

# Digital Deployment Index - 2022

A presentation prepared for Vodafone

March 2022

Confidential



# The Digital Deployment Index (DDI)

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**DDI's objective:** to capture key drivers of investment, including costs and regulatory environments.

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A new 2022 Digital Deployment Index (DDI) conducted by Frontier Economics on behalf of Vodafone, offers a comprehensive analysis into the different factors that inflate costs and slow down the rollout of next generation fixed and mobile networks. The study involves a number of European markets and highlights best practice examples.

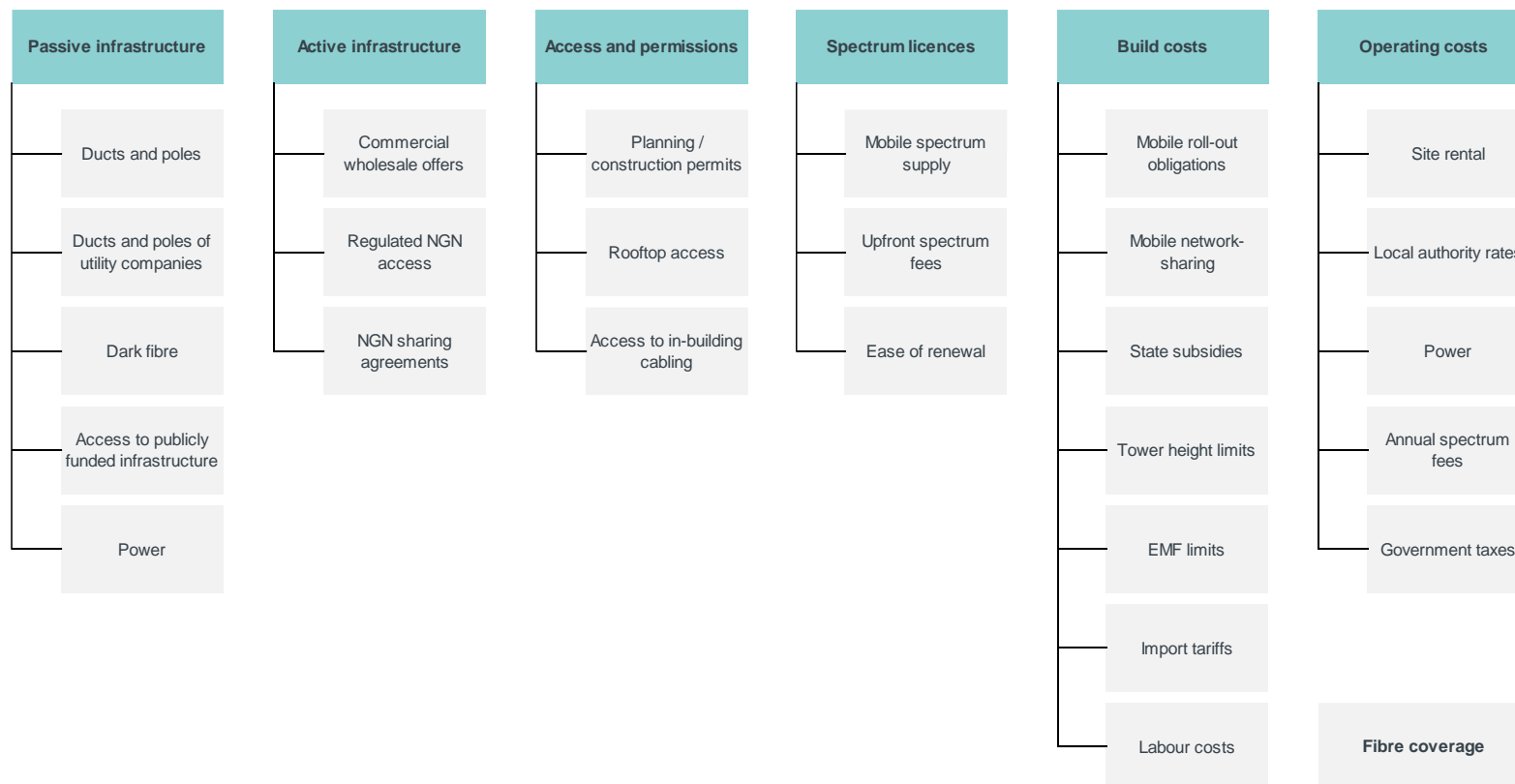
# The DDI is based on 100+ questions on various drivers of investment in fixed and mobile networks

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First, we collect updated data from Vodafone opcos and third-parties<sup>1</sup> on 100+ questions that relate to drivers of investment in fixed and mobile networks. Drivers are organised into categories and sub-categories.

