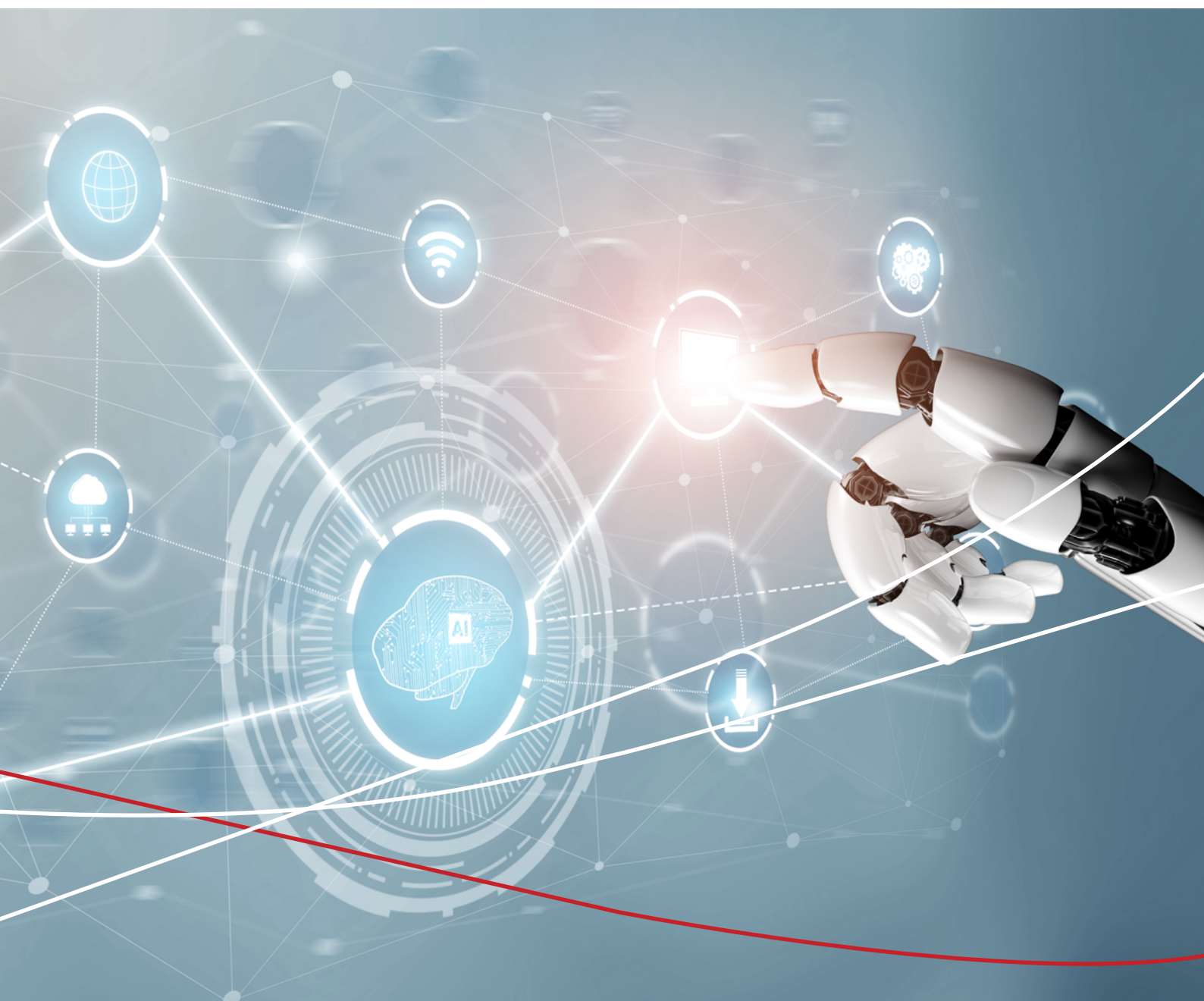


# Huawei Ireland: Economic & Social Impact Report

October 2022





## EXECUTIVE SUMMARY

Since its arrival in 2004, Huawei Technologies (hereafter “Huawei”) activities in Ireland have developed from supplying mobile phones, building Ireland’s first national fixed wireless network, providing fibre optic broadband technologies, to being at the forefront of the current 5G digital transformation. Huawei is responsible for supporting the connectivity of over three million people across Ireland and is currently supporting local customers in the rollout of next generation networks including 5G and gigabit broadband and contributing to the development of Ireland’s national digital infrastructure.

The digitisation of the Irish economy and widespread use of technologies like 5G over the next decade will impact individual’s lives, business activities, and opportunities for economic growth. In the 2021 ‘Digital Economy and Society Index’, Ireland ranked 5th out of the EU 27 countries for its integration of digital technologies, reflecting indicators such as connectivity, digital skills, e-government services and use of e-commerce by SMEs. The recently launched National Digital Strategy highlights the needs for a series of infrastructural investment and promotion of the digital agenda effectively across all areas of Government policy and service delivery to continue Ireland’s progression and achieve its ambition of becoming a world leading digital economy. The continued input and global expertise of ICT providers including Huawei is vital to the successful delivery and timely rollout of the National Broadband Plan, as well as leadership in areas of new digital technologies. Globally, Huawei has spent an estimated \$4bn on 5G research and development (hereafter “R&D”) expenditure over the last decade developing a better understanding of the effect it will have on economies and societies.

The impact of the digitisation of the Irish economy will be twofold, with opportunities for economic growth and the potential to accelerate the transition towards a greener and more sustainable economic future. The effective use of digital technologies, and uptake of solutions such as Huawei’s low carbon power technologies, can progress Ireland’s movement towards carbon neutrality by 2050. Indeed, recent estimates<sup>1</sup> suggest that 20% of Ireland’s targeted emissions reductions could be delivered by digital technologies, equivalent to 9.9-13.1 MtCO<sub>2</sub>eq reductions in Irish emissions by 2030.

Huawei’s activities globally, and in Ireland, are underpinned by a core focus on R&D. Indeed, the EU ranks Huawei as the second highest investor in R&D in the world<sup>2</sup>. Annually Huawei spends 10%-15% of its global sales revenue on R&D and invested over €100 million in its Irish R&D efforts over the period from 2019-2021. The activities of Huawei’s Irish R&D centres create high value-added employment and are directly contributing to the development of a world-class research research and innovation (hereafter “R&I”) ecosystem, a key element of the Government’s innovation strategy “Impact 2030.”

