



# THE ECONOMIC IMPACT OF HUAWEI IN EUROPE

NOVEMBER 2019







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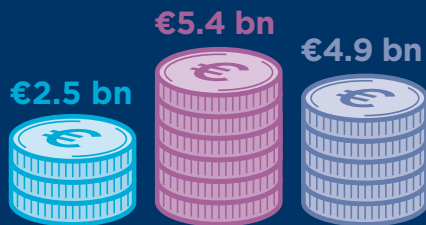
# HUAWEI'S ECONOMIC IMPACT THROUGHOUT EUROPE

## TOTAL EUROPEAN ECONOMIC IMPACT

● Total ● Direct ● Indirect ● Induced

Total contribution to Europe's GDP in 2018

**€12.8 billion**



Average annual growth rate, 2014-2018 (in real terms)

**19%**

Total jobs supported in 2018

**169,700**

**13,300**

**80,300**

**76,100**

Average annual growth rate, 2014-2018

**13%**

Total tax revenues raised in Europe in 2018

**€5.6 billion**

Average annual growth rate, 2014-2018 (in real terms)

**17%**



This is sufficient to match the wage bill for **136,000** individuals each paid **€40,000** per annum—the average for a full-time professional working in the European education and healthcare sectors.

### UNITED KINGDOM

€3.0 bn  
41,400  
€963 mn

### FRANCE

€1.2 bn  
12,200  
€724 mn

### SPAIN

€580 mn  
8,000  
€305 mn

## RESEARCH & DEVELOPMENT



**23**

R&D institutions in 12 European countries



**2,400**

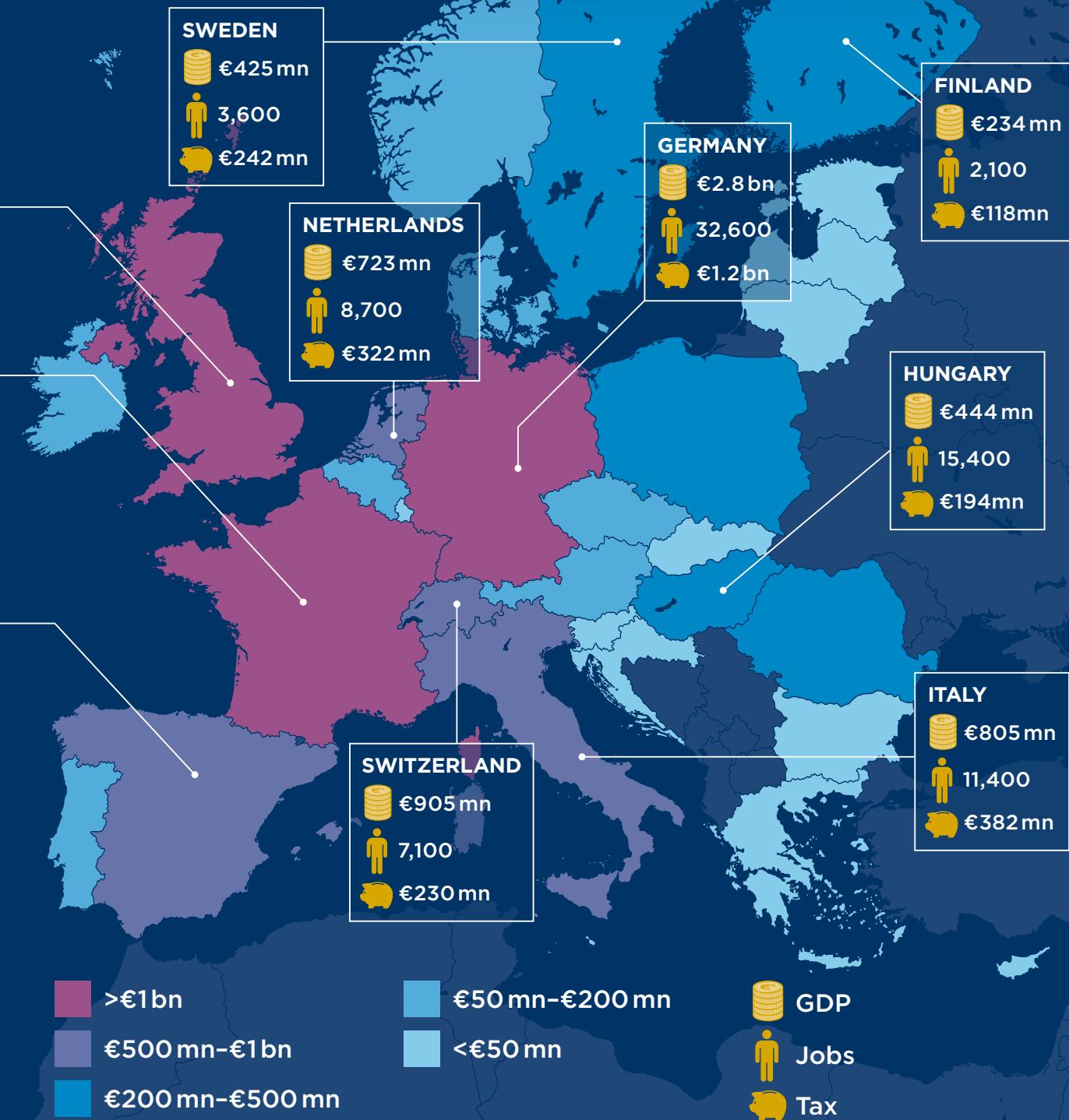
employees are in R&D roles

**89%**

of these are recruited locally

Note: Totals may not sum due to rounding

## TOTAL 2018 GDP CONTRIBUTION BY COUNTRY



# EXECUTIVE SUMMARY

## A DIGITAL EUROPE

The incoming President of the European Commission has made technology—and making Europe “fit for the digital age”—one of the three pillars of her term as President, alongside climate change and population demographics.

Having developed a physical Single Market, the European Commission has long aimed to achieve the same in the digital realm. The Digital Single Market seeks to remove unnecessary regulatory and access barriers, to enable all EU residents to fully enjoy the benefits that digital developments can offer. Successful implementation will enhance the EU economy’s productive capacity and ensure that its firms and industries are not left behind by the pace of digital transformation. **However, the new European Commission seeks to go even further, delivering areas of *digital sovereignty* for the EU by establishing the necessary technological ecosystem across the continent.**

Huawei is among the companies leading the way in innovating the products and services needed to accomplish the EU’s target, including through 5G connectivity, the Internet of Things (IoT), digital security, and enhancing ICT skills. Moreover, by actively working with European businesses, Huawei is ensuring that its technologies are implemented in ways that maximise their benefits for both individual firms and society more widely.

## CALCULATING HUAWEI’S TOTAL ECONOMIC IMPACT IN EUROPE

In addition to helping shape Europe’s digital future, Huawei makes a sizeable and immediate contribution to the continent’s economy. This “total economic impact” is measured annually in terms of its contribution to European GDP, the jobs it supports across the continent, and the tax revenues it generates. These impacts occur both directly and through the “knock-on effects” of demand for European products in the supply chains of Huawei’s European and global operations.

€12.8 billion

Huawei’s total  
contribution to  
Europe’s GDP  
in 2018



**In total, we find that Huawei sustained a €12.8 billion contribution to Europe's GDP in 2018.** This comprised:

- Huawei's "direct" €2.5 billion contribution, stemming from operational expenditure at its sites across the EU, Iceland, Norway, and Switzerland.
- A €5.4 billion "indirect" contribution stimulated by Huawei's European and global operations' procurement of inputs of goods and services from suppliers in the 12 European countries from which Huawei purchases the most.
- An "induced" contribution of €4.9 billion, which captures the wider economic benefits that arise from the payments of wages by Huawei and the firms in its supply chain to their own employees, who spend their earnings in retail, leisure and other outlets. This also includes the economic activity stimulated in these outlets' supply chains.

**In 2018, Huawei supported a total of 169,700 European jobs** through these three channels of impact. This includes 13,300 permanent employees and contracted staff at Huawei's European entities, plus a further 80,300 jobs in European firms within Huawei's worldwide supply chain.

Huawei's employment impact spreads throughout Europe: 10 countries saw more than 5,000 jobs supported as a result of Huawei's activities in 2018, of which two—Germany and the UK—had more than 20,000 jobs linked to the company in some way.

**Furthermore, Huawei generated €5.6 billion in tax revenues for European governments in 2018.** Some €1.8 billion of this was paid by Huawei itself, with a further €1.8 billion resulting from the activities of its supply chain. This total annual tax income is sufficient to match the wage bill for 136,000 individuals each paid €40,000 per annum—the average salary of a full-time professional working in the European education and healthcare sectors.

**169,700**

**Jobs**

**Huawei's total employment impact in 2018.**



**€5.6 billion**

**Total tax payments supported by Huawei's activities in 2018.**



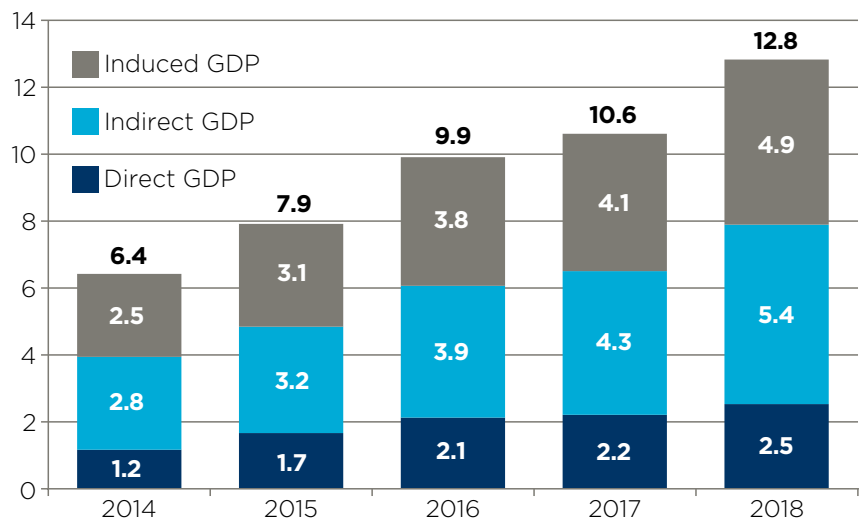
**Huawei itself paid €1.8 billion in tax in 2018.**

**Huawei's economic impact has grown rapidly.** In line with Huawei's increasing commitment to European markets, the company's total economic impact in Europe has grown significantly in recent years. Its investments in staff and facilities have increased along with its procurement spend on goods and services produced by European suppliers.

**Overall, we find that Huawei's total contribution to European GDP grew by an annual average of 19% between 2014 and 2018**, in real terms (see Fig. 1). Over the same period, the total employment supported by Huawei rose by an average of 13% per annum, and total tax revenue generated increased by 17% per year, in real terms.