2

We give each country-specific response a score between 0-10, where a higher score represents an environment of relative ease of investing in digital infrastructure compared to a lower score.



## <sup>1</sup>Notes:

- We previously used data from the FTTH Council Europe but we now use data from the European Commission. The FTTH Council Europe over-estimated fibre coverage, which means that relative to the 2019 model the updated 2022 model finds a decrease in fibre coverage for a number of countries. But this is a data issue only: EC data shows that fibre coverage has increased in every country included.
- Labour costs are sourced from Eurostat.
- Government taxes are sourced from the GSMA Connectivity Index, which includes data on (i) tax (proportion of cost of mobile ownership) and (ii) mobile-specific tax (proportion of cost of mobile ownership).

## To arrive at a single index, we weigh the different metrics depending on their relative importance

- 3** ■ We aggregate across metrics within sub-categories and categories to arrive at an overall index for three types of deployment models:
- Fixed passive access model (which is reliant on access to incumbents' passive infrastructure);
  - Fixed Greenfield model (which assumes that new fibre networks are built from scratch rather than deployed using existing passive infrastructure. This model is more relevant for countries where existing passive infrastructure is limited; and
  - Mobile (which takes into account mobile-specific assets, e.g. spectrum and access to mobile sites).
- We aggregate using weights that reflect each driver's relative importance – these are summarised below for each model.

	Passive infrastructure	Active infrastructure	Access and permissions	Spectrum licenses	Build costs	Operating costs	Fibre rollout (referred to as fibre coverage in the remainder of the slides)
Fixed, passive	32%	10%	10%	0%	14%	5%	30%
Fixed, Greenfield	0%	17%	17%	0%	32%	5%	30%
Mobile	9%	3%	15%	30%	26%	18%	0%

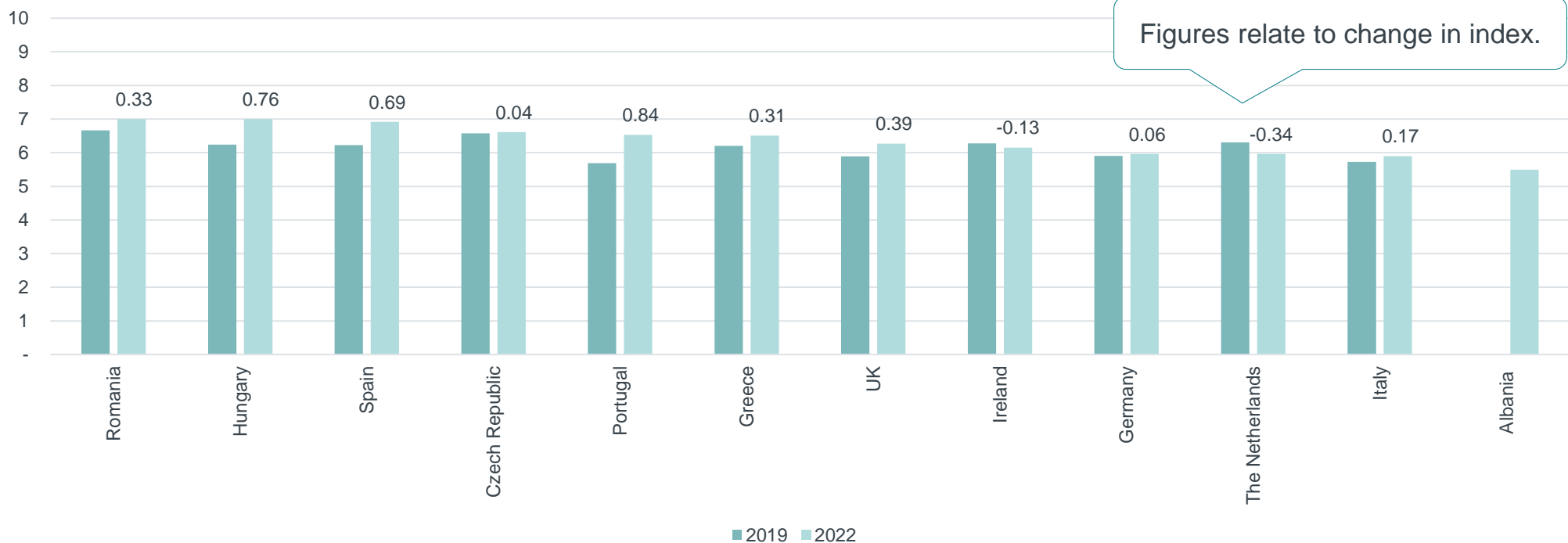
- 4** ■ We also create a “converged” index, which is the average of the (i) maximum of the ‘fixed – passive’ or ‘fixed – Greenfield’ index and the (ii) mobile index.
- Note that in some countries the fixed roll-out model is very clearly passive or Greenfield based – but in other countries both roll-out models may be equally viable. For the purposes of this analysis, we consider that roll-out models in the Netherlands, Czech Republic, Greece and Romania are likely to be Greenfield based. This is highlighted in the country-specific slides as it means that some elements of passive infrastructure are relatively less important for the deployment of fixed infrastructure.

