [Accessed 3 July 2020]

¹⁸ Source: European Commission (2020). What is Horizon 2020. Available at: <https://ec.europa.eu/programmes/horizon2020/what-horizon-2020> [Accessed 3 July 2020]

Fig. 10: Total expenditure on R&D, percentage of GDP 2000-2018¹⁹

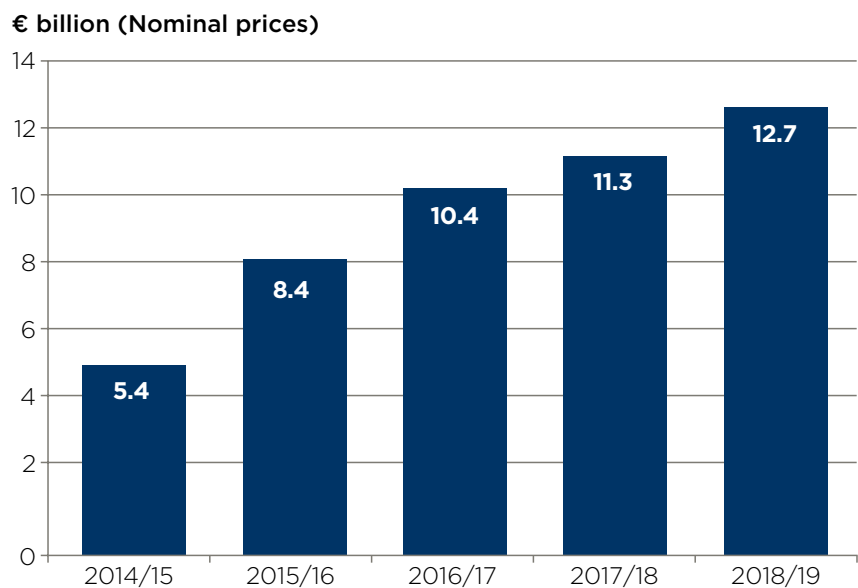


Source: OECD

4.2 HUAWEI'S CONTRIBUTION TO EUROPEAN R&D

Huawei is amongst the world's most prominent investors in R&D. According to the 2019 EU Industrial R&D Investment Scoreboard, published by the European Commission, Huawei invested €12.7 billion globally in 2018/19 (see Fig. 11).²⁰ After ranking in the top 10 since 2016, this placed Huawei fifth on the international R&D scoreboard. Its investment represents 1.5% of the total global investment of the top 2,500 investing companies.

Fig. 11: Huawei's investment on R&D, according to EU R&D Investment Scoreboard, 2014/15-2018/19



Source: European Commission (EU Industrial Scoreboard 2015-2019). Data is intended to refer to the fiscal year, though due to accounting practices, data may refer to accounts published late in the previous year, or mid of the following year

¹⁹ OECD (2020) Gross domestic spending on R&D. Available from: <https://data.oecd.org/rd/gross-domestic-spending-on-r-d.htm> [Accessed 4 July 2020] Chart refers to Gross Domestic Spending on R&D, defined as the total expenditure (current and capital) on R&D within a country by resident companies, research institutes, universities and government laboratories.

²⁰ European Commission (2019) The 2019 EU Industrial R&D Investment Scoreboard

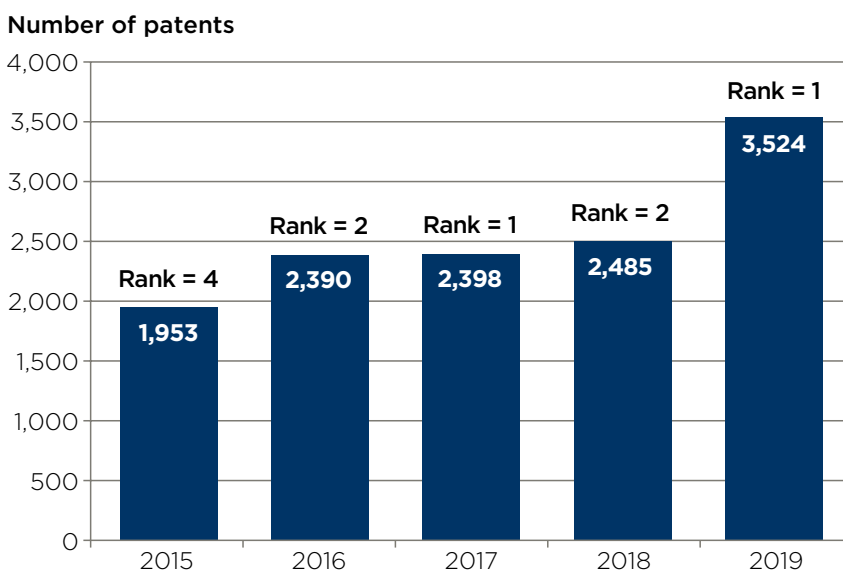
Huawei is also one of the world’s largest patent holders. As of the end of 2019, it held over 80,000 valid patents worldwide, with more than 3,500 applications registered in the European Patent Office in 2019, more than any other company. Its investment in European R&D was evidenced that year by a rapid escalation in patent activity, with European Patent applications up by more than 40% from the year before (see Fig. 12).