**Fig. 1: Huawei's annual total contributions to Europe's GDP, 2014-2018**

€ billion (in 2018 prices)



Source: Oxford Economics

Note: Totals may not sum due to rounding

**19%**

Average annual rise in Huawei's total contribution to Europe's GDP between 2014 and 2018 (in real terms).

*Its total employment impact grew by 13% per year, and its total tax impact by 17% per year.*



## INVESTING IN INNOVATION

**Innovation, research and development plays a fundamental role in sustaining long-run economic growth.** The European Commission has put innovation at the heart of both its Industrial Strategy Policy and the Digital Single Market. Furthermore, the new President of the European Commission has stated that technologies such as high-performance computing and algorithms are a central part of her vision for European innovation.

**Huawei is one of the world's largest investors in R&D,** and Europe represents one of the company's key centres for innovation. It operates 23 Research Institutes across 12 European countries. Around 2,400 of its European workforce are employed in R&D roles, undertaking activities ranging from furthering wireless and optical technology to cloud computing and research into new materials.

**Additionally, Huawei works with entities throughout Europe to improve the returns they can gain from technology.** These associations include the Huawei Innovation Research Program, through which the company has worked with 140 European universities and invested more than \$1 billion in the last eight years, as well as participation in numerous industry bodies to develop joint standards.

**Huawei is actively involved in efforts to innovate in the fields of autonomous driving and smart manufacturing**—through the 5G Automotive Association and the 5G Alliance for Connected Industries and Automation, among others—to help strengthen the competitiveness of European industries. The efforts of Huawei's researchers align closely with the European Commission's aims for digitalisation of the economy and society more widely. The success and continuation of this research will deliver benefits not only to Huawei, but to Europe as a whole.

**>\$1 billion**

**Amount invested by the  
Huawei Innovation  
Research Program  
over the past eight years.**



***Through this program, Huawei  
has worked with 140 European  
universities.***

# 1. INTRODUCTION

**Increasing the integration of digital technology into people's daily lives is a key aim for governments throughout Europe.** Applying the latest innovations to areas ranging from agriculture and manufacturing to healthcare and urban planning is a core part of the continent's aim to reap multiple efficiency gains and enhance the productive potential of Europe's economy. Working across all Member States, the European Commission draws its digital aims together under the "Digital Single Market". This seeks to remove unnecessary regulatory and access barriers, enabling all EU residents to fully enjoy the benefits that digital developments can offer.

**But the new European Commission seeks to go further,** aiming to deliver digital sovereignty for the EU by developing the necessary technological base right across the continent. Its mission states that failing to innovate and incorporate technology could see Europe's firms, and the economy as a whole, left behind.

**Companies such as Huawei are leading the way in innovating the products and services required to accomplish the Digital Single Market,** including 5G connectivity, the Internet of Things (IoT), digital security and enhancing ICT skills. Currently, Huawei employs 2,400 people in its 23 research and development (R&D) operations

across Europe. By actively working with businesses, it seeks to ensure that its technologies are implemented in ways that maximise their benefits for both individual firms and society more widely.

**In addition to helping shape Europe's digital future, Huawei makes a sizeable and immediate contribution to the continent.** The company directly employs more than 13,300 people in its 44 European-based entities, and has a direct presence in 26 EU Member States as well as Iceland, Norway, and Switzerland. In 2018, Huawei spent at least €6.6 billion with European firms, purchasing the goods and services it needs to conduct its global operations.



## 1.1 STRUCTURE OF THIS REPORT

**This report provides an assessment of Huawei's contribution to the economies of the EU plus Iceland, Norway, and Switzerland.** Using a standard means of analysis called an *economic impact assessment*, we were able to model the company's economic impact in terms of its total annual contribution to Europe's GDP, the number of jobs it supported, and the tax revenues it generated for governments.

**Furthermore, in recognition of the wider role Huawei plays in driving economic activity in Europe, this study highlights the extent of the company's R&D operations across the continent.**

The report is structured as follows:

- Chapter 2 sets out our approach for measuring Huawei's total economic impact in Europe.
- Chapter 3 demonstrates the economic contribution Huawei makes to Europe as a whole, and how this has changed in recent years.
- Chapter 4 highlights how the company enhances the productive potential of the European economy, through its investment in R&D.
- Finally, Chapter 5 presents summary results for the 10 European countries where Huawei's procurement was largest in 2018.



**BOX 1: EUROPE'S DIGITAL SOVEREIGNTY TARGETS**

The new President of the European Commission has made clear her aim for Europe to pursue new digital opportunities, in order to maintain and develop Europe's technological leadership. This approach builds on previous steps taken by the Commission—and EU Member States' governments—to achieve digitalisation, primarily in its 2017 Industrial Policy Strategy.

However, that Strategy document recognised significant actions would be needed to achieve this aim. In particular, the Commission noted (i) that Europe's role in the data and platform economy was limited, (ii) that the uptake of digital technology by SMEs was low, and (iii) that only one-fifth of companies in the EU could be classified as highly digitalised.

Moreover, the actions required might be painful. For example, companies have to take on the burden of initial investment in digital technologies, while reaping the benefits of digitalisation might entail major changes to business models and staff upskilling. Against that, failure to keep pace with a rapidly digitalising economy would likely bring reductions in firms' competitiveness, market share, and potentially jobs.

Given these challenges, the European Commission has sought to instigate policies aimed at facilitating the digital transformation of Europe's economy. At the heart of this is the European Digital Single Market—the flagship initiative concerning digital policy in the EU.<sup>1</sup> The initiative extends the idea of the single market, in which

goods, services, people and capital can move freely within the EU, to the digital realm. In particular, the Digital Single Market aims to allow users to access and use online goods and services from across the EU, irrespective of where they live or work, under fair market conditions and with a high level of data protection.

By focusing on removing digital barriers, the EU hopes to expand and enhance the digital economy—and in doing so, facilitate markets to provide greater choice at more competitive prices. The initiative is centred around three pillars:

- 1. The development of e-commerce** to improve inter-EU purchases and sales of goods. By creating a larger digital marketplace, promoting e-commerce will increase consumer choice and make prices more competitive.
- 2. The enhancement of digital networks and services** through improvements in regulation and infrastructure. By delivering well-functioning digital networks and services (such as telecoms, media, and online platforms), this pillar will support economic growth and improve societal well-being.
- 3. Increasing the integration of technology** within businesses and society. Technology plays a crucial part in economic growth, and must be embraced in order to expand the potential of the economy in an increasingly digital world.

<sup>1</sup>European Commission (2015) A Digital Single Market Strategy for Europe. COM(2015) 192 final.

**In fact, the new President of the European Commission seeks to go beyond the Digital Single Market and make Europe a technological leader,** achieving digital sovereignty in critical technology areas including AI, the IoT, high-performance computing, and algorithms. Steps have already been taken to promote European innovation in these areas:

- Some €35 million was made available for research into AI-led solutions to cancer prevention and treatment, and €50 million for a European network to assist AI research more generally.<sup>2</sup>
- Similarly, the Commission has undertaken research into the factors behind the success of current IoT clusters.<sup>3</sup> Successful implementation of IoT is hoped to address problems ranging from supporting the elderly to efficient farming to managing traffic.<sup>4</sup>
- Governments across the continent are taking steps to introduce the 5G mobile technology that will be crucial to the implementation and use of both AI and the IoT, as well as many other elements of digitalisation.

Policies to deliver European digital sovereignty and ensure its place as a technological leader will generate sizable economic benefits for the continent. Indeed, recent research suggests that the digitalisation of Europe's economy is creating more than one million new jobs each year across the EU.<sup>5</sup>

<sup>2</sup> European Commission. (2019). EU invests €35 million to develop Artificial Intelligence solutions for cancer prevention and treatment. Last updated 12 July 2019. <https://ec.europa.eu/digital-single-market/en/news/eu-invests-eu35-million-develop-artificial-intelligence-solutions-cancer-prevention-and>

<sup>3</sup> European Commission. (2019). Study on mapping Internet of Things innovation clusters in Europe. Available from: <https://ec.europa.eu/digital-single-market/en/internet-of-things/clusters>.

<sup>4</sup> European Commission. (2019). Internet of Things: Towards an Interconnected Society. Available from: <https://ec.europa.eu/digital-single-market/en/node/93386>

<sup>5</sup> Prof Maarten Goos. (2019). Digitalisation and the Future of Work. Page 2. Available at: <https://ec.europa.eu/digital-single-market/en/news/digital-assembly-2019-report-and-recommendations-digital4jobs>

## 2. OUR METHODOLOGY

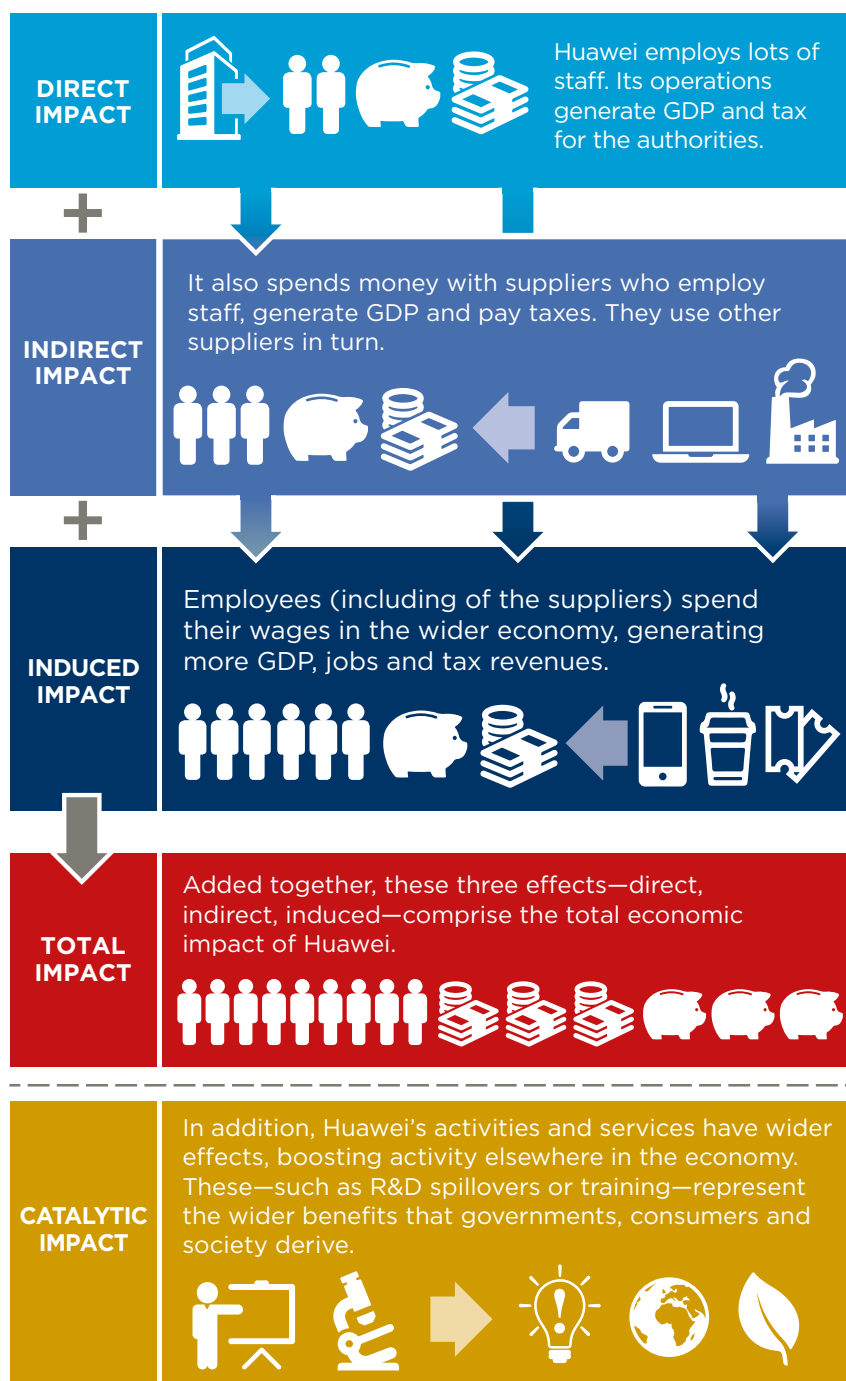
**The impact of Huawei's operations in Europe is assessed using a standard means of analysis called an economic impact assessment.**