# The updated **mobile** DDI shows positive changes in almost all countries. However, there is scope for further improvements

- Highest score: Romania, 7.0

- Lowest score: Albania, 5.5

## Mobile



- Most countries' mobile DDI index improved. The biggest increase is for Portugal (+0.84), followed by Hungary (+0.76).

- The biggest decrease is for the Netherlands (-0.34).

- Albania has the lowest score of 5.5, which compares to the second lowest score of 5.9 for the Netherlands.

# Since 2019, most countries have improved access to spectrum and policies affecting operating costs, but further work is needed to simplify permits and to reduce build costs

Number of countries whose mobile score for specific categories has (i) improved, (ii) stayed the same or (iii) worsened.

Category	Mobile		
	Improved	Same	Worse
Passive infrastructure	6	3	2
Active infrastructure	2	7	2
Access and permissions	5	0	6
Spectrum licences	9	0	2
Build costs	4	0	7
Other operating costs	7	0	4
Fibre coverage	N/a	N/a	N/a

## Access to spectrum has improved in most countries

- Improvements are driven by lower upfront spectrum fees (CZ, DE, RO, UK) or better spectrum availability (NL, PT, ES, GR). There have been limited changes in ease of renewal.

## There have also been improvements in policies affecting operating costs

- This is generally driven by lower radio site rentals (HU, IE, UK).
- A number of countries have benefitted from lower power costs or regulated access to power (PT, ES).<sup>1</sup>

- Most countries have seen scores for active infrastructure stay the same or worsen. Many countries still do not have regulated NGN access.

- There have been negative changes in policies affecting access and permits** in a number of countries as the cost and time taken to obtain permits has increased (see slide 13 for more detail).

- Policies affecting build costs have also worsened. This is primarily driven by higher coverage obligation costs** to Vodafone. The biggest changes were seen in DE, NL and UK.