Huawei is particularly active in the field of 5G, evidenced by its cumulative US \$4 billion R&D investment in this space between 2009 and 2019.²¹ Huawei’s standard-essential patents for 5G account for 20% of the world’s total, and the 21,000 5G-related patents over the last decade are the most in the industry.²²

In 2020, Huawei celebrates the 10-year anniversary of its Huawei Innovation Research Program. In that time, the programme has invested more than US \$1 billion with over 100 universities and research institutions around the world.²³ As well as funding opportunities, it provides long-term research partnerships to universities and research institutes engaged in fields such as communication technology and computer science engineering. In Europe, its collaborative relationship with industry and academia is facilitated through its 23 research sites, which are managed by the Huawei European Research Institute in Leuven, Belgium.²⁴

Huawei’s strategic emphasis on R&D means it can play an important role in helping the European Commission realise its own digital strategy over the coming years. Huawei is actively engaged in several Horizon 2020 projects, in a wide array of research areas such as 5G, cloud computing and self-driving cars. Through these, and further R&D initiatives in the future, Huawei’s investment in Europe presents opportunities for long-term growth.

Fig. 12: Huawei’s patent applications to European Patent Office, 2015-2019



Source: European Patent Office

²¹ Source: Huawei

²² A standard-essential patent is “a patent that is necessarily practiced by any implementation of a technology standard”. European Commission (2017) Licensing Terms of Standard Essential Patents p.8.

²³ Source: Huawei

²⁴ Huawei (2020) Innovation for Europe Delivering on EU plans for our digital future. Available from <https://www.huawei.eu/file-download/download/public/2541> [Accessed 09 June 2020]

HUAWEI



APPENDIX: METHODOLOGY

METHODOLOGY FOR CAPTURING DIRECT IMPACTS

Estimates of the direct impact of Huawei—including its contribution to GDP, jobs supported, and taxes paid by the businesses and employees—were largely based on information provided directly by the company, and from third parties licensed to distribute corporate financial information.

METHODOLOGY FOR CAPTURING THE INDIRECT AND INDUCED IMPACTS

To estimate Huawei's indirect and induced GDP impacts, Oxford Economics utilised an input-output model of the European economy, using the latest OECD Inter-Country Input-Output Table as its starting point.²⁵

An input-output model gives a snapshot of an economy at any point in time. The model shows the major spending flows from “final demand” (i.e. consumer spending, government spending, investment, and exports to the rest of the world); intermediate spending patterns (i.e. what each sector buys from every other sector – the supply chain in other words); how much of that spending stays within the economy; and the distribution of income between employment income and other income (mainly profits). In essence, an input-output model is a table which shows who buys what from whom in the economy.

The model used captures the impact of transactions between, as well as within, each European economy. In addition, a “rest of the world” sector is included, to capture the impact of supply chains flowing out of Europe but then back in.

Purchases by Huawei's worldwide operations, from suppliers based in 12 key European markets, were provided by Huawei.²⁶ This procurement spending was split into a pattern of purchases, by type of product and location of supplier, taking into account information in the multi-country input-output table for the “hi-tech goods manufacturing” sector, of which Huawei is a part. However, as purchases from European suppliers based in the other 19 countries could not be captured, the indirect impacts arrived at in this study are likely to underestimate the true values and should therefore be seen as conservative estimates.

Each year's data was fed into the model to arrive at total sales throughout the European supply chain, by sector of supplier, for the year concerned. The indirect contribution to GDP was worked out from there, using GDP-to-sales ratios for each industry, taken from the OECD I-O table. The indirect employment impact was calculated in turn from there, using GDP-to-jobs ratios for each industry for that year.²⁷

The induced sales figures for each year were worked in two stages. The impact relating to spending by employees in Huawei's supply chain was worked out alongside the indirect impact, taking Huawei's procurement as the starting point. This calculation used an extended part of the input-output model, which takes into account the pattern of European household consumption as well as intra-industry transactions. The impact relating to spending by Huawei's own employees was modelled separately, using estimates of their spending power—the company wage bill net of employees' tax and social security contributions—as the starting point. The two estimates of induced sales, on an industry-by-industry basis, were added together and the induced GDP and jobs impacts estimated from there.

Finally, tax contributions were estimated taking into account sales, GDP and employment by industrial sector, and applying various appropriate tax-to-expenditure and tax-to-income ratios, sourced from the OECD, Eurostat and other official datasets.

²⁵ <https://www.oecd.org/sti/ind/inter-country-input-output-tables.htm>

²⁶ The 12 markets were: Denmark, Finland, France, Germany, Hungary, Italy, the Netherlands, Poland, Spain, Sweden, Switzerland and the UK.

²⁷ Based on GDP and employment data also sourced from the OECD.

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November 2020

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