This involves quantifying the impact of three types of expenditure undertaken by Huawei (also summarised in Fig. 2):

- **Direct impact** relates to the operational expenditure that Huawei undertakes running its own activities. It encompasses the economic activity and employment generated at its sites across the EU, Iceland, Norway and Switzerland.
- **Indirect impact** is the economic activity and employment stimulated along its supply chain by Huawei's European and global operations' procurement of inputs of goods and services from European suppliers.
- **Induced impact** comprises the wider economic benefits that arise from the payments of wages by Huawei and the firms in its supply chain to their own employees, who spend their earnings in retail, leisure and other outlets. It includes the economic activity stimulated in these outlets' supply chains.

**The sum of these channels makes up the total of Huawei's expenditure impacts.**

**Fig. 2: Schematic of Huawei's economic contribution to the European economy**





The results are presented on a gross basis. They therefore ignore any displacement of activity from Huawei's competitors or other firms. Nor do they consider what the resources currently used by Huawei or stimulated by its expenditure could alternatively produce in their second most productive usage. 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. It is used to judge the rate of growth of the economy, and to define whether the country enters a recession. GDP equals the sum of GVA and taxes minus subsidies on production.

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

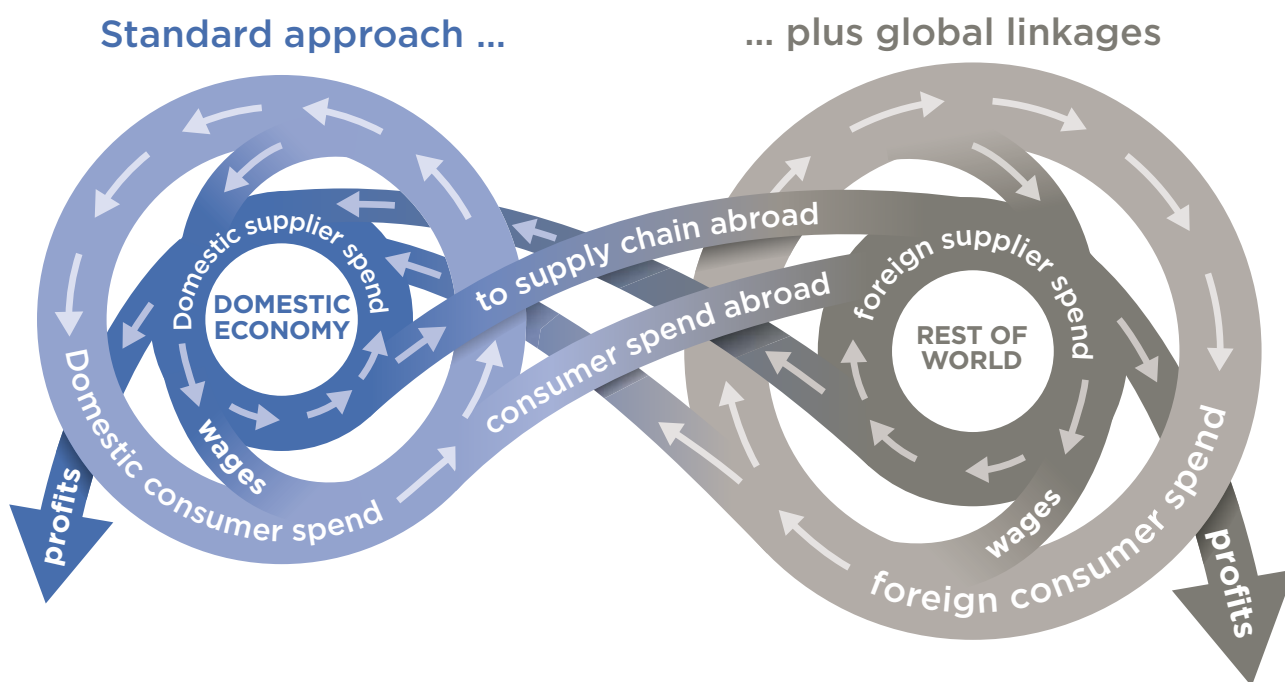
**While most economic impact studies assess these effects based only on spending that occurs within the country of interest, this report goes further by assessing the impact of Huawei's global activities on European economies.** This is a more comprehensive approach that is suited to companies with a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

as Huawei, and highlights the international nature of its supply chain (as illustrated in Fig. 3). A detailed methodology discussion is located in the appendix to this report.

**It should 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 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. However, this report does not attempt to quantify the scale of this impact.

**Fig. 3: Our Global Impact Model captures how Huawei's contribution spans economies**



## 3. ECONOMIC IMPACT OF HUAWEI

This chapter investigates the economic activity in Europe stimulated by different types of expenditure undertaken by Huawei: its own operational spending; the impact of its European and headquarters operations' procurement from suppliers located in the continent; and the payment of wages by the company and its suppliers to workers based in the region.

The results are first presented for Europe as a whole, separately for each channel of activity, namely the direct (own operations), indirect (supply chain) and induced (wage-funded staff spending). This is followed by an overview of the distribution of the total impact by country. More detail for the 10 countries where Huawei procures the most can be found in Chapter 5 of this report.

### 3.1 HUAWEI'S DIRECT IMPACT ACROSS EUROPE

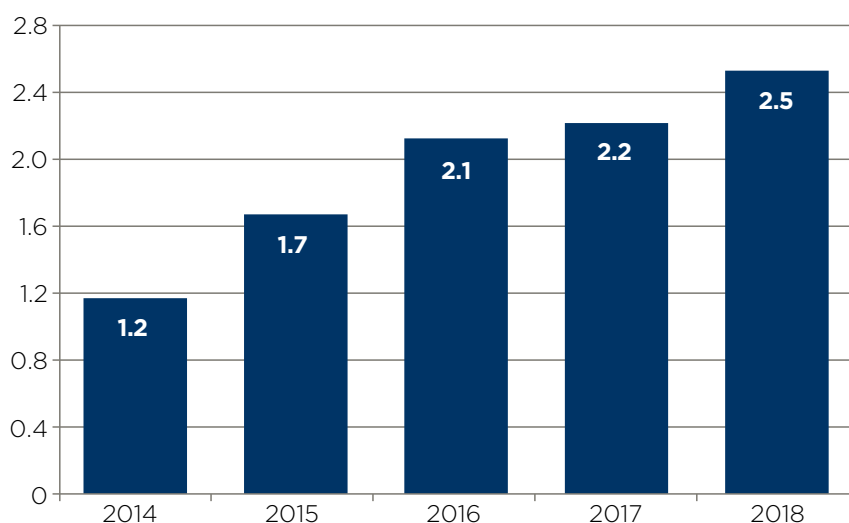
Huawei contributes to the European economy in a number of ways. The company's direct economic contribution reflects the value it adds within its own operations. We estimate this direct contribution to GDP, of Huawei entities in the 31 European countries studied, using the "income approach" to national accounting. This involves aggregating the employee compensation paid and the gross profits made.<sup>6</sup>

On this basis, Huawei's direct contribution to European GDP has grown significantly since 2014 (see Fig. 4). In 2018, the company made a €2.5 billion impact, up by over 115% on 2014 in real (inflation-adjusted) terms.<sup>7</sup>

This cumulative growth figure, for Huawei's own European-based GDP, equates to an average of over 21% per year. The company's expansion, therefore, far outstripped that of all European telecoms equipment manufacturers taken together (3.7% per annum), and that of all European manufacturers of "hi-tech" equipment (6.5% per year).<sup>8</sup> As a result, the company's share of all European telecommunications equipment manufacturing GDP stood at 23% in 2018 (see Fig. 5), although its share of all hi-tech manufacturing GDP remained very modest at 1.9%.

**Fig. 4: Huawei's annual direct contributions to Europe's GDP, 2014-2018**

€ billion (in 2018 prices)



Source: Huawei; Oxford Economics

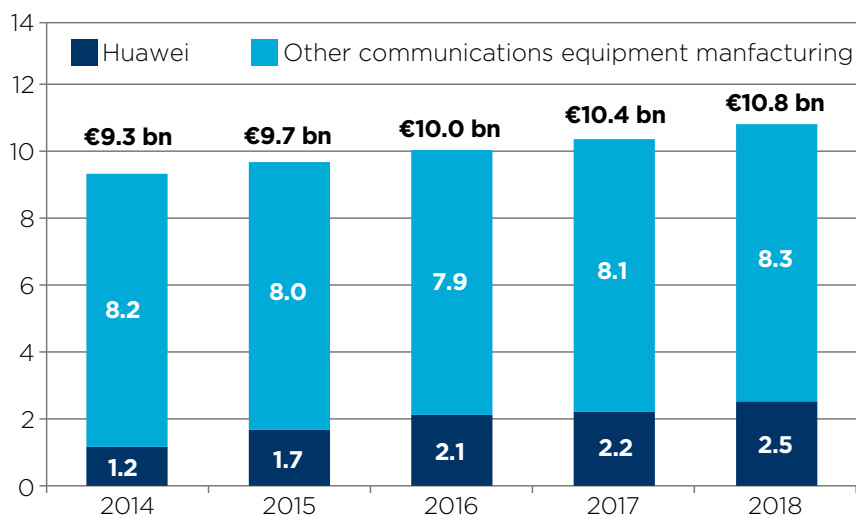
<sup>6</sup> Measured as earnings before interest, tax, depreciation and amortisation, or EBITDA

<sup>7</sup> All figures throughout this report are presented in 2018 prices.

