

SYNOPSIS REPORT

on the public consultation on the needs for Internet speed and quality beyond 2020 and measures to fulfil these needs by 2025

1. Methodology of the public consultation and of this report

1.1. The online questionnaire

The European Commission ran a consultation on the needs for Internet speed and quality beyond 2020 from 11 September to 7 December 2015 for 12 weeks. The purpose was to assess and understand the needs for Internet speed and quality beyond 2020 better, with 2025 as a landmark, with a view to developing policy measures which facilitate investment in the deployment of future-oriented connectivity networks, and ensure that all users benefit from the digital economy and society. Given the time horizon for investment, the European Commission is particularly interested in measures that would fulfil by 2025 the future needs for Internet speed and quality.

The contributions will feed into the design and the implementation of EU policy, regulatory and funding instruments that can contribute to facilitating broadband deployment, including the review of the regulatory framework for electronic communications and the use of public funding.

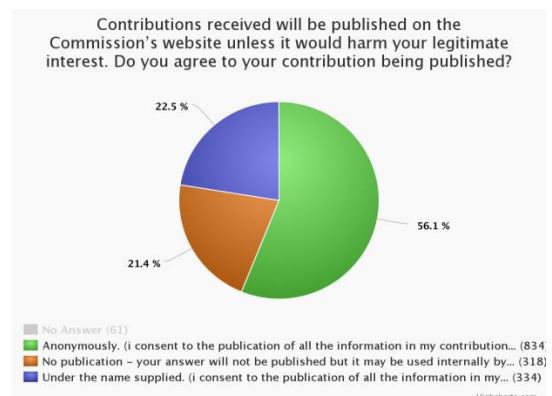
This report analyses the replies to the public consultation.

The online questionnaire had a mix of closed and open questions in 23 EU languages. Out of the 1551 replies, 1546 came through the online questionnaire; 32 respondents sent position papers, reports, factsheets and answered the questionnaire; 11 responded by email¹ out of which 4 did not answer the questionnaire.

The respondents' profile reflects the self-selecting nature of a public consultation and imposes a certain caution when interpreting the results, since the responses cannot be considered as a representative random sample of all European users. The sheer number of respondents is nevertheless indicative of the high interest that this topic raises.

Respondents could opt for:

- publication of their response including their identity
- publication of their response anonymously
- refuse publication while allowing the European Commission to analyse the response



The replies of contributors who agreed to publication are available on [DG CONNECT's website](#).

¹ CNECT-B5-PUBLIC-CONSULTATION@ec.europa.eu

1.2. Methodology of the analysis

All online contributions were analysed when drafting this report, and will be used for further analysis. The consultation was primarily addressed to connectivity users: citizens or organisations. That is why many organisations which did not want to necessarily respond as users sent position papers or similar documents. The European Commission has taken full account of the latter in analysing the contributions to the public consultation. Given the heterogeneity of the documentation received and the difficulty in many instances to link it to specific questions, the European Commission focused on two main aspects for the purposes of this report:

1. the views on connectivity objectives beyond 2020;
2. the views on the need for and the kind of public policy measures.

The other aspects of the contributions are taken into account for further analysis.

Most questions were optional so the percentages below refer to the number of actual respondents to the given questions, not to the total number of respondents to the consultation.