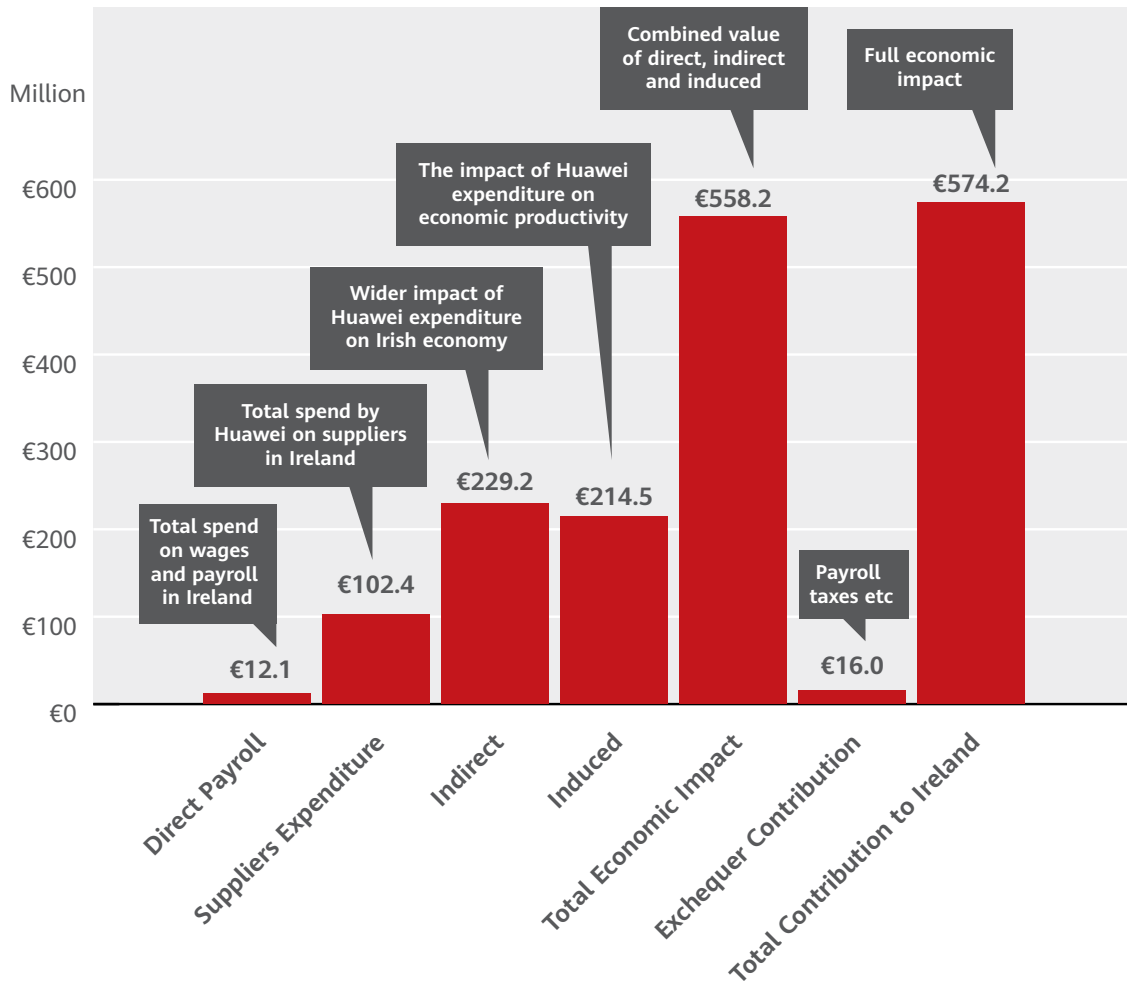
Alongside the positive impact of Huawei’s R&D activities, Ireland’s economy derives significant economic benefits from Huawei’s operational expenditure and exchequer contributions, with a total annual economic contribution of €0.5 billion. Huawei’s Irish operations employ 510 individuals, and support the employment of a further 5,700 individuals through indirect and induced effects from its activities.

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1 Digital sustainability: <https://www.huawei.com/ie/news/ie/2021/irelands-digital-path-to-sustainability>

2 EU rankings: <https://huawei.eu/press-release/eu-ranks-huawei-2nd-highest-investor-rd-world>

The contribution of Huawei to Ireland’s economy is summarised as follows:



In addition, Huawei’s CSR initiatives are impacting local communities, allowing participation in STEM subjects, and providing support to non-profit research organisations. Huawei has donated ICT kits to schools to aid digital acceleration, provided financial scholarships and training resources for higher education students through its ‘Seeds for the Future Programme’ and recently partnered with Cork-based non-profit, Ocean Research & Conservation Association Ireland, to provide technological support for its marine project.

Huawei makes important direct, indirect, and induced contributions annually to Ireland’s economy, including direct, indirect and induced.

It directly contributes through the employment of 510 people, and operational expenditure (incl. payroll, employee and employer taxes) across its five offices in Dublin, Cork and Athlone. Significantly the activities of its three R&D centres play a key role in creating high value employment, developing Ireland's research and innovation ecosystem, attracting highly skilled individuals from abroad and enhancing Ireland's reputation as an 'Island of Innovation.' The location of Huawei's R&D centres in Cork and Athlone further contributes to the economic impact on Ireland's economy, aiding balanced regional development and the expansion of rural supply chains.

Operations across Huawei's five Irish offices necessitate expenditure on Irish suppliers of goods and services, ranging from the provision of office supplies to highly-skilled subcontractors. Huawei's expenditure on Irish suppliers creates indirect contributions to Ireland's economy, through job creation, payroll and taxation further along the supply chain. The payroll to staff in the supply chain then gets spent on goods and services in the Irish economy, for example retail and leisure, creating a further induced economic contribution.

Nor is Huawei's contribution to Ireland limited to employment and investment, important as these are. Huawei is actively involved in supporting R&D activities in Irish-third level institutions as well as a wide range of CSR.

This report sets out:

1. An overview of Huawei's activities in Ireland, including a timeline of key events and partnerships that illustrate the expansion of their Irish operations.
2. An economic impact assessment of the annual contribution of Huawei to Ireland's economy.
3. A high-level overview of the impact of 5G technologies on Irish consumers, businesses and the wider economy.
4. A review of the socio-economic impact of Huawei's R&D and CSR activities, as well as insights from stakeholders.
5. An outline of the key Government policies towards which Huawei's Irish activities contribute.

## 1. Overview of Huawei's Irish Activities

Huawei is a leading global information and communications technology company serving over three billion people across the globe. Within Ireland Huawei is responsible for the connectivity of over three million people and is currently supporting local customers in the rollout of next generation networks including 5G and gigabit broadband and contributing to the development of Ireland's national digital infrastructure.

Huawei is a leading global provider of information and communications technology (hereafter "ICT") and smart devices. At the end of 2021, Huawei had over 195,000 employees working in more than 170 countries and regions. Huawei ranked as the world's 8th best employer in 2021, according to Forbes. The company and its subsidiaries principally provide end-to-end ICT solutions. This includes the research, design, manufacture and marketing of telecom network equipment, IT products and solutions, cloud technology and services, digital power products and solutions, and smart devices for telecom carriers, enterprises and consumers.

In 2004, Huawei entered the Irish market opening its first office in Merrion Square, Dublin. Its initial activities were centred around selling mobile dongles to consumers and businesses in need of high speed broadband connectivity. Since then Huawei's Irish activities have expanded to playing a leading role in delivering Ireland's digital infrastructure, including a number of strategic partnerships with Irish carriers to build networks across the country.