<sup>8</sup> "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, as well as telecoms equipment.

**Fig. 5: Gross value added of European telecommunications equipment manufacturers, 2014-2018**

€ billion (in 2018 prices)



Source: Oxford Economics

Note: Totals may not sum due to rounding

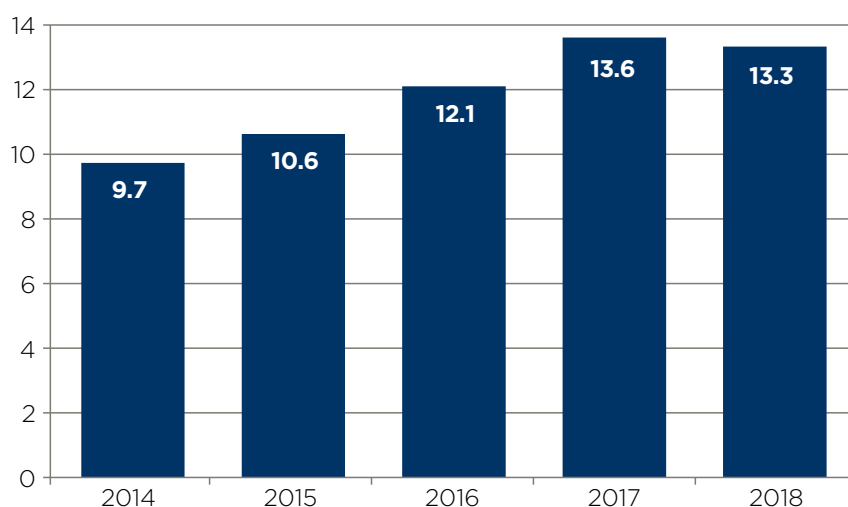
To help support this expansion, the number of people employed by Huawei across these European countries has also grown. From around 9,700 employees in 2014, Huawei's European workforce—encompassing permanent employees and contractors—numbered 13,300 in 2018 (see Fig. 6). This cumulative growth of 37% is equivalent to 8.1% per year, significantly exceeding the growth in total European employment which averaged just 1.3% per year. Some 74% of Huawei's employees in Europe were locally recruited.

Huawei's significant and growing presence in Europe also means that the company makes a substantial contribution to tax authorities across the continent. Over the period 2014

to 2018, the company and its workers paid nearly €7.1 billion in taxes (in 2018 prices). Of this total, some €1.8 billion relates to 2018 alone, up from €1.0 billion just four years earlier.<sup>9</sup>

**Fig. 6: Huawei's own employment across Europe, 2014-2018**

Headcount, thousands



Source: Huawei; Oxford Economics

<sup>9</sup> Identifiable corporate and employee taxes as reported by Huawei, plus a small amount of unrefunded taxes built into the price of goods and services purchased locally by Huawei, as modelled by Oxford Economics.



### 3.2 INDIRECT EFFECTS ARISING FROM HUAWEI'S SUPPLY CHAIN

But the economic impact of Huawei in Europe extends far beyond its direct operations. Huawei also purchases inputs of goods and services from European suppliers, both for its operations in Europe and for the rest of its business worldwide.

Between 2014 and 2018, Huawei procurement spending captured by this study totalled €24.4 billion in real terms—of which some €6.6 billion (27%) occurred in 2018 alone. And this will understate the full amount received by European-based suppliers to Huawei, possibly quite significantly, as it only includes purchases from suppliers located in Germany, the UK, and the 10 other European countries.

These purchases from European suppliers support economic activity across a wide range of European companies, including many in hi-tech sectors such as software and network design (within information and communication services) and electronic component production (within manufacturing). On average, we find they supported a real GDP contribution of €3.9 billion (in 2018 prices) each year between 2014 and 2018. This includes activity supported in all European countries as a result of purchases by customers further “down” Huawei's European supply chain, regardless of the country of the customer.

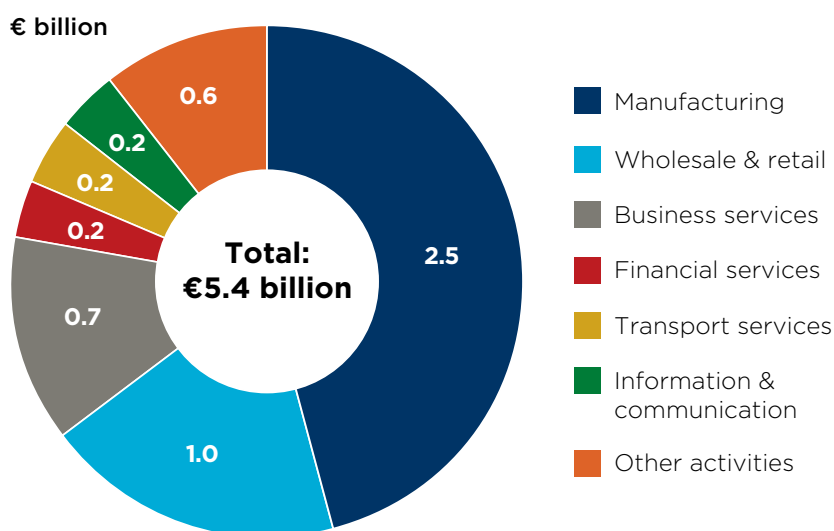
This indirect GDP impact was associated with an average headcount of 63,200 throughout that time, in Huawei's European supply chain, with some €1.3 billion per annum of tax revenues generated in the indirect channel.

In 2018 alone, Huawei's €6.6 billion of identified procurement from European businesses supported a €5.4 billion contribution to GDP in the supply chain. Based on the pattern of procurement by manufacturers of hi-tech equipment by country of supplier and type of product supplied, we estimate that 46% or €2.5 billion of this GDP contribution occurred in the

manufacturing sector (see Fig. 7).<sup>10</sup> Business and financial services providers, as well as distribution and transport providers and information and communication services providers, account for most of the remainder.

The total indirect jobs contribution in 2018 alone was 80,300, and the indirect tax contribution in that year amounted to €1.8 billion.

**Fig. 7: Industrial distribution of Huawei's indirect GDP impact in Europe, 2018**



Source: Oxford Economics

### 3.3 INDUCED EFFECTS ARISING FROM WAGES BEING SPENT

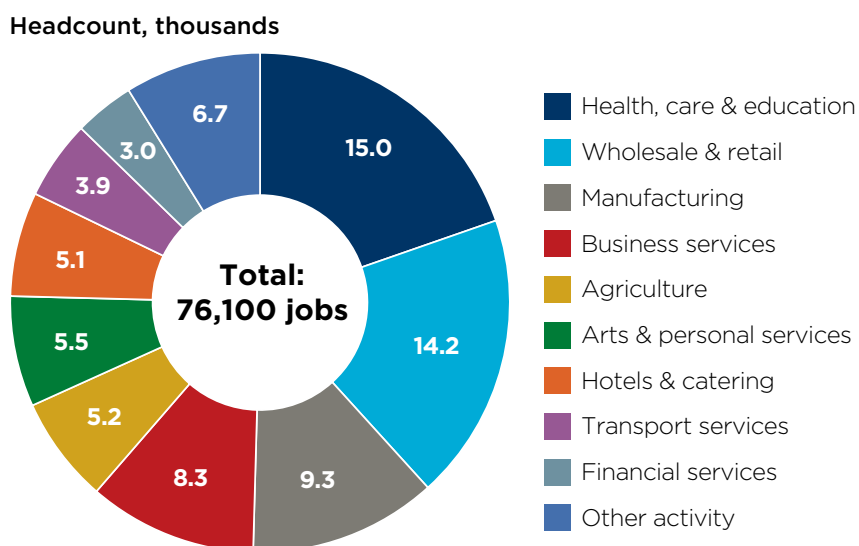
Over the period 2014 to 2018, Huawei paid its employees in Europe a total of €6.1 billion in gross wages (in real terms). In addition to this, we estimate that people employed in its supply chain received €12.2 billion in real wage payments (and equivalent self-employed income) over the same period. The payment of wages to people working either for Huawei, or in its supply chain, funds consumer spending, which in turn supports economic activity at leisure, retail, and other outlets, and in those businesses' European supply chains.

Over the period 2014 to 2018, we estimate that all this wage-financed consumption supported an average annual contribution to GDP of €3.7 billion (in 2018 prices). It also supported 59,500 jobs, on average throughout the five years, and a €1.5 billion induced real-terms annual tax contribution (including taxes on products, such as VAT, levied on spending by Huawei and supply chain employees).

We find that in 2018 alone, the payment of these wages contributed some €4.9 billion to European GDP, supporting 76,100 jobs and €2.0 billion in tax receipts.

The employment created by this wage-financed consumer spending benefits a wide range of industries, with the pattern of activity by sector very different to that seen in the indirect channel (see Fig. 8). While the sectors benefiting significantly include manufacturing and business services,<sup>11</sup> the most important are healthcare, social care and education (15,000 jobs),<sup>12</sup> and wholesale and retail services (14,200). Agriculture, arts and personal services, and hotels and catering—which do not feature prominently in the indirect channel—also benefit.

**Fig. 8: Industrial distribution of Huawei's induced contribution to employment, 2018**



Source: Oxford Economics

<sup>11</sup> "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.

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

### 3.4 HUAWEI'S TOTAL IMPACT ON THE EUROPEAN ECONOMY

Aggregating across the direct, indirect and induced economic impacts, we calculate that Huawei's total contribution to European GDP has increased from €6.4 billion in 2014 to €12.8 billion in 2018, in real terms (see Fig. 9). This is an overall increase of 100%, with the three separate channels of impact growing by fairly similar proportions.

Huawei's impact on the European labour market has also increased significantly. Summing the three channels of impact, we find that the total number of jobs supported rose from 103,300 in 2014 to 169,700 in 2018 (see Fig. 10). This is a 64% rise over the five-year period. While Huawei's own direct employment (including contract workers) increased by a cumulative 37%, indirect jobs increased by 59% and induced jobs by 77%.