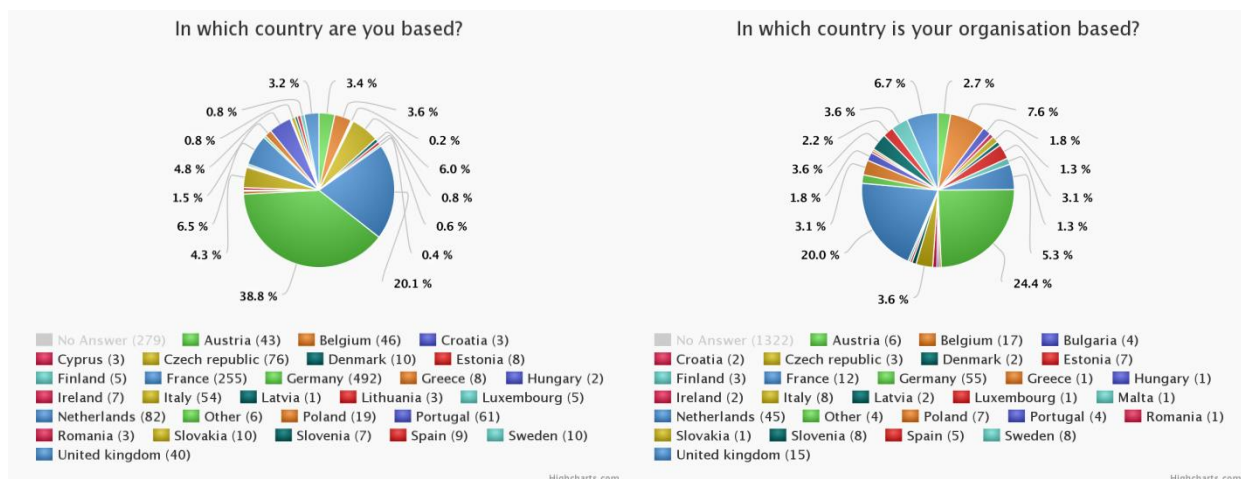
The report follows the structure of the questionnaire. It includes sections on: respondents' profile; expectations for connectivity features; trends in use, access and provision; risks from inadequate connectivity; fulfilment of current and future connectivity needs; need for policy measures.

2. Respondents' profile

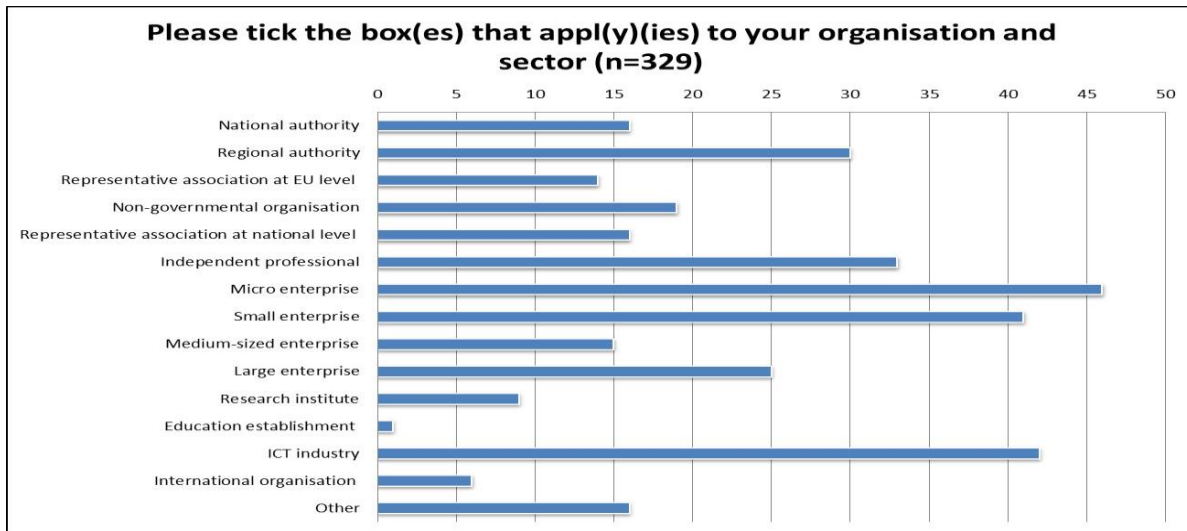
Out of 1551 respondents:

- 1282 replied as individuals in their personal capacity;
- 229 replied as representatives of an organisation;
- 40 did not specify

Respondents contributed from throughout Europe. Some countries were more represented than the average.