Huawei currently employs 510 individuals directly and has five offices in Ireland, including their Dublin headquarters for its Irish operations and R&D centres in Dublin, Athlone and Cork. Through its partnerships, Huawei is responsible for the connectivity of three million people across Ireland and is currently supporting local customers in the rollout of next generation networks including 5G and gigabit broadband and contributing to the development of Ireland's national digital infrastructure.

A core focus for Huawei is the utilisation of digital technologies to accelerate the transition towards cleaner forms of energy and sustainable growth. Huawei offers low carbon power solutions to industry customers in Ireland and worldwide. Usage of technologies like Huawei's will play a key role in Ireland tackling climate change and achieving its targets, including a 51% reduction in greenhouse gas emissions by 2030 and net-zero by 2050.

Huawei is renowned for its R&D focus and has developed a number of partnerships with Irish research institutions, while making extensive investments in the innovation ecosystem over the last two decades. In 2021, Huawei announced investment of a further €80 million in R&D in Ireland, doubling its commitment from 2019. Huawei Ireland also has a series of CSR initiatives, including ICT equipment donation, financial bursaries and skills development resources, that benefit schools, university students and local businesses.

### Huawei Globally



174 Countries  
& Regions



195,000  
employees



107,000 R&D  
employees



22% of 2021  
sales revenue  
invested in R&D



110,000  
patents held

### Huawei in Ireland



Five offices  
(incl. 3 R&D  
centres)



Supporting the rollout  
of next generation  
networks including  
5G and gigabit  
broadband



510  
employees



3 million people  
connected across  
Ireland using  
Huawei products



Over €100 million  
in R&D expenditure  
in Ireland over the  
period of 2019-2021



### Huawei's Irish Activities

Since its arrival in Ireland in 2004, Huawei's activities have expanded from portable internet devices to intelligent connectivity with fibre and 5G technologies, and digital power technologies for the solar PV and data centre industries. Huawei works closely with local operators/partners, directly and indirectly supporting over 1,000 jobs.

**2004**

Huawei enters the Irish Market and opens its first office in Merrion Square

**2008**

Huawei signs a contract with O<sub>2</sub> to deploy ICT equipment for 1.7m users across Ireland

**2012**

Huawei agrees a strategic partnership with Eircom to provide next-generation connectivity to homes and business throughout Ireland

**2013**

Opening of a new R&D centre spread across two sites in Dublin and Cork

**2014**

During an Irish Presidential visit to China it is announced that Irish students will participate in Huawei's 'Seeds for the Future Programme'

**2015**

Inaugural 'Seeds for the Future' programme begins with 10 Irish students visiting China

**2015**

A new R&D office in the ISFC, Dublin is opened with the creation of 50 jobs

**2016**

A partnership with Imagine is created for Huawei to be the sole supplier of Ireland's first national fixed wireless network

**2017**

Huawei wins a contract with SIRO to provide fibre-optic broadband technology for its first phase build of 500,000 premises

**2017**

Huawei and Trinity College Dublin agree to a research partnership

**2018**

Huawei receives a Technology Ireland award for its work with Adapt, a Science Foundation Ireland Research Centre. The work is centred on a system that enables automatic in-scene detection and placement of advertisements in video

**2019**

Huawei begins the rollout of Ireland's largest 5G network with eir

**2019**

A new three year innovation partnership with the GAA is announced to enhance the technology infrastructure at Croke Park

**2019**

Huawei Deputy Chairman Mr. Guo Ping and rotating CEO opens Huawei Ireland's new state of the art Dublin office and announces the creation of 100 jobs over the next three years

**2019**

Huawei commits to investing €70m in Irish R&D over a three year period

**2019**

Huawei invests €6m in Levo software research centre based in the University of Limerick

**2020**

Huawei launches the Tech4AllSmart Whale project, using AI technology to help protect marine biodiversity in Cork

**2021**

Huawei announces an additional €80m investment in Irish R&D and the creation of 110 high-quality jobs by end of 2022

**2021**

Huawei awards 80+ university students with Seeds for the Future and TECH4HER scholarships in partnership with UCD, TU Dublin and UCC



## 2. Irish Economic Contribution of Huawei

The impact of Huawei’s Irish operations is assessed using a standard means of analysis called an economic impact assessment. This begins with quantifying the impact of three types of expenditure undertaken by Huawei in Ireland, based on a three-stage approach.



### 1. Operational Expenditure

The operational expenditure of Huawei’s Irish activity is disaggregated at three distinct levels:

- Payroll – income (after tax) paid to Huawei Ireland employees/partners directly employed in Huawei Ireland, excluding payroll taxes/PRSI contributions
- Supplier – expenditure by Huawei Ireland on goods and service suppliers central to the operation and delivery of its activities in Ireland
- Exchequer – payment to the Exchequer of business, payroll and related taxes (including PRSI, USC etc)

In addition to directly employing hundreds of engineers and other professionals in Ireland, Huawei procures a wide range goods and services from Irish suppliers to support delivery of their economic activity. Some 73% of supplier expenditure is spent on a range of highly-skilled subcontractors including engineers, digital technologists, SMEs, and PhD graduates to support a wide range of Huawei’s activities. The remaining 27% is spent on more traditional forms of operational expenditure, ranging from rental costs to office supplies, supporting the daily functioning of Huawei’s Irish operations.

In the past three years, taking the three levels of operational expenditure, the *annual average* figure for Huawei Ireland's payroll, non-payroll and Exchequer expenditures and payments have averaged the following annual amounts:

- Payroll Contribution: €12.1 million
- Supplier Contribution: €102.4 million
- Exchequer Contribution: €16.0 million

Using this information, we can work out the full economic impact and total economic contribution of Huawei's Irish operations.

## 2. Full Economic Impact

Huawei's expenditure in the Irish economy has direct, indirect and induced impacts on national output and FTE jobs. Therefore modelling the full economic impact of Huawei requires us to recognise three different levels of impact for analysis purposes:

1. *Direct impact* relates to the operational expenditure Huawei Ireland undertakes running its own activities. It encompasses the economic activity and employment generated at its offices and operations in different locations throughout Ireland;
2. *Indirect impact* is the economic activity and employment stimulated along its Irish supply chain by Huawei's procurement of inputs of goods and services from Irish suppliers;
3. *Induced impact* comprises the wider economic benefits to Ireland as a result of the economic growth sustained by Huawei's expenditures, and the contribution to economic productivity and growth due to the nature of Huawei's investments, R&D etc.

Note: the economic impact of Huawei's capital expenditure is not considered due to data unavailability and commercial sensitivities. Therefore the total estimated economic impact for Huawei in Ireland is understated due to these considerations.

However, the contribution of the wider 5G and other digitalisation activities by Huawei and other companies in Ireland is examined in page 10.