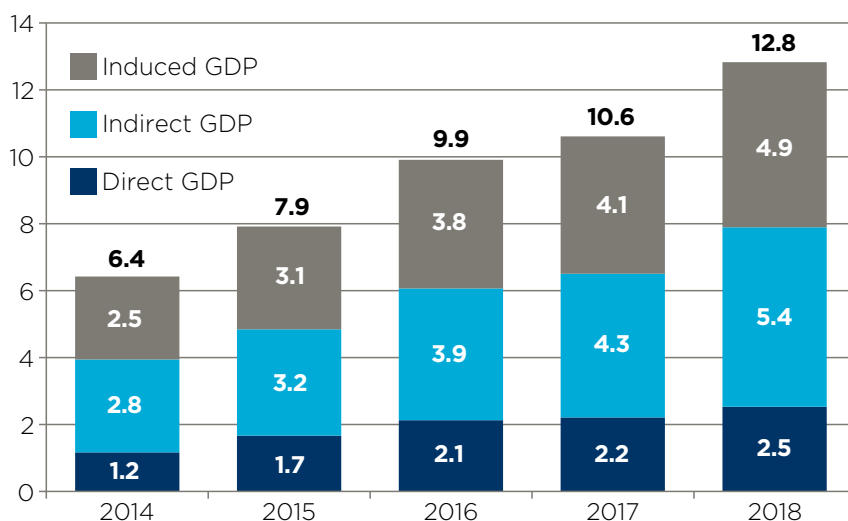
We also find that the total value of tax receipts supported across the three impact channels increased by 87% in real terms between 2014 and 2018. Huawei's own direct tax contribution increased by 80%, while taxes supported through the indirect and induced channels each increased by broadly 90%.

Overall, the tax revenues Huawei supported in 2018, through the three channels of impact, would support the employment of some 135,000

professional education and healthcare workers, on the average European wage for such employees.<sup>13</sup>

**Fig. 9: Huawei's total contribution to the European GDP in real terms, 2014-2018**

€ billion (in 2018 prices)

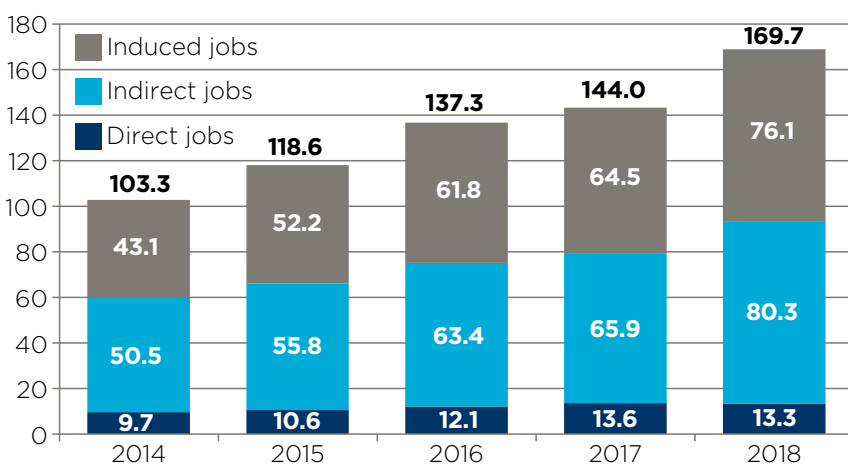


Source: Oxford Economics

Note: Totals may not sum due to rounding

**Fig. 10: Huawei's total contribution to European employment, 2014-2018**

Headcount, thousands



Source: Oxford Economics

Note: Totals may not sum due to rounding



**BOX 2: HOW HUAWEI OPENLAB ENABLES DIGITAL TRANSFORMATION**

Huawei's global OpenLab initiative provides platforms for experts from different industries to identify their future digital transformation needs, and companies to develop bespoke technological solutions through local collaborations.

Of the 13 Huawei OpenLabs around the world, two are based in Western Europe—in Munich and Paris. According to Wu Mo, Director of Western European OpenLabs, their mission is to “open up Huawei's powerful ICT capabilities to facilitate partners to develop diverse, intelligent applications in various industries”. The ultimate target, he says, is to build “the Foundation for the Digital World”.

The main focus of the Munich OpenLab—established in 2016 and recently upgraded to a 700 square-metre facility—is to build an Industry 4.0 Testbed by innovating in areas such as wireless factory with 5G, Industrial Internet with TSN & Industrial gateway, Interaction Operation Center with edge computing and big data analysis. It has the best 5G & WiFi6 testing environment for European customers. Visitors to this facility can experience first-hand solutions in everything from manufacturing and transport to smart city and smart campus.

The Paris OpenLab is larger at 1,000 square metres. Officially opened in 2018, its principal areas of research are “smart retail” and Internet of Vehicles (IoV) enterprises. Like its Munich counterpart, the facility is divided up into distinct areas such as the “Joint Innovation Area”, the “Solution Development Centre”, and the “Partner Cooperation Centre”.

Collaborations stemming from the Paris OpenLab include a Europe-wide initiative with one leading German retailer. This digital transformation of its offline stores addresses operational challenges from IT management confusion to the enduring use of printed price labels.

Another Paris OpenLab collaboration led to the development of the DS7 Crossback—the first vehicle to use Groupe PSA's Connected Vehicle Modular Platform (CVMP) and equipped with Huawei's OceanConnect IoT platform and Cloud services. More than five million cars are now connected on the platform in Europe and China.

Over the next five years, Huawei has pledged to invest €35 million in the Paris OpenLab. Speaking at the May 2019 VivaTech Conference in Paris, Huawei's Deputy Chairman Ken Hu said the investment showed confidence that France “is in a great position to be a global hub for innovation. Huawei has been here for 17 years, and we are so proud to be part of this ambition.”

And what's the secret to seizing new opportunities? “When it comes to innovation,” Hu said, “organisations need to do what they do best, and collaborate on the rest.”



### 3.5 HUAWEI'S TOTAL IMPACT: OVERVIEW OF THE NATIONAL PATTERN

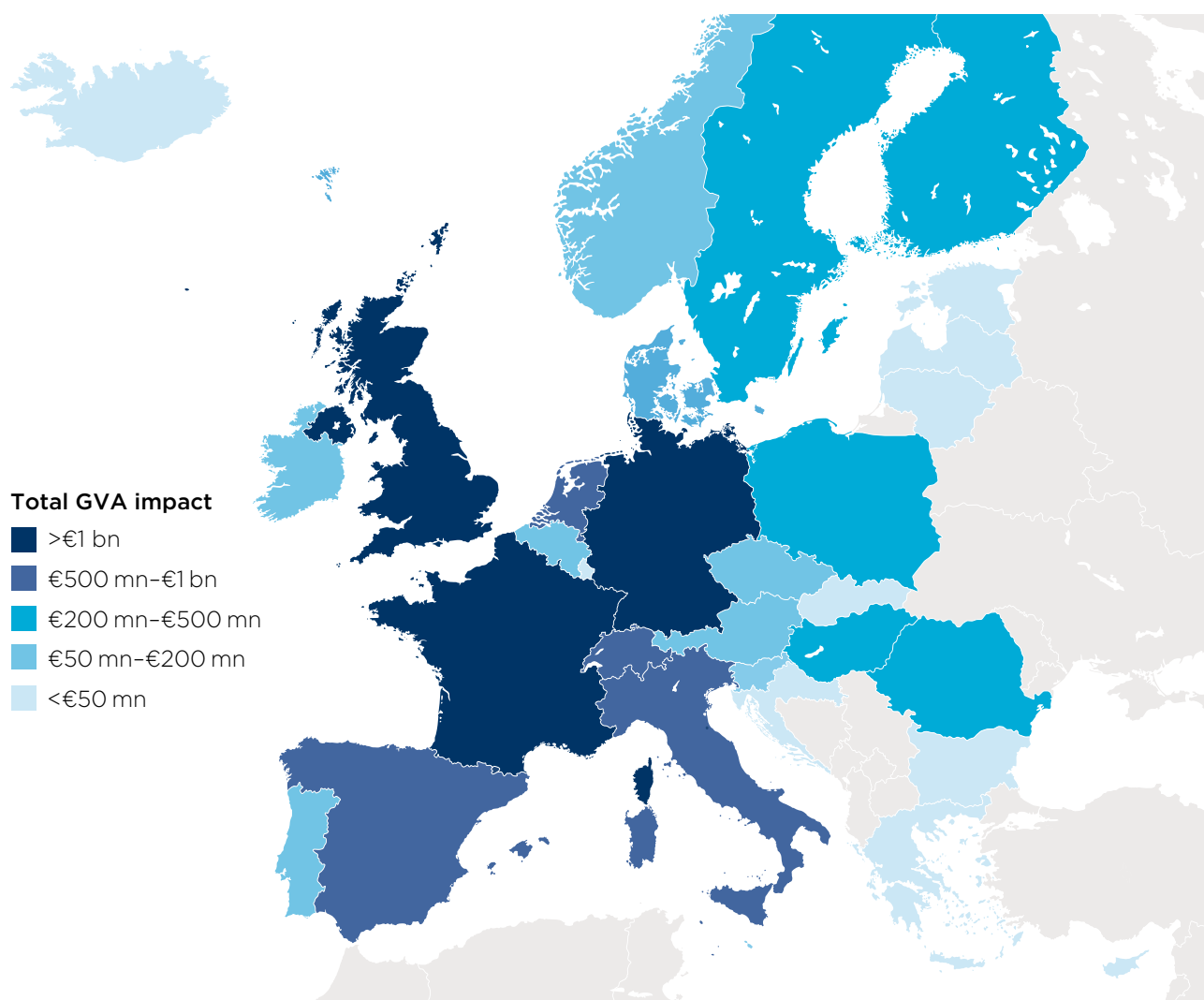
In 2018, the total contribution to European GDP was spread widely by country, but the largest contributions in absolute terms were found in the UK, Germany, France, Switzerland, and Italy (see Fig. 11).<sup>14</sup> In total, the contribution to national GDP was €100 million or more in 18 of the 31 European states captured in the analysis.

On average across Europe, Huawei's total contribution accounts for some 0.10% of total economy-wide GDP. But this ratio was higher than that in seven countries, with the most significant relative impact found in Hungary (0.39% of national GDP), Switzerland (0.16%) and the UK (0.14%) (see Fig. 12). Above average contributions,

in proportionate terms, are also found in Romania, Finland, the Netherlands, and Sweden.