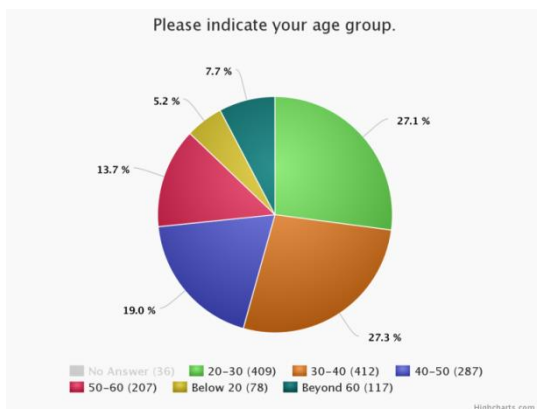


Many types of organisations contributed to the public consultation. Participation from different categories of organisations was overall balanced.



Out of the 1510 respondents who specified whether they are based in an urban, sub-urban or rural area:

- 45% are based in an urban area
- 25% in a sub-urban area
- 30% in a rural area



Out of the 1510 respondents who indicated their age group, 60% are under 40.

Respondents were predominantly active and interested users. 92% of respondents indicated that connectivity is the primary means by which their business is conducted or an important part of their business or activity / an important component of their household activities.

3. Trends in terms of use, access and provision

Overall, users expect the usage of Internet services and applications through both fixed and mobile connectivity to increase considerably by 2025 compared to today.

Some specific trends can be observed from the responses:

- The expected increase will impact mobile more than fixed connectivity.
- Respondents in rural areas have higher expectations than those in cities.
- Organisations' expectations are higher than individuals'.

3.1. Number of devices

A vast majority of respondents were digitally skilled: 71% count over 5 devices sharing simultaneously the same main connection in their organisation / household. This percentage reaches almost 90% for organisations including 72% with over 10 devices sharing simultaneously the same main connection. Devices mentioned are mostly smartphones, tablets, PCs, laptops, video games consoles, TV sets and file storage devices.

85% of respondents think that the maximum number of devices that will share simultaneously the same main connection in their organisation / household will increase (slightly or significantly) by 2025. This percentage reaches 91% for organisations. The emergence of the Internet of Things – of connected devices in the smart home, of wearables etc. – is the main reason for this trend according to respondents.

3.2. Current use of Internet services, applications, content and products

For fixed connectivity, over half of the respondents use continuously text communication (77%), collaborative tools (52%) and data repositories (51%). Voice communication and assistive devices and/or accessible technologies are used at least once a day by respectively 68% and 64% of respondents. Concerning mobile connectivity, over half of the respondents also use continuously text communication (75%) and collaborative tools (56%). Data repository, voice communication and assistive devices and/or accessible technologies are used at least once a day by respectively 64%, 62% and 56% of respondents. Overall, text communication is the service most frequently used: 98% of respondents use it through fixed connectivity at least once a day; 93% through mobile connectivity.

In terms of the frequency of access to content and services, a clear discrepancy arises between content, mostly accessed at least once a day or continuously, and services, accessed by around half of the respondents on a weekly or monthly basis.

In terms of content provision, products and services, no clear trends emerge except for text content provided through both fixed and mobile connectivity, which is used at least once a day (and often continuously) by around 60% of respondents.

65% of respondents (69% for individuals, 43% for organisations) currently use maximum 5 Internet services, applications, content and products simultaneously through the same fixed connection. Likewise, 43% of the organisations (12% of the individuals) use more than 10 Internet services, applications, content and products simultaneously through the same fixed connection.

The Internet applications, content and products most mentioned by respondents include social networks, video games, voice and text communications, music and video streaming, cloud computing and blogs. E-commerce and e-banking are the services most used. Some respondents point out that they cannot currently use many services due to the limited quality of their connections.

3.3. Expected future use of Internet services, applications, content and products

As the table below shows, a (often broad) majority of respondents think that their use of Internet services and applications will increase by 2025 compared to today. This is much more significant for organisations than for individuals. That applies for both fixed and mobile connectivity, but the trend is even more visible for mobile connectivity. Around 90% of the organisations think that their use of a range of Internet services and applications through mobile connectivity will increase by 2025.