There is no composite set of economic multipliers and employment effects currently available for the Irish economy. For this reason, we have used averaged European data on multipliers from a similar study by Oxford Economics<sup>3</sup>.

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3 Oxford Economics: <https://www.oxfordeconomics.com/resource/The-economic-impact-of-Huawei-in-Europe/>

Applying these European multipliers to Huawei's payroll and employment data we estimate the following:

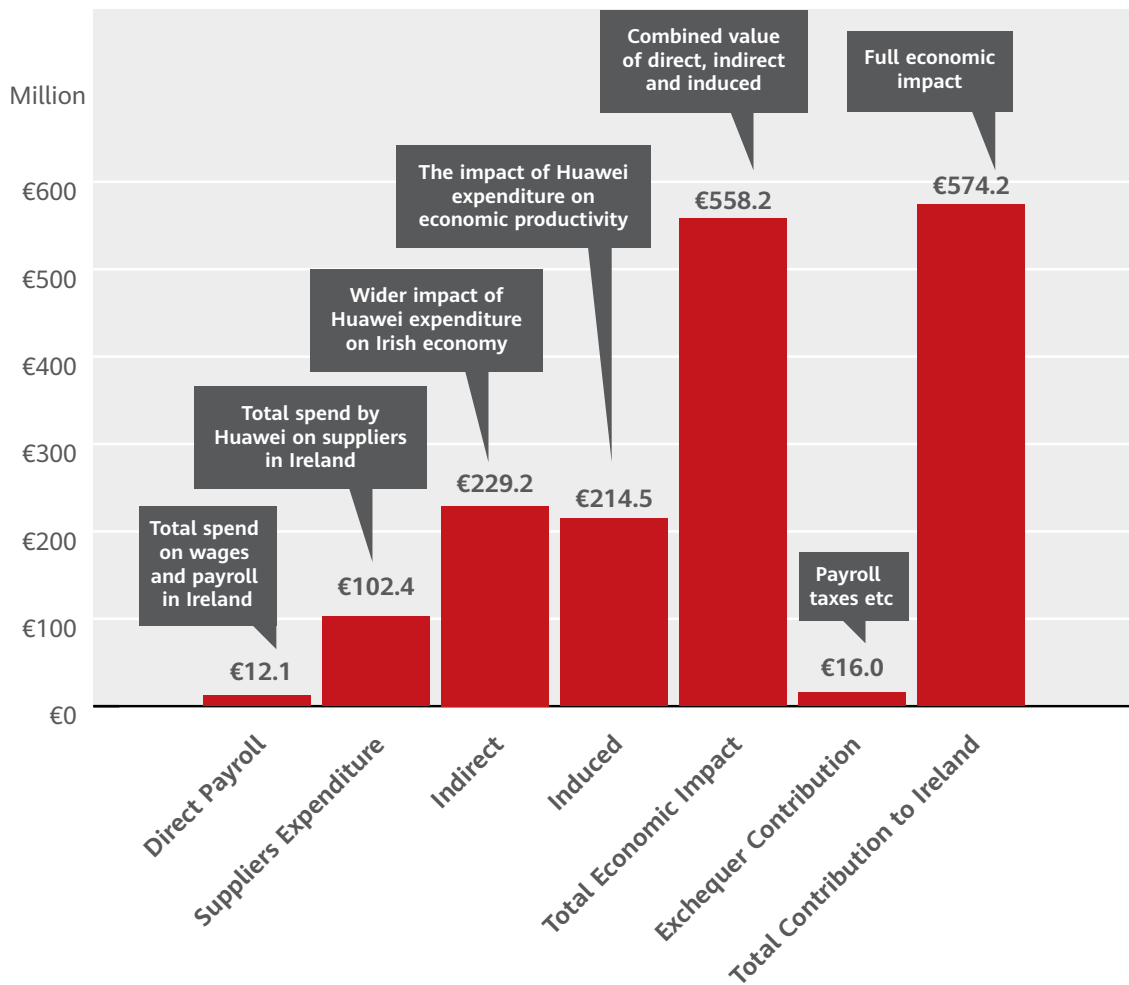
<b>Annual Average Contribution to the Irish Economy</b>	<b>€ million</b>
Huawei Expenditure on Payroll	€12.1
Huawei Expenditure on Suppliers	€102.4
Huawei Contribution to the Exchequer	€16.0
Direct value of Huawei Expenditure (excl. Exchequer & Capital Spend)	€114.5
Indirect value of Huawei Expenditure	€229.2
Induced value of Huawei Expenditure	€214.5
Economic Impact of Huawei in Ireland	€558.2

### 3. Total Contribution

Finally, as part of these calculations, we have to add back the Exchequer contribution of Huawei's economic activities, which we noted earlier was an annual average of €16 million. Therefore combined with the economic impact estimate above, the total contribution of Huawei's Irish expenditures equals over €570 million.

As noted earlier, we have not included specific estimates for Huawei's capital expenditure in Ireland, however the above multiplier-based estimates (derived from European data) do allow for the implicit impact of CapEx though it has not been modelled separately in this exercise.

These findings are summarised below:



Moreover, we can apply a similar Direct/Indirect/Induced framework to estimating the employment contribution of Huawei in Ireland (again using EU multipliers):

<b>Annual Average Contribution to Irish Employment</b>	<b>Jobs</b>
Direct jobs	510
Indirect jobs	2978
Induced jobs	2770

Therefore the economic impact of Huawei in Ireland averages over €0.5 billion in terms of its contribution to the Irish economy, and an employment impact of over nearly 6,000 jobs.

### 3. The '5G Effect'

Previous research by Amárach measured the economic consequences of failing to embrace 5G effectively in Ireland. The study estimated that failure to invest in Ireland's 5G network over the rest of the decade could see a significant shortfall equivalent to €12.6 billion in Irish GDP by 2030<sup>4</sup>.

GDP €BN	CENTRAL FORECAST	GDP: LOW 5G INVESTMENT SCENARIO	GDP: HIGH 5G INVESTMENT SCENARIO	OPPORTUNITY COST OF LOW 5G ADOPTION*
2019	€356.1	€356.1	€356.1	
2025	€415.5	€411.8	€417.9	€6.1
2030	€472.4	€464.9	€477.5	€12.6
2035	€537.2	€524.8	€545.6	€20.9

#### Enhancing Economic Growth

Developing Ireland's digital and 5G infrastructure can make a positive contribution to future economic growth. An Accenture report on the socio-economic impact of 5G in the EU notes that 5G capacity investment generates a positive economic multiplier effect of 1:2<sup>5</sup>. A recent PwC report analysing five industry sectors, including healthcare, smart utilities, consumer and media, industrial manufacturing, and financial services, estimated that the adoption of 5G technologies across these sectors would add \$1.3trn to global GDP by 2030<sup>6</sup>. The report also highlights that the ongoing infrastructural rollout of 5G means that it will create only modest contributions to economic growth until 2025, after which widespread use of 5G-enabled applications will create a greater economic impact on economies.