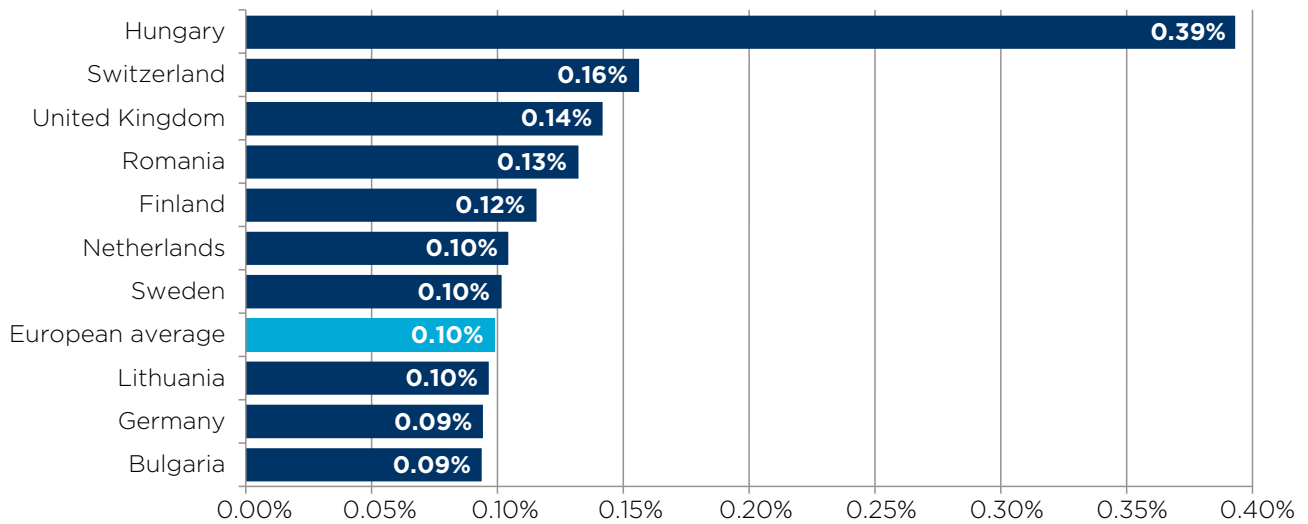
Huawei also supports employment right across Europe's nations. In 2018, the countries benefiting most in absolute terms were the UK, Germany, Hungary, France, and Italy (see Fig. 13).

**Fig. 11: Huawei's total contribution to Europe's GDP by country, 2018**

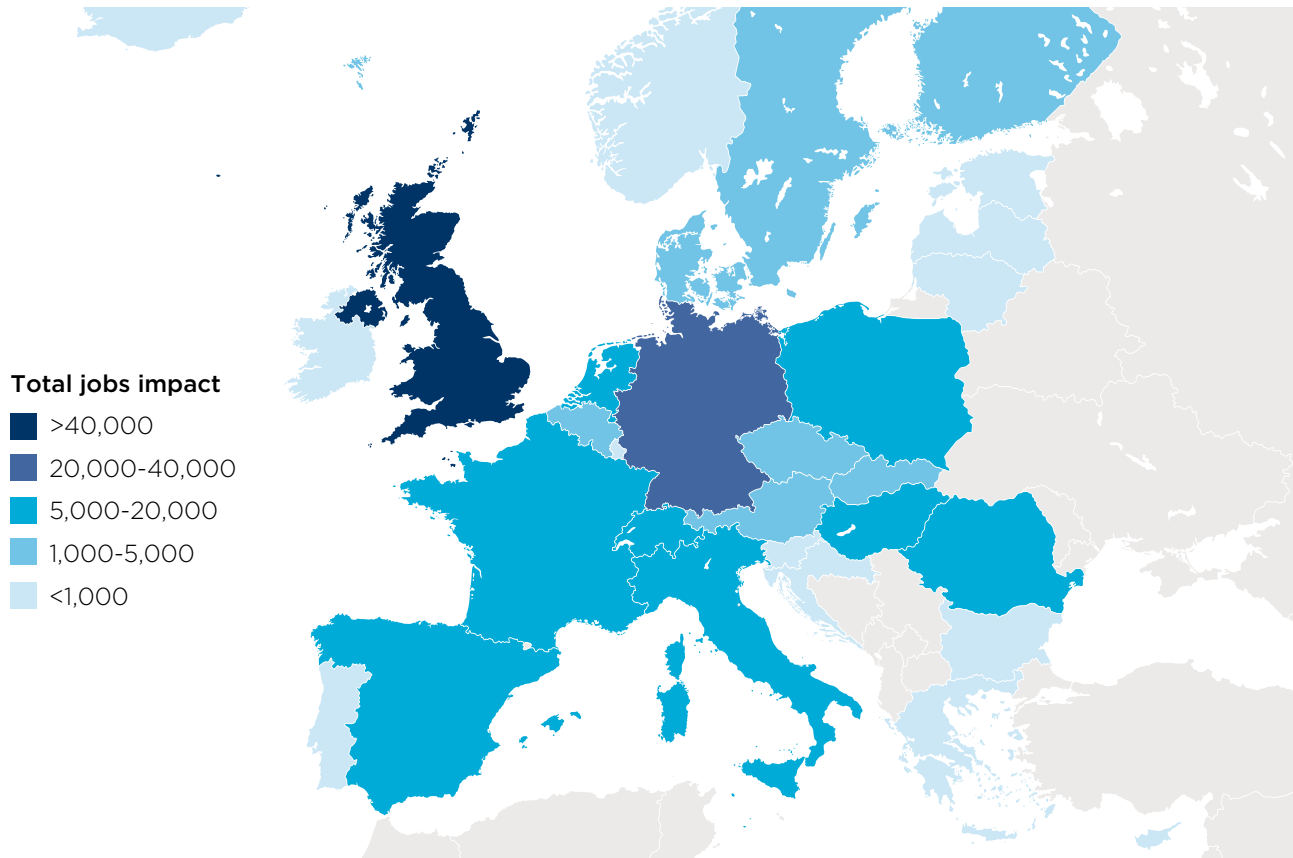


<sup>14</sup> The total GDP contribution in the UK and Germany is higher in this study than in separate recently-published reports, as this study takes into account the impact of cross-border transactions in the indirect and induced channels—for example, indirect GDP in the UK due to sales by UK firms to Huawei suppliers based in France. These impacts cannot be captured in 'standalone' single-country studies.

**Fig. 12: The GDP supported by Huawei in total, in each country in 2018, as a share of total national GDP**

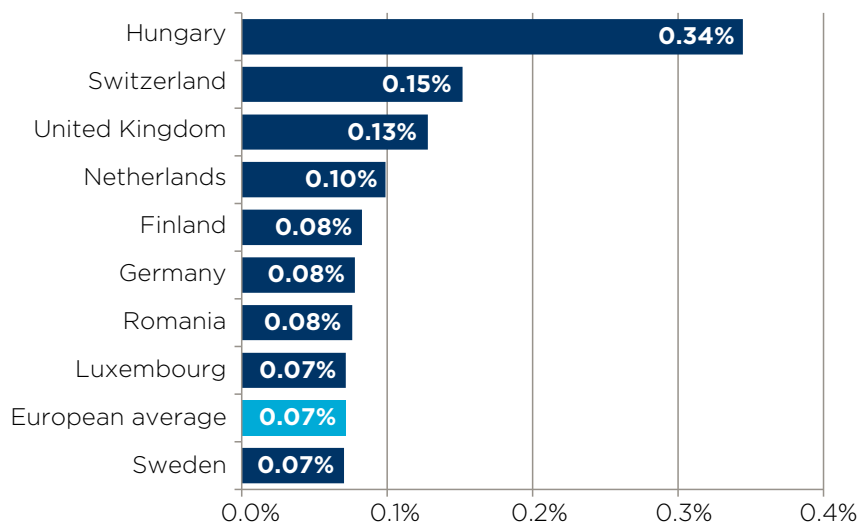


**Fig. 13: Huawei's total jobs contribution in Europe by country, 2018**



However, when the employment contribution is considered relative to the total number of people employed in each country, a different picture again emerges (see Fig. 14). Here, the average share of all jobs supported by Huawei across Europe, through its three channels of impact, is 0.07%. But it is above that average in eight countries, including Hungary (0.34%) and Switzerland (0.15%) most notably, as well as the UK, Netherlands, Finland, Germany, Romania and Luxembourg.

**Fig. 14: Jobs supported by Huawei in total, in each country in 2018, as share of total national employment**



Source: Oxford Economics, Eurostat

### BOX 3: HUAWEI'S SEEDS FOR THE FUTURE PROGRAMME

Huawei contributes directly to the skills of Europe's workforce through its flagship corporate social responsibility programme, Seeds for the Future. This is designed to cultivate local ICT talent around the world, enhance knowledge transfer, promote a more in-depth understanding of ICT, and encourage greater participation in digital communities.

Participants in the scheme undertake a four-week trip to China featuring cultural, technical, and business training. During the trip, students spend an initial period in Beijing, where they receive Mandarin training and learn about Chinese culture. They then travel to Huawei's headquarters in Shenzhen, where they learn about the company's international business culture and values, and spend time learning about Huawei's products and solutions.

More than 1,300 European STEM (science, technology, engineering, and mathematics) students have benefitted from the Seeds for the Future programme since it began in 2011. The company expects this number to have reached 3,000 by 2021.





**BOX 4: GELSENKIRCHEN, GERMANY'S PIONEERING SMART CITY**

Gelsenkirchen, Germany's 25<sup>th</sup>-largest city, is embracing the power of digital technology to transform itself into a pioneering smart city. From a history of heavy industry, including coal power and vehicle manufacturing, this city at the heart of the western Ruhr region is helping to shape how digitalisation can be applied in an urban context by becoming a model "networked city" and testbed for new innovations.

By connecting businesses, public organisations and individuals, the networked city aims to provide concrete benefits to its residents. Fast, secure internet access, coupled with smart software, fosters transparency and participation, meaning that people in Gelsenkirchen are able to actively participate in urban design and to network with each other better. Agreed priority areas for the networked city include mobility, energy, health, knowledge transfer and start-ups, e-commerce, tourism, education, security and smart homes.



While such aims are commendable and ambitious, implementation can be difficult. Consequently, Gelsenkirchen sought two technology partners to assist in delivering its plan: Gelsen-Net, a regional technology services provider, and Huawei. The two companies dovetail to provide Gelsenkirchen with the hardware and services it needs to become a smart city. Huawei has provided cloud, network, and platform technologies, along with robust security, while Gelsen-Net offers the latest ICT capabilities for third parties to develop integrated smart city service applications. The two companies also provided a big data support platform to allow sharing of historical and real-time city data with all agencies.

To date, the results of this three-way partnership have been impressive. A 13,000-kilometre, fibre-optic cable network connects all industrial parks, hospitals, and schools. Comprehensive public Wi-Fi is available throughout the city, including a large, free-of-charge Wi-Fi hotspot area covering two kilometres of the Bahnhofstrasse, Gelsenkirchen's main street. This infrastructure and the Internet of Things places services at the public's fingertips.

Gelsen-Net and Huawei are also combining to provide high-speed internet access across the city's public transport network. For example, the Bochum-Gelsenkirchen Streetcars Corporation offers free Wi-Fi onboard its PowerBus, thanks to a Huawei-developed mobile eLTE access point which supplies passengers with unlimited internet access via a fast broadband connection.

Gelsenkirchen may be a testbed for new technologies, but its residents and businesses are already experiencing some real benefits. And these benefits are set to be enjoyed by many more people—in Germany and across the rest of Europe—as more and more urban areas aspire to become smart cities.







## 4. HUAWEI'S CATALYTIC IMPACT

The previous chapter explored the immediate contribution Huawei makes to Europe's economy through its operations and expenditure with other firms. But the firm can play a far greater role in stimulating the continent's long-term growth through R&D it undertakes in Europe, and globally.