How do you think your / your organisation's uses of the following Internet services and applications will evolve by 2025 compared with today?

Types of Internet services, applications, content and products	More used through fixed connectivity by 2025 compared with today			More used through mobile connectivity by 2025 compared with today		
	All	Ind	Org	All	Ind	Org
Data repository (e.g. cloud)	74.7%	74.1%	79.1%	83.1%	81.9%	90.4%
Text communication	49.4%	46.3%	69.4%	70.5%	68.3%	85.4%
Voice communication	57%	55.7%	67%	75.8%	73.6%	90.9%
Video communication	68.3%	67%	78%	78.6%	77.1%	89.5%
Collaborative tools	57.2%	56%	71.2%	73.4%	70.8%	91.5%
Connected objects	76%	76.6%	73.5%	83.5%	82.2%	92.5%
Assistive devices / accessible technologies	70.2%	69.1%	76.3%	81.2%	79.3%	93.9%

Besides, respondents in rural areas expect a slightly higher increase of their use, access to and provision of Internet services, applications, content and products through fixed connectivity. This is particularly the case for the use of communication (text, voice and video) and for the access to content and services.

Over 90% of respondents think that the maximum number of Internet services and applications that they use simultaneously through the same fixed connection will increase (slightly or significantly) by 2025, mostly due to the increasing number of connected devices as well as data processing, data storage and cloud based services. Many stressed the difficulty to predict the future, yet this is in line with both the expected rise of connected devices and the expected increasing use of Internet services, applications, content and products.

4. Expectations in terms of connectivity features

Overall, the results of the public consultation tend to confirm the trends of increasing importance of other features than download speed for both fixed and mobile connectivity. In particular:

- **For fixed connectivity, while download speed is perceived as the most important feature today and in 2025, other connectivity features are expected to gain significant importance in the future: notably upload speed, reliability and uninterrupted access.**
- **For mobile connectivity, most features are perceived today as much less important than those of fixed connectivity, but will become increasingly important in the future.**

The results point to a clear need for improved connectivity features and better quality of service in the future.

4.1. Importance of connectivity features

As the table below shows, all the connectivity features mentioned in the relevant questions are considered very important in 2025 by a majority of respondents (in many instances around three respondents out of four) for both fixed and mobile connectivity, except symmetry for mobile connectivity. The respondents also consider that all the connectivity features will be more (and in some cases, much more) important in 2025 than they are today.

In your view, how important are / will be the following features of fixed / mobile connectivity?

Connectivity features	Fixed / mobile	Considered as very important		
		Today	In 2025	Evolution
Download	Fixed	73%	84.3%	+11.3 pp ²
	Mobile	37.8%	72.9%	+35.1 pp
Upload	Fixed	55.1%	81.2%	+26 pp
	Mobile	31.7%	62.6%	+30.9 pp
Symmetry	Fixed	34.8%	57.6%	+22.3 pp
	Mobile	23%	44.6%	+21.6 pp
Latency	Fixed	49.1%	73.5%	+24.4 pp
	Mobile	29.7%	59.1%	+29.4 pp
Network congestion	Fixed	50.8%	75.3%	+24.5 pp
	Mobile	42.3%	72.8%	+30.5 pp
Resilience	Fixed	51%	74.2%	+23.2 pp
	Mobile	40.4%	67.6%	+27.2 pp
Reliability	Fixed	66.7%	86.8%	+20.1 pp
	Mobile	50.1%	78.8%	+28.7 pp
Uninterrupted access	Fixed	64.2%	86.3%	+22.1 pp
	Mobile	47.6%	77.8%	+30.2 pp
Ubiquity	Fixed	43.1%	70.2%	+27.1 pp
	Mobile	44.3%	74.9%	+30.6 pp

4.2. Needs for connectivity features

As the table below shows, expectations for the quality of service of fixed connectivity in 2025 provides clear results - especially improving download speed (above 1 Gbps) and latency (less than 10 ms). The results are more nuanced when assessing answers concerning mobile connectivity in 2025, but still point to an important need for upgrades.