The market for international capital and investment is extremely competitive. The strength of a country's FDI offering depends on the robustness of its constituent parts, e.g., infrastructure, skilled workforce, market access, political stability. Post pandemic, international capital/investment is increasingly scrutinous of a country's digital infrastructure. While Ireland currently ranks as the 5th most digitally advanced economy in Europe, further developing Ireland's digital infrastructure and 5G technologies can enhance the competitiveness of Ireland's FDI proposition. Ireland's position on the IMD World Competitiveness Rankings is 19th out of 63 global economies for digital competitiveness, and 28th in terms of technology indicators (regulatory framework, capital, technological framework). This ranking is indicative of the need for sustained development and investment in physical and knowledge based technological infrastructure.

The deployment of 5G infrastructure and services directly creates employment in the telecommunication, equipment, and construction industries. Further job creation can then occur through businesses utilising the enhanced connectivity of 5G services to innovate and reach new markets. The EU report on the socio-economic impact of 5G estimated that it would be directly and

4 The 5G Future: <https://huawei.eu/press-release/failure-invest-irelands-5g-network-could-result-eu126bn-gdp-loss>

5 The Impact of 5G on the EU Economy: [https://www.accenture.com/\\_acnmedia/PDF-144/Accenture-5G-WP-EU-Feb26.pdf](https://www.accenture.com/_acnmedia/PDF-144/Accenture-5G-WP-EU-Feb26.pdf)

6 The Global Economic Impact of 5G: <https://www.pwc.com/gx/en/industries/technology/publications/economic-impact-5g.html>

indirectly responsible for 10,700 jobs in Ireland alone in 2020 and 2.3 million across the EU 27 Member States and the United Kingdom.

### Achieving Sustainability Goals

In addition to enhancing economic growth, 5G and related digitalisation measures can help Ireland achieve our ambitious climate policy goals. Indeed, successfully deploying digital technologies could deliver up to 40% of the reduction in carbon emissions needed to meet Ireland’s 2030 targets<sup>7</sup>.

Amárach’s analyses suggest that the effective implementation of a sustainable programme of transformation – through digital solutions in energy, manufacturing, agriculture, buildings and transportation – has the potential to reduce emissions as part of meeting the targets set out by the Climate Action Plan 2021. Using Digital Europe figures for digital’s potential role in CO<sub>2</sub> emission reductions, Amárach Research calculated that digitalisation could deliver 9.9-13.1 MtCO<sub>2</sub>eq. in emission reductions towards Ireland’s 2030 target.

<b>Sectoral Reduction Scenarios by 2030</b>	<b>Potential contribution of digital technologies to emissions reduction in lower scenario (MtCO<sub>2</sub>eq.)</b>	<b>Potential contribution of digital technologies to emissions reduction in higher scenario (MtCO<sub>2</sub>eq.)</b>
Electricity	2.6	3.4
Transport	2.0	2.4
Buildings	1.6	2.0
Industry	1.0	1.4
Agriculture	2.0	2.8
Land Use/Forestry	0.7	1.1
<b>Total due to digital technologies</b>	<b>9.9</b>	<b>13.1</b>

Source: Amárach calculations based on Digital Europe/Department of the Environment, Climate and Communications data

Huawei is a leading global player in the digital power space<sup>8</sup>. Huawei’s technologies lead the way in Energy Cloud OS, Power Electronics Technologies, and Third Gen Power Semi-Conductor Technologies. Placing Huawei at the centre of a global journey towards a sustainable world by 2030 and beyond.

7 Ireland’s digital path to sustainability: [https://www-file.huawei.com/-/media/corporate/local-site/ie/pdf/huawei\\_digital\\_sustainability\\_report\\_final.pdf?la=en-ie](https://www-file.huawei.com/-/media/corporate/local-site/ie/pdf/huawei_digital_sustainability_report_final.pdf?la=en-ie)

8 Digital power: <https://www.huawei.com/en/giv/digital-power-2030>

## 4. Socio-Economic Impact of Huawei's Activities

Huawei is renowned for its commitment to R&D, continually innovating and making advances across its industry sector. This focus is aligned with Ireland's desire to be a knowledge intensive and R&I economy.

Huawei's strategy of "focus, persevere and break through" drives their efforts to sustain technological development into the future and reflects their significant investment in R&D over the last few decades. In 2021, Huawei increased their investment in fundamental communication theories, AI and other fields. This is in addition to their R&I in the areas of optical networks, carrier and enterprise networks, intelligent O&M, smartphone media, physical engineering, basic software, and trustworthy theories, technologies and engineering practices.



**10%** of Huawei's annual sales are invested in R&D activities

**CNY845bn** has been invested in R&D activities over the past decade



**107,000** or **54.8%** of Huawei employees worked in R&D in 2021



Huawei has one of the **largest patent portfolios** in the world

For volume of patents granted, it ranks:

**No 1** - China  
**No 1** - Europe  
**No 5** - USA



Huawei is an **industry leader** for patents in the fields of **5g, Wi-Fi** and **H.266**

### R&D Centres

Much of the global research that Huawei carries out takes place in Europe. Huawei set up its first research centre in Sweden in the year 2000. Today, Huawei employs over 2,400 researchers in 23 research centres across Europe. Through a series of partnerships with over 150 European universities, Huawei is deeply embedded within the ICT research ecosystem in Europe. Through this collaborative research activity, Huawei makes Europe fit for the digital age.

Huawei has three Irish R&D centres in Dublin, Cork and Athlone, employing several hundred engineers, researchers and scientists working on fundamental research in the areas of cloud software reliability engineering, artificial intelligence, trustworthy programming languages, and smart network innovation including autonomous driving networks. Over 30% of the R&D centre employees hold a PhD, with the R&D centres operations focusing on key technology breakthroughs and business value creation. Huawei's R&D activities in Ireland are playing an important role in creating a highly-skilled talent pool of workers within the innovation ecosystem, and supporting the development of future STEM leaders.



## R&D Partnerships

Huawei directly contributes to the development of the Irish innovation ecosystem with important partnerships with key institutions, including Science Foundation Ireland (hereafter “SFI”) research centres like Adapt, Lero, Connect and Insight, and universities right across Ireland. These institutions benefit through financial support and opportunities for their researchers to work with world leading experts through Huawei’s R&D centres in Ireland and across the globe.

## Trinity College Dublin

Trinity College Dublin (hereafter “TCD”) and Huawei have conducted several successful multiannual research projects in the areas of telecommunications, software and materials spaces. These programmes involved Huawei working with a number of TCD Departments, including the schools of Computer Science and Statistics, Physics and Chemistry, Mechanical and Electrical Engineering, and the TCD hosted SFI research centres ADAPT and CONNECT. Huawei’s involvement with Trinity provides researchers with valuable insight and knowledge of the scientific challenges and the technical and commercial future of the telecommunications industry.