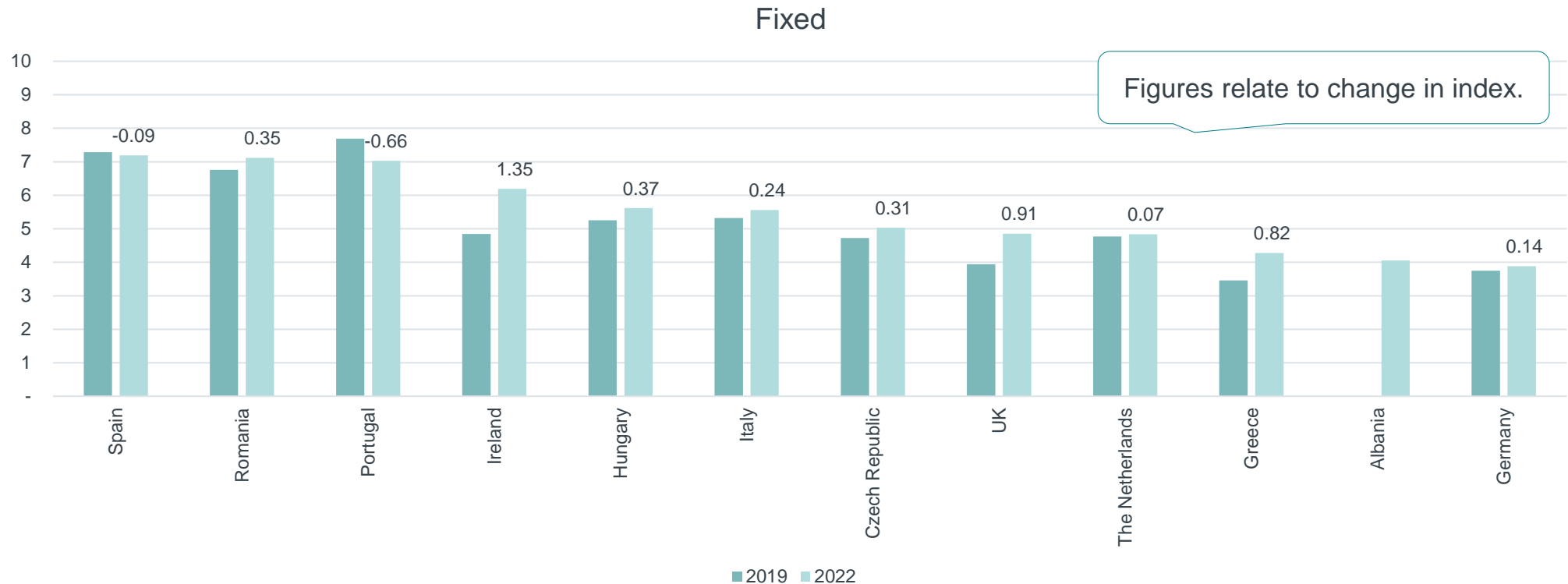
<sup>1</sup> data collected Jan-March 2022.

# The average **fixed** DDI has fallen as countries that scored highly before have seen scores drop

- Highest score: Spain, 7.19

- Lowest score: Germany, 3.89

Fixed DDI is based on the maximum of passive and Greenfield scores.



- Performance has generally improved: a number of countries that previously had lower scores have improved (e.g. UK, IE) and two countries that had higher scores have seen their scores fall (ES, PT).

- Portugal was ranked first before, but it has since dropped by (-0.66).

- The UK appears to have done well. Its score has increased from 3.9 to 4.9.

# Access to active infrastructure and policies affecting permits have improved

Number of countries whose fixed score for specific categories has (i) improved, (ii) stayed the same or (iii) worsened.

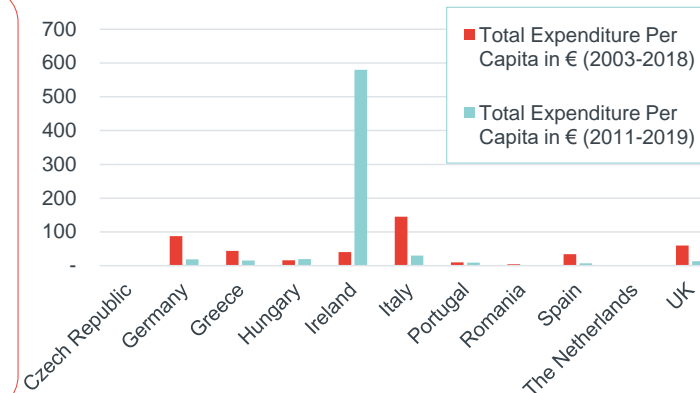
Category	Fixed - Passive access roll-out		
	Improved	Same	Worse
Passive infrastructure <sup>1</sup>	3	2	0
Active infrastructure	10	0	1
Access and permissions	6	1	4
Spectrum licences	N/a	N/a	N/a
Build costs	3	1	7
Other operating costs	2	9	0
Fibre coverage <sup>2</sup>	6	2	3