Which fixed / mobile connectivity features do you think you / your organisation need(s) today/ will need in 2025?

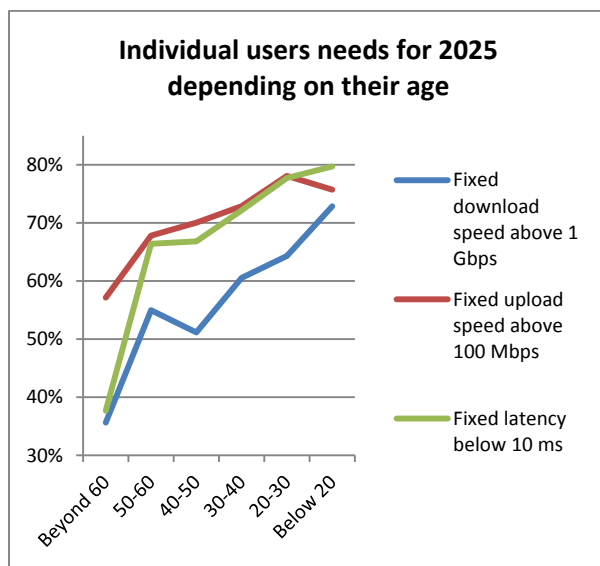
Connectivity features	Fixed / mobile	Most important features (top results only) ³	
		Today	In 2025
Download speed	Fixed	30-100 Mbps (45.9%)	Above 1 Gbps (58.5%)
	Mobile	Below 30 Mbps (53.8%)	100 Mbps - 1 Gbps (34.4%)
Upload speed	Fixed	Below 30 Mbps (45.8%)	Above 1 Gbps (39.1%)
	Mobile	Below 30 Mbps (64.6%)	30-100 Mbps (32.8%)
Latency	Fixed	10-100 ms (51.1%)	Below 10 ms (69.2%)
	Mobile	10-100 ms (38.3%)	Below 10 ms (43.6%)

The following results illustrate the need for improved connectivity features / quality of services in the future:

² Percentage points

³ Due to the design of the tool used for the public consultation, respondents had the possibility to tick more than one answer for the questions related to the importance of connectivity features. While they were supposed to mark only one answer for today and one for 2025, in some cases more than one option for one or both years was marked. We assumed as the correct answer the more demanding answer as e.g. 100Mbps speed includes 30Mbps. Some other respondents marked an answer and "I don't know" option - in such a case "I don't know" was assumed to be the answer.

- 59% of respondents think they will need download speeds above 1 Gbps in 2025 through fixed connectivity; only 8% think they will need download speeds below 100 Mbps in 2025.
- While close to half (46%) of the respondents think that today they need an upload speed below 30 Mbps through fixed connectivity; 97% think they will need upload speed above 30 Mbps in 2025.
- 69% think that they will need latency below 10 ms through fixed connectivity in 2025.
- While above half (54%) of the respondents think that they need download speed below 30 Mbps today through mobile connectivity, 92% think that they will need download speed above 30 Mbps in 2025.
- Two thirds (65%) of the respondents think that today they need an upload speed below 30 Mbps through mobile connectivity but 85% think that they will need an upload speed above 30 Mbps in 2025.
- While less than one respondent out of ten (9%) think that today they need a latency below 10 ms through mobile connectivity, this figure rises to 44% for 2025.



On fixed connectivity, there is a correlation between the level of anticipated need and the age of individual respondents: the younger the respondents, the greater the anticipated need.

4.3. Other aspects of current and future connectivity needs

Respondents were asked to specify relevant aspects of their connectivity needs in free-text open questions that the closed ones had not covered.

A large number recalled the importance of speed and increasingly of upload speeds and symmetry. Some respondents signalled the lack of information on different types of speed.

The vast majority of the respondents emphasized that speed is not the only important parameter to consider:

- A substantial number of respondents emphasize the importance of volume. Large or unlimited data plans are essential for the development of certain applications/services.
- Affordability is another concern especially for individual respondents.
- Some respondents signalled that advanced wireless networks (especially in rural areas) can only be an alternative, not a substitute to fixed broadband connections.
- Some respondents emphasized the importance of a neutral internet access service that allows users to choose the services or content they wish to access.