Trinity College has a master framework agreement in place with Huawei and conducted several successful multiannual research projects in the telecommunication, software, and materials spaces. These programmes have involved many units across the college including the school of Computer Science and Statistics, School of Physics and Chemistry, Mechanical and Electrical Engineering. Trinity hosts the ADAPT and CONNECT SFI research centres and both centres worked closely with Huawei with Trinity support. We have co-hosted international conferences and student hackathons with Huawei. During Covid, Huawei generously donated computer equipment to students under our university outreach programmes.

The key benefits from having a relationship with Huawei and being a beneficiary of Investment and Industry Research include:

- Providing our researchers with valuable insight and understanding into the future commercial, technical, and scientific challenge of the telecommunications industry.
- Participation of Huawei with cash investment in many research collaborations of key scientific and commercial interest, both nationally and internationally.
- Supporting and endorsing the university research mission and advocating the economic value and significance of continued research investment by enterprise and government into the university sector.
- Financially supporting the hiring of research staff at postgraduate and post-doctoral level within the university in key area of research interest. Enabling the career progression of these individuals with valuable industry experience.
- Inviting our research leaders to international conferences to support dissemination and collaboration of research.
- Supporting the purchase of equipment and infrastructure to enable the collaboration programmes and sustain the wider research and education mission of our schools and research centres.

Alongside this, Huawei provides funding for the research initiatives and financial support for postgraduate and post-doctoral level researchers, facilitating career progression and valuable industry experience. Huawei's partnerships with Trinity play a key role in highlighting the value of university sector research to both enterprise and Government, as well as the development of a world-class innovation ecosystem.

### **The Insight SFI Research Centre for Data Analytics**

The Insight SFI Research Centre for Data Analytics is one of the largest data analytics centres in Europe. It undertakes high-impact research, seeks to derive value from Big Data and AI and provides innovative technology solutions for industry and society by enabling better decision-making. Insight is driven by €150m in funding, supporting 450 researchers across areas such as Foundations of Data Science, Sensing and Actuation, Scalability, Multi Modal Analysis, Data Engineering and Governance, and Decision Making.

Huawei has been a valued industry partner of Insight since September 2017, with the first engagements focused on video feature extraction and wearable neurotechnology for adaptive user interaction experiences. While there were already existing links with Huawei via the personal relationships of individual Insight Principal Investigators, the establishment of a dedicated Huawei R&D lab in Ireland allowed us to put the relationship on a more strategic footing. By working closely with the Huawei Irish leadership team, a number of high-impact collaborative research programmes were identified. This resulted in a number of funded research projects between Insight researchers and the Huawei Irish lab as well as other Huawei labs in Europe and China.

Recent projects have included projects on scalability/provisioning analysis and knowledge graph development for intent classification. The collaborations have resulted in multiple co-authored publications in top tier international peer-reviewed conferences and journals as well as valuable intellectual property via patents filed with both Insight and Huawei co-inventors. This, in turn, allowed Huawei to work closely with Ireland's R&D ecosystem to co-create and play a leading role in large-scale research initiatives that target topics of national strategic importance, such as the Internet of Things, Smart Cities and Data Governance. The relationship has also enabled our researchers to broaden their international networks of academic and industry collaborators as well as raising the overall profile of Insight internationally.

***"I believe that the relationship has been mutually beneficial and overall has driven a diverse range of high quality research outputs."***

Prof Noel E O'Connor, Dublin City University

## The SFI Centre for Research Training in Machine Learning

The Science Foundation Ireland Centre for Research Training in Machine Learning is a collaboration between University College Dublin, Dublin City University, and Technological University Dublin delivering an ambitious PhD training programme that supports students to develop the research and technical expertise required for ground breaking machine learning research, alongside transferable skills and industry experience to help them become future leaders in the field.

The benefit from having a relationship with Huawei and being a beneficiary of Investment and Industry Research.

Huawei has been a partner at the Science Foundation Ireland Centre for Research Training in Machine Learning since the centre's inception in 2019. Huawei has supported the centre through influencing the strategic direction of the centre, delivering industry expert talks to our PhD candidates, hosting PhD candidates on industry placement, and deep collaboration on research projects.

In particular, Huawei has funded and collaborated with PhD candidate Joyce Mahon, and her supervisors Dr. Brett Becker and Dr. Brian Mac Namee, at the School of Computer Science at University College Dublin on a PhD project investigating the most effective ways to deliver education on artificial intelligence (AI) and machine learning (ML) to second level students in Ireland. This led to the delivery of an online training module in AI and ML to over 8,000 transition year students in over 100 schools during the 2021-2022 school year.

Through talks delivered by Huawei researchers, and other interactions they have had with Huawei staff, PhD candidates have also benefited from real exposure to how AI and ML are used and deployed in industry.

On the project developing education materials for second level students, Huawei has provided valuable insights into how to present with an industry perspective as well as access to internal Huawei materials that we have used. Moreover, access to the broader Huawei network has been extremely valuable in communicating the work and its impact.

On top of the financial benefits from collaborating with Huawei, the centre has been able to benefit from their insights into key research directions in AI and ML that should be addressed at the centre and the ideal skills profile that PhD graduates in AI and ML should have to be successful in industry.

***On top of the financial benefits from collaborating with Huawei, we have been able to benefit from their insights into key research directions in AI and ML that should be addressed at the centre and the ideal skills profile that PhD graduates in AI and ML should have to be successful in industry.***

Dr. Brian Mac Namee, University College Dublin

## Huawei's CSR Initiatives

Huawei has a series of educational programmes including financial bursaries and training initiatives aimed at increasing the numbers in STEM subjects and female participation. Alongside this, Huawei are engaged in the local community donating ICT equipment to schools to aid digital acceleration in the classroom.

### *Seeds for the Future Programme*

Local investment at community level, and initiatives to education and upskill, are core premises of Huawei's CSR and philanthropic activities in Ireland. In 2015, Huawei launched its 'Seeds for the Future' programme and since then has provided over 170 Leaving Cert and third level students considering or currently studying STEM subjects with access to financial bursaries and opportunities for learning and cultural experiences. In May the 2022 edition of the initiative was launched with a €250,000 scholarship fund, a variety of courses in areas including the latest innovations in smart cities, artificial intelligence, cloud computing, 5G, and the Internet of Things, as well as virtual tours of Huawei's Chinese campuses. This initiative enables young people to gain insight into the global business environment, learn more about advanced technologies and accumulate new skills and experiences.

Working with local NGOs to support biodiversity and sustainability using digital technologies in, March 2021, Ireland's first real-time monitoring project of cetacean species (whales, dolphins and porpoises) was launched off the South Coast by Ireland's Ocean Research & Conservation Association, with the aim of creating a near real-time detection model for the species and examining the impact rising ocean noise pollution is having on Ireland's marine life. Huawei Ireland is providing technological support and assistance as part of its global TECH4ALL initiative. The project is the first TECH4ALL undertaking to be launched in Ireland and the first to focus on ocean and marine wildlife globally.