### 4.1 THE IMPORTANCE OF RESEARCH AND DEVELOPMENT

R&D comprises a wide array of activities that range from 'blue-skies' research and exploring how to apply new discoveries, to end-stage product development. Such products and services are then put into use by business and government. In doing so, businesses and government may enjoy significant benefits through advances in operations and new products that further their productive capacity and profitability.

However, the returns from R&D are not limited to the organisations conducting the activity themselves. The research can also lead to gains for other entities, and benefit the wider economy and society, through so-called 'positive spillover impacts'. These spillover benefits can arise through channels such as the following:

- Sale of products embodying new technology and consequent take-up and imitation.
- Migration of staff from one firm to another, taking their knowledge with them.
- Shared access to intellectual capital, for example through collaborative research and/or university links.

- Partnerships between large firms and their suppliers aimed at improving the suppliers' products and processes.
- Other transfers of know-how through interlocking supply chains and knowledge sharing.

Academic studies have sought to quantify the economic benefits of R&D, with the private return to this activity found to be between 20% and 30%.<sup>15</sup> But the social returns associated with the research are typically two- to three-times larger than the private returns.<sup>16</sup> When viewed at an aggregate level across the whole economy, such benefits represent an increase in the productive capacity of the economy. In other words, the productivity of the economy and its long-run growth potential increases.

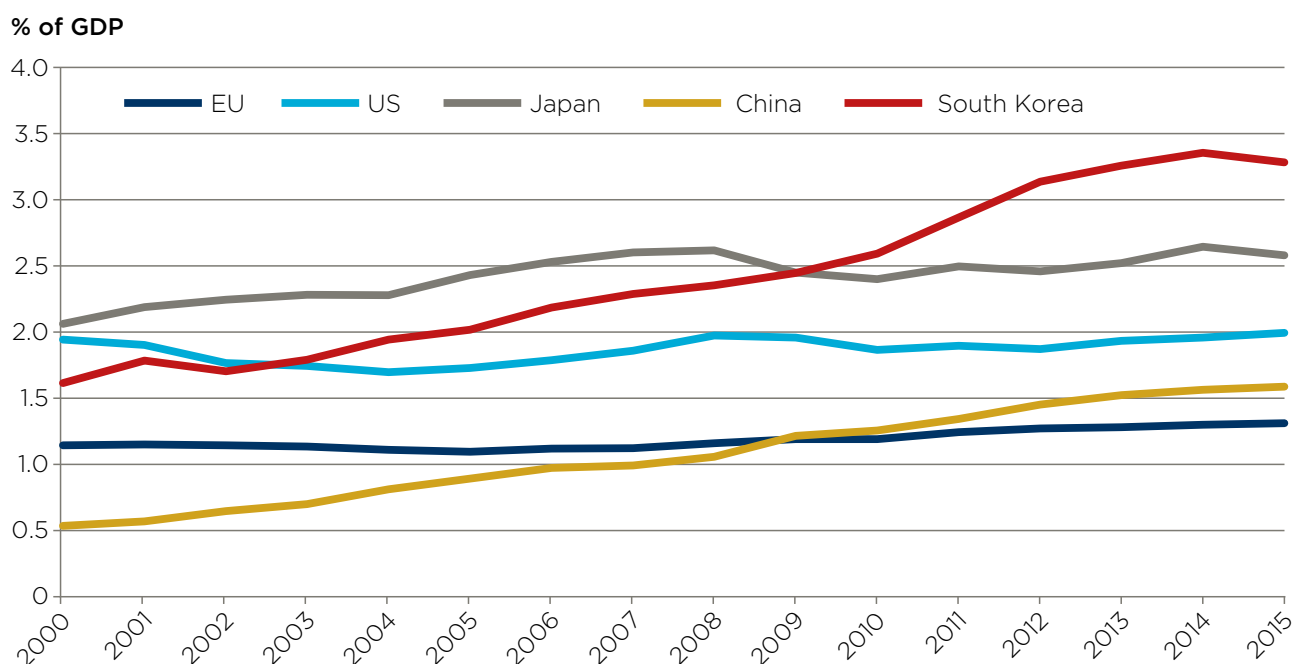
<sup>15</sup> The return to R&D is calculated in relation to the 'stock' of R&D – that is, the cumulative amount of R&D spending over many years with some allowance for 'depreciation'.

<sup>16</sup> Frontier Economics (2014) Rates of return to investment in science and innovation.

The wider benefits that can accrue from R&D are recognised by the European Commission: “*Europe’s economic and social prosperity depends on our ability to innovate*”.<sup>17</sup> So too is the need to create an environment that encourages innovation, which form a part of both the EU’s Industrial Policy Strategy and the Digital Single Market, including its initiatives around cyber-security and data flows regulation. Furthermore, the new President of the European Commission has stated that exploring new digital opportunities, such as high-performance computing and algorithms, are a central part of her vision for European innovation in order to maintain and develop Europe’s digital leadership technologies.<sup>18</sup>

The Commission’s moves to strengthen the incentives to engage in R&D reflect a lingering weakness in private investment innovation. While the EU accounted for around one-fifth of global spending on R&D in 2015, the level of business investment in R&D in the EU lags its peers. In 2015, such investment was equivalent to 1.3% of EU GDP, far below comparable metrics for China, the US, Japan and South Korea (see Fig. 15).<sup>19</sup>

**Fig. 15: Intensity of business enterprise expenditure on R&D, 2000 to 2015**



Source: European Commission

<sup>17</sup> European Commission (2018), A renewed European Agenda for Research and Innovation – Europe’s chance to shape its future. COM (2018) 306. P17.

<sup>18</sup> Ursula von der Leyden. (2019). A Union that strives for more: My agenda for Europe. Available at: [https://ec.europa.eu/commission/sites/beta-political/files/political-guidelines-next-commission\\_en.pdf](https://ec.europa.eu/commission/sites/beta-political/files/political-guidelines-next-commission_en.pdf). Page 13

<sup>19</sup> European Commission (2018) Science, Research and Innovation Performance of the EU 2018: Strengthening the foundations for Europe’s future.



## 4.2 HUAWEI'S R&D ACTIVITIES IN EUROPE

Huawei is one of the world's largest investors in R&D. Indeed, the 2018 EU Industrial Investment Scoreboard ranked Huawei as the world's fifth-highest R&D-spending business for the financial year 2017-18.<sup>20</sup> The company's global R&D spend for that year, estimated to have been \$13.6 billion (€11.5 billion), accounted for 1.5% of all the R&D carried out by the world's top 2,500 R&D-investing companies.

More recent data from Huawei indicate that this investment is increasing. In 2018, the company's global R&D spend totalled \$14.8 billion (€12.5 billion), up from \$2.1 billion (€1.5 billion) in 2009. Its cumulative R&D outlay over the whole period totalled \$74.4 billion (€60.0 billion).<sup>21</sup>

Europe represents one of Huawei's key centres for R&D. Its European Research Institute operates 23 sites across the EU, with around 2,400 of its European workforce employed in R&D roles. Together, this team is undertaking activities ranging from furthering wireless and optical technology to cloud computing and research into new materials—with over 10,000 patents registered at the European Patent Office. Additionally, Huawei works with entities throughout Europe to improve the returns they can gain from technology.

These associations include the Huawei Innovation Research Program, through which the company has worked with 140 European universities and invested more than \$1 billion

in the last eight years, and participation in numerous industry bodies to develop joint standards. Huawei is also actively involved in efforts to innovate in the fields of autonomous driving and smart manufacturing (through the 5G Automotive Association and the 5G Alliance for Connected Industries and Automation, among others) to help strengthen the competitiveness of European industries.

The efforts of Huawei's researchers align closely with the European Commission's aims for digitalisation of the economy and society more widely. The success and continuation of this research should deliver benefits not only to Huawei, but to Europe as a whole.

### BOX 5: HOW HUAWEI IRELAND IS DRIVING INNOVATION

Huawei Ireland is at the forefront of the company's commitment to research and development in Europe. Underlining this, in August 2019 Huawei announced a €70 million investment in its Ireland research centres over the next three years, with the company's Rotating Chairman, Guo Ping, praising Ireland for its "outstanding talent and some of the best researchers in the world".

Huawei Ireland already has more than 180 employees, of which more than half work in R&D. In October, Huawei announced plans to create 100 jobs over the next three years in its new Dublin office.

Huawei is committed to partnering with Irish institutions on joint innovation across AI, video, cloud computing, and Site Reliability Engineering. In 2018, Huawei Ireland received a Technology Ireland award for its work with Adapt—a research centre funded by Science Foundation Ireland (SFI).

Huawei Ireland's R&D strategy is going from innovation to invention, with many exciting developments on the horizon. According to Jijay Shen, Huawei Ireland's CEO: "Our focus is on long-term investment and building positive relationships with key partners. Our latest investment will help us drive innovation and collaboration in Ireland."

<sup>20</sup> European Commission (2018) The 2018 EU Industrial R&D Investment Scoreboard.

<sup>21</sup> Source: Huawei.



## 5. COUNTRY-LEVEL RESULTS

In this chapter, we present Huawei's total economic impact at a country-level for the 10 countries where Huawei spends most on procurement for its worldwide businesses. The results are given for 2018, and also for the five-year period from 2014 to 2018.

The countries included are:

- Germany
- UK
- Hungary
- Switzerland
- Netherlands
- France
- Italy
- Sweden
- Spain
- Finland





# GERMANY

## 2018 IMPACT RESULTS

● Total ● Direct ● Indirect ● Induced

Totals may not sum due to rounding.

### SPENDING WITH GERMAN SUPPLIERS



### CONTRIBUTION TO GDP

**€2.8 billion** 0.1% of German GDP



### EMPLOYMENT SUPPORTED

**32,600 jobs** 0.1% of German employment



### TAX REVENUES GENERATED

**€1.2 billion** 0.1% of government revenues



## FIVE-YEAR OVERVIEW (2014-18)

Total spent with German suppliers



Average annual total contribution to GDP



Average annual total employment supported



Total tax revenues associated with Huawei's activity



Real growth  
in tax revenues  
linked to  
Huawei's activity



2014

2015

2016

2017

2018



**72%  
TOTAL**

All monetary values expressed in 2018 prices.

The results for Germany presented in this study are greater than those reported in the study published by DIW Econ, *Der ökonomische Fußabdruck von Huawei in Deutschland*. The reason for these differences is the inclusion of economic activity supported in Germany as a result of inter-country supply chains stimulated by Huawei's procurement and employees spending wages in other European countries.

# UNITED KINGDOM

## 2018 IMPACT RESULTS

● Total ● Direct ● Indirect ● Induced

Totals may not sum due to rounding.