- The need for harmonised latency requirements is mentioned as a key element for safety related applications in the transport sector but many also single out latency as important in the context of connected cars, the use of other critical networked sensors, internet-video-telephony, etc.
- Integrity is a key feature for railways network maintenance purposes. Some generally quote security.
- For security applications (CCTV) reliability and high performance are key requirements.
- Some respondents signal the importance of low jitter, packet loss and high resilience.
- Some respondents highlight the importance of seamless connectivity between different types of broadband networks, and the need to take into account the likely simultaneous use of different technologies.

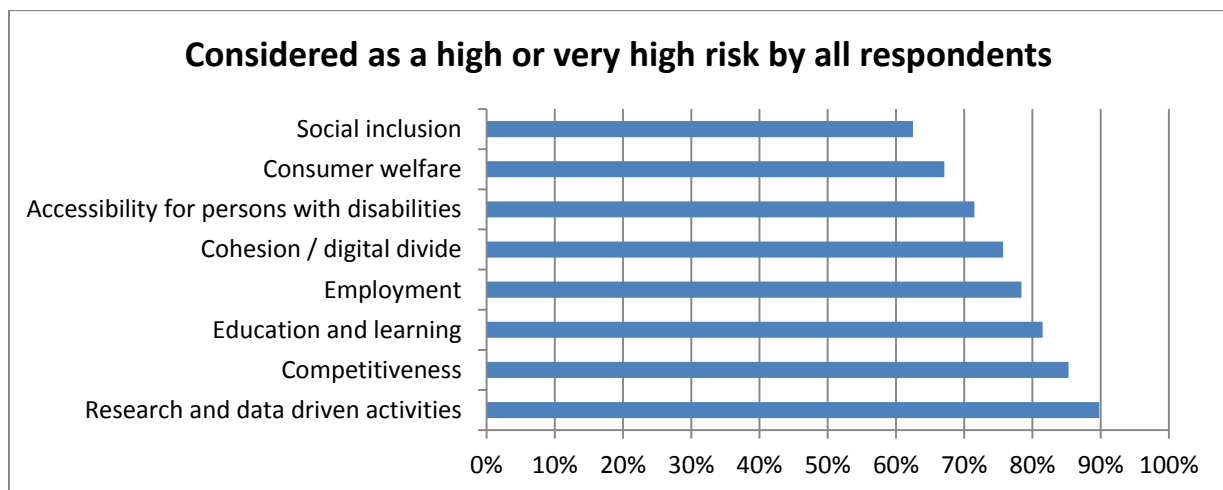
Some respondents warn against dissociating technological and economic factors (affordability and willingness to pay), and call for a cost-benefit analysis that takes both into account. Many respondents recall the importance of other topics such as net neutrality and IPV6.

5. Risks arising from inadequate connectivity

Most respondents share the view that inadequate connectivity may limit or hamper the achievement of the Digital Single Market benefits. Adequate connectivity is seen as a necessary condition to achieve the Digital Single Market's jobs and growth.

Inadequate connectivity is considered a risk or a high risk for several developments perceived as important from the policy perspective. On average, around three quarters of the respondents view connectivity as an enabling factor for employment, cohesion, education and learning, research and data driven activities, consumer welfare, and accessibility.

Do you consider inadequate connectivity as a risk to?



6. Fulfilment of current and future connectivity needs

Overall, most respondents are dissatisfied: half do not consider their current connectivity needs fully fulfilled, a third is very dissatisfied. Respondents are equally split between those who consider that their future connectivity needs will be fulfilled and those who are pessimistic or very pessimistic. In particular:

- **Individuals are more dissatisfied and pessimistic than organisations.**

- The most dissatisfied and pessimistic respondents reside in rural areas.