### *Tech4Her Scholarship Programme*

In 2020, Huawei Ireland launched the Tech4her scholarship programme in partnership with the Technological University Dublin, University College Dublin, and University College Cork. The initiative provides scholarships to female students studying STEM subjects at both undergraduate and postgraduate level. In the past two years over €150,000 has been allocated to 32 recipients of the scholarships, along with other opportunities to engage in masterclasses.

## Community Engagement

Huawei Ireland makes important contributions to local communities, including sponsoring local GAA teams (Cuala GAA) and donating tech equipment. In 2021, Huawei partnered with its client eir under a business in the community initiative to donate ICT kits to secondary schools in the Limerick and Sligo regions, with the intention of accelerating connectivity and digitisation in classrooms. These contributions are indicative of Huawei's desire to engage with the local community.

Cuala GAA runs on an amateur basis – which means that it is volunteer-led and all members engage and play as amateurs. Like most GAA clubs – Cuala relies on voluntary fund-raising, membership fees and sponsorship to support its activities. Fund-raising and membership fees support day-to-day costs, whereas having Huawei as a corporate sponsorship raises the bar and creates a chain of benefits:

- Raising standards of excellence in our sportsmen and women through access to the best facilities and expertise. We strive for professional standards in an amateur setting.
- Higher standards lead to success and higher profile for players and the club in the local community and across the country.
- In our experience, players who feel they are invested in are more likely to act as role models and voluntarily participate in club and community events including:
  - Youth coaching (e.g. Cuala camps, Coaching workshop)
  - Social events in the community
- Higher profile means we can leverage more at a community level e.g.
  - Cuala drove the massive "Support4Drummo" campaign to raise funds for Seán Drummond who suffered a critical brain injury.
  - Cuala All Stars is an inclusive venture for children with physical and mental disabilities supported by high profile Cuala players.
  - Cuala Sports and Social Integration Programme supports several community initiatives – Cuala CLG (cualagaa.ie) in which players regularly engage.
  - Home4Cuala – an initiative to redefine the ageing clubhouse into a community centre to be shared with other sports.

Overall, Huawei corporate sponsorship enables these activities by creating a virtuous cycle that generates deep and long-term benefits for the club and the overall community.

## 5. Contributions to Government Policy

The economic and socio-economic activities of Huawei are directly and indirectly enhancing Ireland's productive capacity, the creation of highly skilled jobs, supporting engagement in STEM subjects and enhancing Ireland's global positioning as an island of innovation. We summarise the key contributions in the table below:

Government Policy	Policy Objective	Huawei Contribution
<b>National Recovery and Resilience Plan 2021</b>	Economic and societal recovery from the impact of COVID-19 through the advancement of three key national priorities including advancing the green transition, accelerating and expanding digital reforms, and job creation.	The use of 5G technologies are fundamental to accelerating Ireland towards its climate change goals and reaping the benefits of the digitisation of public services. Huawei's educational initiatives with a number of universities across Ireland's are also assisting with technical skills development.
<b>Project Ireland 2040</b>	By 2040 there will be an estimated 1m additional people living in Ireland. Population growth of this scale requires job creation, new homes, cultural and societal amenities, and enhanced regional connectivity and environmental sustainability. Project Ireland 2040 plan sets out a strategy for development of these resources.	Huawei's expertise and support of partners in the rollout of digital infrastructure is key to the development of regional and global connectivity, as well as job creation. The presence of Huawei R&D centres in Cork and Athlone contributes to the development of regional clusters, high value add employment and global connections.
<b>Harnessing Digital – The Digital Ireland Framework</b>	To become a digital world leader, Ireland must make a series of infrastructural investments and promote the digital agenda effectively across all areas of Government policy and service delivery, while working in tandem with a broad range of stakeholders.	The role of Huawei and other global ICT providers working with local companies to bring 5G to the market, is vital to the overall success and implementation of the National Digital Framework.

Government Policy	Policy Objective	Huawei Contribution
Impact 2030: Ireland's Research and Innovation Strategy	This policy re-emphasises Ireland's commitment to becoming a knowledge based economy, building stronger ecosystems and enhancing support for education, public institutions and private enterprises involved in research and innovation.	Huawei's R&D centres in Dublin and Cork, play an important role in attracting skilled labourers to Ireland and the development of the innovation ecosystem. In addition, Huawei has partnerships with a number of Science Foundation Ireland institutions and universities carrying out activities in AI, video and cloud computing.

## Ireland's National Recovery and Resilience Plan 2021

Huawei directly and indirectly supports a number of the priorities of this plan through the use of low carbon 5G technologies, digital initiatives, educational platforms, and the direct creation of 510 jobs in knowledge intensive activities

### Outline of Policy

In July 2020 the EU adopted a historic €750 billion recovery package for Europe in response to the public and health crisis caused by COVID-19. Ireland's National Recovery and Resilience Plan 2021 ("NRRP") was developed in response to this setting out an agenda for the €915m in grants they will receive from the EU recovery fund between 2021 to mid-2026. The priorities of the NRRP are:

1. Advancing the Green Transition
2. Accelerating and Expanding Digital Reforms
3. Social and Economic Recovery and Job Creation

### Impact of Huawei

#### 1. Advancing the Green Transition

The NRRP is the first step in Ireland achieving its ambition to halve carbon emissions over the course of the next decade, with reform and funding directed towards a range of decarbonisation projects. The NRRP is also aligned with domestic policies, including the 'Climate Action Plan 2021 - Securing Our Future' which identifies digital transformation of enterprise, remote working and the use of 5G technologies as key drivers to accelerating Ireland towards its climate goals. At a recent World Economic Forum, it was estimated that digital technology could help reduce global carbon emissions by 15% by 2030. In the ICT sector, Huawei has committed to cutting carbon emissions per connection by 80% by 2025. The achievement of this goal would make ICT one of the most energy-efficient industries in the world.

## 2. Accelerating and Expanding Digital Reforms

The Government recognises the importance of supporting Irish business and citizens as they adapt to and subsequently benefit from digitalisation. There is an extensive reform agenda for the digital transformation of Ireland, ranging from a shared Government data centre, Irish innovation hubs, 5G technologies to eHealth initiatives, with the digitalisation of public services being a top priority in light of the challenges highlighted by COVID-19. The successful implementation and transformation of these technologies and services will be heavily dependent on the skills and knowledge of those in the ICT sector locally, nationally, and globally.

## 3. Social and Economic Recovery and Job Creation

The NRRP also highlights a strong commitment to reforming further education training (“FET”) in Ireland, an initiative that has long played a critical role in labour market activation and the upskilling of workers. The plan focuses on three key areas of investment including, work placement experience programmes, skills response programmes and further funding for technological universities to aid their development and promote regional economic growth. The ICT sector has long been a key partner of technological universities across Ireland, with Huawei being one of many entities in the sector offering programmes in ICT knowledge and culture, as well as financial scholarships to university students. These initiatives play a key role in supporting Government objectives, including the alignment of skill sets in the labour market with an enhanced focus on climate action and digitisation.