### SPENDING WITH UK SUPPLIERS



### CONTRIBUTION TO GDP

**€3.0 billion** 0.1% of UK GDP



### EMPLOYMENT SUPPORTED

**41,400 jobs** 0.1% of UK employment



### TAX REVENUES GENERATED

**€963 million** 0.1% of government revenues



## FIVE-YEAR OVERVIEW (2014-18)

Total spent with UK suppliers



Average annual total contribution to GDP



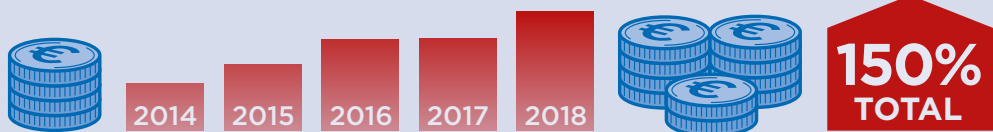
Average annual total employment supported



Total tax revenues associated with Huawei's activity



Real growth  
in tax revenues  
linked to  
Huawei's activity



All monetary values expressed in 2018 prices.

The results for the UK presented in this study are greater than those reported in the study published by Oxford Economics, *The Economic Impact of Huawei in the UK*. The reason for these differences is the inclusion of economic activity supported in the UK as a result of inter-country supply chains stimulated by Huawei's procurement and employees spending wages in other European countries.



# HUNGARY

## 2018 IMPACT RESULTS

● Total ● Direct ● Indirect ● Induced

Totals may not sum due to rounding.

### SPENDING WITH HUNGARIAN SUPPLIERS



### CONTRIBUTION TO GDP

**€444 million** 0.3% of Hungarian GDP



### EMPLOYMENT SUPPORTED

**15,400 jobs** 0.3% of Hungarian employment



### TAX REVENUES GENERATED

**€194 million** 0.3% of government revenues

## FIVE-YEAR OVERVIEW (2014-18)

Total spent with Hungarian suppliers



Average annual total contribution to GDP



Average annual total employment supported



Total tax revenues associated with Huawei's activity



Real growth  
in tax revenues  
linked to  
Huawei's activity



All monetary values expressed in 2018 prices.

# SWITZERLAND

## 2018 IMPACT RESULTS

● Total ● Direct ● Indirect ● Induced

Totals may not sum due to rounding.

### SPENDING WITH SWISS SUPPLIERS



### CONTRIBUTION TO GDP

**€905 million** 0.2% of Swiss GDP



### EMPLOYMENT SUPPORTED

**7,100 jobs** 0.1% of Swiss employment



### TAX REVENUES GENERATED

**€230 million** 0.1% of government revenues

## FIVE-YEAR OVERVIEW (2014-18)

Total spent with Swiss suppliers



Average annual total contribution to GDP



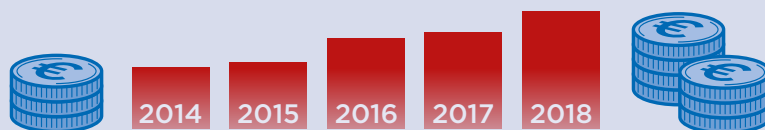
Average annual total employment supported



Total tax revenues associated with Huawei's activity



Real growth  
in tax revenues  
linked to  
Huawei's activity



**91%  
TOTAL**

All monetary values expressed in 2018 prices.

# NETHERLANDS

## 2018 IMPACT RESULTS

● Total ● Direct ● Indirect ● Induced

Totals may not sum due to rounding.

### SPENDING WITH DUTCH SUPPLIERS



### CONTRIBUTION TO GDP

**€723 million** 0.1% of Dutch GDP



### EMPLOYMENT SUPPORTED

**8,700 jobs** 0.1% of Dutch employment



### TAX REVENUES GENERATED

**€322 million** 0.1% of government revenues



## FIVE-YEAR OVERVIEW (2014-18)

Total spent with Dutch suppliers



Average annual total contribution to GDP



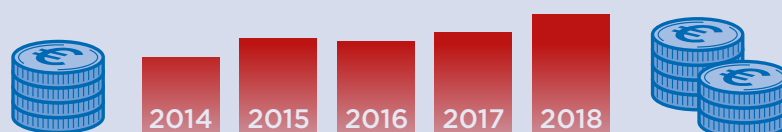
Average annual total employment supported



Total tax revenues associated with Huawei's activity



Real growth  
in tax revenues  
linked to  
Huawei's activity



**55%  
TOTAL**

All monetary values expressed in 2018 prices.

# FRANCE

## 2018 IMPACT RESULTS

● Total ● Direct ● Indirect ● Induced

Totals may not sum due to rounding.

### SPENDING WITH FRENCH SUPPLIERS



### CONTRIBUTION TO GDP

**€1.2 billion** 0.1% of French GDP



### EMPLOYMENT SUPPORTED

**12,200 jobs** 0.04% of French employment



### TAX REVENUES GENERATED

**€724 million** 0.06% of government revenues



## FIVE-YEAR OVERVIEW (2014-18)

Total spent with French suppliers



Average annual total contribution to GDP



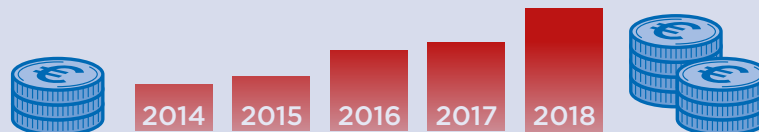
Average annual total employment supported



Total tax revenues associated with Huawei's activity



Real growth  
in tax revenues  
linked to  
Huawei's activity



**165%  
TOTAL**

All monetary values expressed in 2018 prices.

# ITALY

## 2018 IMPACT RESULTS

● Total ● Direct ● Indirect ● Induced

Totals may not sum due to rounding.

### SPENDING WITH ITALIAN SUPPLIERS

 **€416 million**

### CONTRIBUTION TO GDP

**€805 million** 0.05% of Italian GDP



### EMPLOYMENT SUPPORTED

**11,400 jobs** 0.05% of Italian employment



### TAX REVENUES GENERATED

 **€382 million** 0.05% of government revenues

## FIVE-YEAR OVERVIEW (2014-18)

Total spent with Italian suppliers

 **€1.3 billion**

Average annual total contribution to GDP

 **€576 million**

Average annual total employment supported

 **8,000 jobs**

Total tax revenues associated with Huawei's activity

 **€1.8 billion**

Real growth  
in tax revenues  
linked to  
Huawei's activity



All monetary values expressed in 2018 prices.



# SWEDEN

## 2018 IMPACT RESULTS

● Total ● Direct ● Indirect ● Induced

Totals may not sum due to rounding.

### SPENDING WITH SWEDISH SUPPLIERS



### CONTRIBUTION TO GDP

**€425 million** 0.1% of Swedish GDP



### EMPLOYMENT SUPPORTED

**3,600 jobs** 0.1% of Swedish employment



### TAX REVENUES GENERATED

**€242 million** 0.1% of government revenues

## FIVE-YEAR OVERVIEW (2014-18)

Total spent with Swedish suppliers

**€802 million**

Average annual total contribution to GDP

**€396 million**

Average annual total employment supported

**3,400 jobs**

Total tax revenues associated with Huawei's activity

**€961 million**

Real growth  
in tax revenues  
linked to  
Huawei's activity



**94%  
TOTAL**

All monetary values expressed in 2018 prices.

# SPAIN

## 2018 IMPACT RESULTS

● Total ● Direct ● Indirect ● Induced

Totals may not sum due to rounding.

### SPENDING WITH SPANISH SUPPLIERS

 **€151 million**

### CONTRIBUTION TO GDP

**€580 million** 0.05% of Spanish GDP

 **€193 million**  **€144 million**  **€242 million**

### EMPLOYMENT SUPPORTED

**8,000 jobs** 0.04% of Spanish employment

 **1,269 jobs**  **2,600 jobs**  **4,100 jobs**

### TAX REVENUES GENERATED

 **€305 million** 0.06% of government revenues

## FIVE-YEAR OVERVIEW (2014-18)

Total spent with Spanish suppliers

 **€597 million**

Average annual total contribution to GDP

 **€474 million**

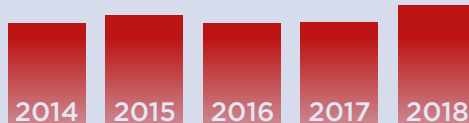
Average annual total employment supported

 **6,500 jobs**

Total tax revenues associated with Huawei's activity

 **€1.4 billion**

Real growth  
in tax revenues  
linked to  
Huawei's activity



**17%  
TOTAL**

All monetary values expressed in 2018 prices.

# FINLAND

## 2018 IMPACT RESULTS

● Total ● Direct ● Indirect ● Induced

Totals may not sum due to rounding.

### SPENDING WITH FINNISH SUPPLIERS

 **€118 million**

### CONTRIBUTION TO GDP

**€234 million** 0.1% of Finnish GDP

 **€62 million**  **€85 million**  **€87 million**

### EMPLOYMENT SUPPORTED

**2,100 jobs** 0.1% of Finnish employment

 **249 jobs**  **900 jobs**  **1,000 jobs**

### TAX REVENUES GENERATED

 **€118 million** 0.1% of government revenues

## FIVE-YEAR OVERVIEW (2014-18)

Total spent with Finnish suppliers

 **€357 million**

Average annual total contribution to GDP

 **€146 million**

Average annual total employment supported

 **1,400 jobs**

Total tax revenues associated with Huawei's activity

 **€319 million**

Real growth  
in tax revenues  
linked to  
Huawei's activity



**714%  
TOTAL**

All monetary values expressed in 2018 prices.

# APPENDIX: METHODOLOGY

## METHODOLOGY FOR CAPTURING DIRECT IMPACTS

Estimates of the direct impact of Huawei—including its contribution to GDP, jobs created, 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.<sup>22</sup>

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 crossing out of Europe altogether but then back in.

Purchases by Huawei's worldwide operations, from suppliers based in 12 key European markets, were provided by Huawei.<sup>23</sup> 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 minimum 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.<sup>24</sup>

<sup>22</sup> <http://www.oecd.org/sti/ind/inter-country-input-output-tables.htm>.

<sup>23</sup> The 12 markets were: Denmark, Finland, France, Germany, Italy, the Netherlands, Poland, Spain, Sweden, Switzerland and the UK.

<sup>24</sup> Based on GDP and employment data also sourced from the OECD.



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.

## **DIFFERENCES IN THE RESULTS FOR THE UK AND GERMANY**

The results for the UK presented in this study are greater than those reported in the study published by Oxford Economics, *The Economic Impact of Huawei in the UK*. The reason for these differences is the inclusion of economic activity supported in the UK as a result of inter-country supply chains stimulated by Huawei's procurement and employees spending wages in other European countries.

The same factors explain differences in the results for Germany, compared with the June 2019 study by DIW ECON, *Der ökonomische Fußabdruck von Huawei in Deutschland*.

# OXFORD ECONOMICS

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