6.1. Fulfilment of current connectivity needs

According to the responses on current fixed and/or mobile connectivity needs:

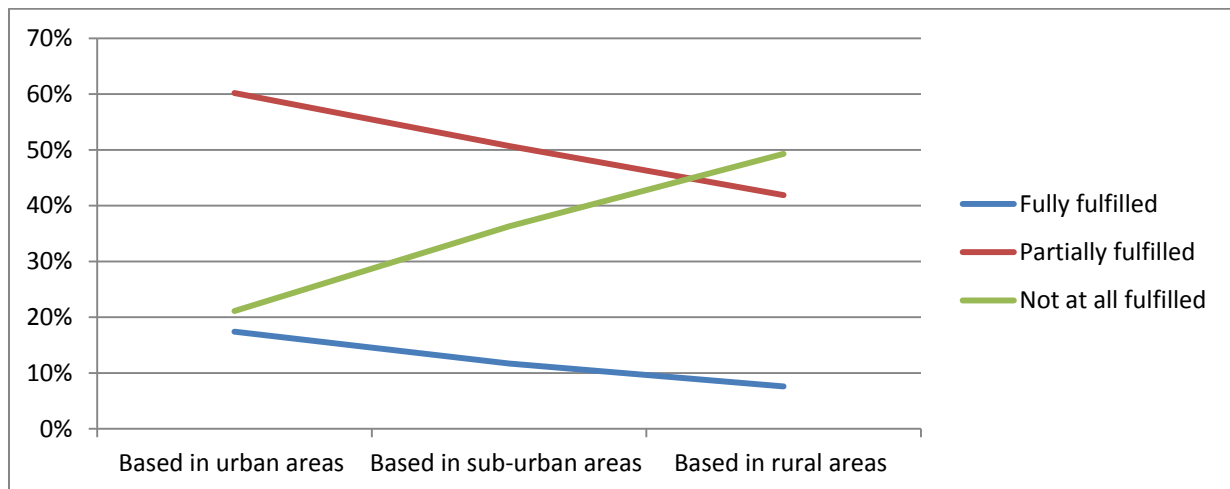
- 13% of respondents consider them fully fulfilled
- 53% of respondents - partially fulfilled
- 33% of respondents - not at all fulfilled

Overall, do you feel that your / your organisation's current fixed and/or mobile connectivity needs are fulfilled?

	All	Individuals	Organisations
Fully fulfilled	13,1%	11,9%	21,6%
Partially fulfilled	52,5%	52,1%	52,6%
Not at all fulfilled	32,9%	34,6%	24,4%
Do not know	1.4%	1.4%	1.4%

The satisfaction level seems to depend on the respondents' location: the more rural the area, the less the current needs are considered to be fulfilled.

Overall, do you feel that your / your organisation's current fixed and/or mobile connectivity needs are fulfilled?



Respondents who think their connectivity needs are partially or not at all fulfilled were prompted to further specify their reply: in the related closed question. Many of the responses illustrate their current connectivity and why it does not fulfil their needs, with many respondents complaining. Many complain about inadequate connectivity and – to a much lesser extent – excessive prices for the connectivity provided.

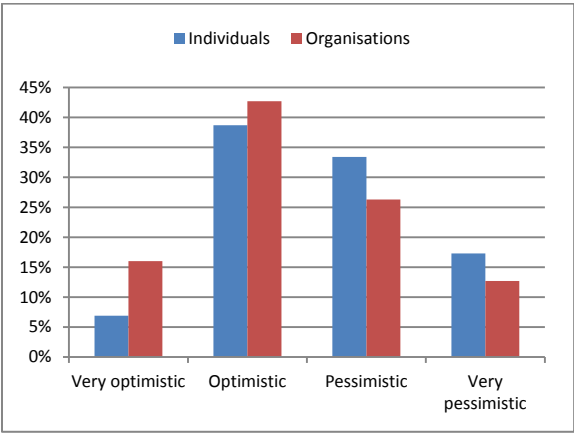
Most contributions call for improved speed and/or quality, primarily mentioning download and upload speed, latency and reliability. Many respondents explicitly ask for fibre connections. Several also specifically highlight the need for better mobile connectivity and broader mobile coverage.