## Project Ireland 2040

This is a comprehensive long term strategy for embedding resilience and sustainability in both Irish society and the economy, with core focuses on the deployment of physical infrastructure, as well as supporting business and communities across Ireland.

### *Outline of Policy*

Project 2040 is Ireland's long term strategy for building a more resilient future. It is estimated that there will be an additional 1m people living in Ireland by 2040. This level of population growth will require substantial job creation, new homes, enhanced regional connectivity and improved environmental sustainability. Project Ireland 2040 encompasses the National Planning Framework ("NPF") and the National Development Plan 2021-2030 ("NDP"), with the NPF setting out the vision and the NDP providing the framework for implementation. Sustainability is a strong feature across the NPF goals in terms of economic growth, mobility systems, environmental resources, and ultimately transitioning Ireland to a low carbon economy and society. This goal works in tandem with the vision for greater connectivity between urban and rural areas, as well as internationally through both improved physical and digital infrastructure. So far, the NDP is the largest and most environmentally conscious plan delivered in Ireland. The primary focus is delivering timely and high quality infrastructural projects.

### *Impact of Huawei*

It is estimated in the NPF that there will be an additional 660,000 people at work in the Irish economy by 2040. Against the background of increasing global uncertainty and technological disruption, strengthening the economy through skills, innovation, and an enhanced focus on regional enterprise bases is fundamental to building resilience. Huawei's presence in Cork and Athlone, through its R&D centres, is beneficial to the development of competitive regional clusters, generating high value employment and creating international links to regional areas. Huawei's engagement with local universities through its student scholarship programmes and research partnerships also works in tandem with the ambitions outlined in the NPF for a greater focus on R&D activities in higher education.

The success of regional clusters and enhanced job creation in rural areas is heavily dependent on the provision of high speed digital infrastructure. The NPF recognises that continued support and successful delivery of the National Broadband Plan is the most effective means to ensuring enterprise, employment, education, and engagement with the digital economy in rural areas. Huawei's global expertise and role supporting partners in the rollout of the 5G technologies is pivotal to the overall success of a regionally balanced economy.

The development of effective digital infrastructure across the island will be an important enabler in Ireland's transition to a low carbon and climate resilient economy. As Ireland moves away from fossil fuels towards alternate greener sources and 'smart energy' systems, there will be a strong reliance on innovation from the commercial sector and low-carbon power solutions such Huawei's.

## Harnessing Digital – The Digital Ireland Framework

The successful digitisation of the Irish economy is key to its future growth. Huawei's partnerships with 5G providers in the Irish market is facilitating digitisation and the provision of 5G services to both businesses and consumers across Ireland

### *Outline of Policy*

In line with the objectives of Europe's Digital Decade to 2030 'Harnessing Digital - The Digital Ireland Framework' ("National Digital Framework") sets out the pathway for Ireland to achieve its ambition of becoming a digital world leader. While Ireland ranks as the 5th most digitally advanced economy in Europe, there are both challenges and opportunities as it enters a new decade of digital transformation. Ireland must achieve climate change goals, continue to enhance productivity, while at the same time creating a balanced and inclusive society. To accomplish these goals Ireland must promote the digital agenda effectively across all areas of Government policy and service delivery, while working in tandem with a broad range of stakeholders.

### *Impact of Huawei*

Of the four dimensions outlined in the National Digital Framework, the second focuses on the digital infrastructure that will underpin the transformation across the economy and wider society. More specifically, Ireland aims to have all households and businesses covered by gigabit networks by 2028, and populated areas covered by 5G by 2030. The Government recognises these aims can only be achieved by "complementing commercial investment in infrastructure with Government initiatives and facilitating other enablers as appropriate." The role of Huawei and other global ICT providers working with companies located in Ireland to bring 5G to the market, including Eir, Imagine and Siro, is key to the overall success and implementation of the National Digital Framework.

## Impact 2030: Ireland's Research and Innovation Strategy

The extensive R&D activities Huawei engages in Ireland are key to attracting other industry entities, the further development of the innovation ecosystem and successful achievement of Ireland's aim to be a globally renowned knowledge and innovation economy.

### *Context*

Ireland has a global reputation for its research and innovation ecosystem, with a strong record of extensive collaborations between public research bodies and private enterprises. Total public and private expenditure in 2020 was estimated to be €4.6 billion, a 79% increase in value since 2011. This increase in investment has largely been attributed to private expenditure growth from €1.8 billion to €3.4 billion in 2020. Despite this, significant progress has not been made towards the 'Innovation 2020' research intensity rate target of 2.5% of GNP. This objective has been partially undermined by Ireland's economic growth exceeding pre-identified targets between 2009 - 2020. As other EU member states increase their investment in R&I, Ireland's position on the European Innovation Scorecard has dropped, moving from 6th place in 2016 to 11th place in 2021.

### *Outline of Policy*

Launched in May 2022, 'Impact 2030: Ireland's Research and Innovation Strategy' ("Impact 2030") acknowledges recent economic and societal changes, including climate change, increased international competition and geopolitical instability, ultimately rephrasing Ireland's commitment to becoming a knowledge-based economy.

Ireland aims to build a stronger ecosystem for innovation, through strengthening support for people, higher education institutions, enterprises, and public service institutions involved in R&I.

### *Impact of Huawei*

Impact 2030 recognises the increasingly competitive global market for talent and the need for Ireland to be the location of choice for R&I people. The presence of global enterprises, such as Huawei, distinguished for their R&D focus, is key to attracting the right talent to Ireland. Huawei employs over 2,400 researchers in 23 research centres across Europe. Through a series of partnerships with over 150 European universities, Huawei is deeply embedded within the ICT research ecosystem in Europe. Through this collaborative research activity, Huawei makes Europe fit for the digital age. In addition, Huawei works with a number of Irish third level institutions and Science Foundation Ireland institutions to fund vital research into video, artificial intelligence and cloud computing. At the release of Impact 2030, the Irish Government reiterated that fostering greater engagement between R&I stakeholders, including enterprises, the tertiary education system and research organisations, will play an important role in realising the vision of the strategy.

## About Huawei

Huawei is a leading global provider of information and communications technology (ICT) infrastructure and smart devices. With integrated solutions across four key domains – telecom networks, IT, smart devices, and cloud services – Huawei is committed to bringing digital to every person, home and organisation for a fully connected, intelligent world. Huawei employs over 195,000 people in 170 countries across the globe.

Huawei has been in Ireland since 2004, with its business now serving over three million people and supporting over 3,400 direct and indirect jobs.

Huawei's business activities in Ireland continue to thrive. Intelligent connectivity with fibre and 5G technologies has begun and will empower the market of mobile networks and broadband networks with AI and IOT technologies. Huawei Ireland is working very closely with local operators and partners, and is focused on nurturing future talent and highly-skilled professionals in these areas across the country.

## About Amárach

Amárach is an independent research consultancy, measuring the business implications of consumer and business trends in Ireland and abroad.