## Active infrastructure scores have improved for most countries

- Improvements are driven by an increase in the percentage of households that could be covered with fibre using commercial wholesale offers currently in the market (CZ, DE, IT, NL, PT, ES, UK)<sup>3</sup>.
- Higher scores on access and permissions** are based on better processes for fibre deployment permits; the average time to obtain permits has improved in IT, NL, RO and the costs are lower in HU and the UK.

- Operating costs in fixed relate to power and general government taxes. These figures have remained the same for most countries.<sup>4</sup>

- Build costs have increased in a number of countries.** This is driven by updated data on state subsidies. New data from the [EC](#) shows poorer relative performance compared to the leader Ireland.<sup>5</sup>



<sup>1</sup> Relative performance on passive infrastructure is only reported for the countries that have a passive roll-out model. <sup>2</sup> Fibre coverage in all countries increased, but because of the data issue set out on slide 5, some countries now have a lower score.<sup>3</sup> This is different to the result for mobile as the latter is focused on commercial access to leased lines. <sup>4</sup> data collected Jan-March 2022. <sup>5</sup> Graph shows EC subsidies by country



# A converged score provides an overall view of the relative ease of investment in a particular country

- Highest score: Romania, 7.1

- Lowest score: Albania, 4.8

Converged

Figures relate to change in index.



- Converged scores are calculated as the average of a country's fixed and mobile score.

- Spain ranked first in 2019 with a score of 6.76 and has since increased by +0.30.

- The UK looks to have done well. Its score has increased from 4.9 to 5.6.

# An analysis of metrics that are related to the Broadband Cost Reduction Directive (BCRD) shows that there continues to be lot of variation in the time and cost of permits

- The BCRD-related questions we have looked at relate to access and permissions for digital deployment.

BCRD-related questions	Sub-question	Average across all countries	Best performing in the sample	# of countries that have <u>improved</u> compared to 2019	# of countries that are <u>unchanged</u> compared to 2019	# of countries that are <u>worse</u> compared to 2019
What is the <b>average time</b> (in number of days) required to obtain the necessary permissions and permits to roll-out new network infrastructure?	Macro mobile sites	252 days (~8 months)	60 days (HU)	2	5	4
	Fibre deployment	163 days (~5 months)	48 days (NL)	3	7	1
	Rooftop mobile sites	183 days (~6 months)	0 days (IE)	6	3	2
What is the <b>cost</b> of obtaining planning permissions/ construction permits (if applicable)? <i>Note: figures provided in €; in the model these are adjusted for PPP)</i>	Macro mobile sites	€3,024	€160 (CZ)	5	1	4
	Fibre deployment	€1,047	€0 (UK)	2	1	5
	Rooftop mobile sites	€2,014	€0 (IE)	3	1	4

- It takes between 5-8 months on average for permits to be obtained, which is longer than the 4 month timescale set out in the BCRD. There is considerable variation within this average. E.g. for many countries it takes **a year or longer to obtain** a macro mobile site permit (AL, CZ, GR, NL, PT, ES).

- Changes in the cost of permissions from 2019 to 2022 have varied.
- It is generally the case that permit costs for macro mobile sites have decreased. **But some permit costs remain high.** E.g. the cost of permits for macro mobile sites in GR have fallen by €500 from €5,000 to €4,500. But this cost remains considerably higher than other countries, e.g. CZ where permits cost less than €200.
- In some countries the cost of permits has increased.
  - In RO, permits have increased by an average of around €400.
  - In GR, the cost of **rooftop** mobile site permits has increased by €1.4k.

- Overall a number of improvements are required in both the time and cost of permits in order to streamline processes in support of deployment.



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