Beyond these main trends, some respondents address a few specific issues i.e. the need to check whether the advertised connectivity matches the actual one, the need for more competition on the market, the need for lower data roaming charges, the need for better connection along transport routes.

6.2. Fulfilment of future connectivity needs

When asked about their expectations on the fulfilment of their connectivity needs in 2025, respondents are 8% very optimistic; 39% optimistic; 33% pessimistic; 17% very pessimistic; and 3% do not know.

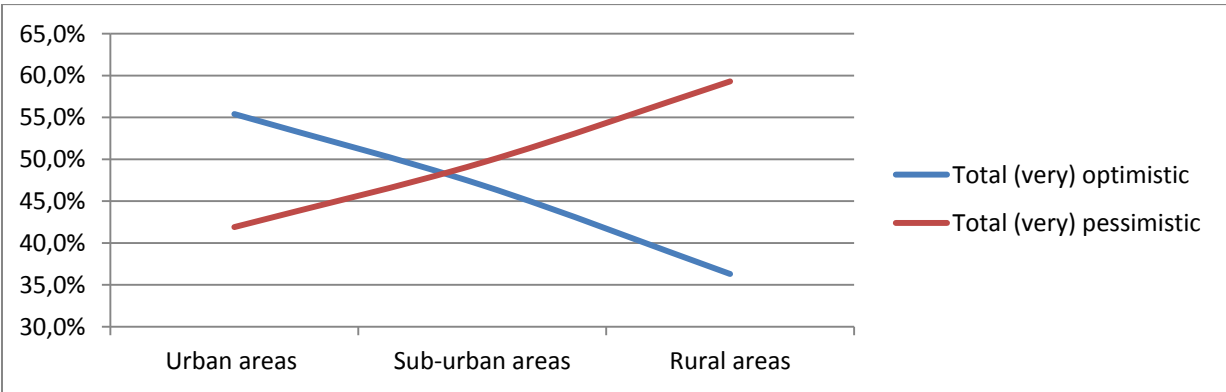
Overall, are you optimistic that your / your organisation's future fixed and/or mobile connectivity needs will be fully fulfilled in 2025?



Overall, organisations are more optimistic than individuals.

Overall, as illustrated in the graph below, respondents based in rural areas are significantly less optimistic than those living in urban areas.

Overall, are you optimistic that your / your organisation's future fixed and/or mobile connectivity needs will be fully fulfilled in 2025?



7. Need for policy measures

The respondents who are pessimistic or very pessimistic about the fulfilment of their future fixed and/or mobile connectivity needs in 2025 strongly call for public policy measures at all levels to promote an adequate infrastructure deployment.

They perceive connectivity as essential infrastructure and call for features and actions typically associated with a utility deployment model i.e. leapfrogging to superior technology, universal coverage, and public involvement.

Among the respondents who are pessimistic or very pessimistic about the fulfilment of their future fixed and/or mobile connectivity needs in 2025, an overwhelming 91% think that measures by public authorities are needed to promote investment in and take-up of connectivity networks and services. In other words, they trust public intervention can and should intervene to help upgrade the networks up to future needs, which include for example already known uses that are expected to very much increase (see section 3) and new uses such as machine generated content, virtual reality content, ambient media, connected and autonomous cars, 5G, healthcare applications, etc..

According to those respondents, the focus of such measures should be on:

1. Households (for 94%)
2. Public use (for 70%)
3. Professional use (for 70%)
4. Particular industrial connectivity needs (for 30%)
5. Some specific sectors (for 25%)

Some respondents stressed the need for public measures when it comes to public use including schools and administrations; others specifically mentioned coverage in rail and metro lines. On the other hand, others called for a more holistic approach, i.e. without distinguishing between different uses.

According to organisations, the focus should be on professional use (82%), then on households (79%), public use (61%), particular industrial connectivity needs (39%) and on some specific sectors (24%).

Concerning mobile connectivity in particular, the focus of public policy measures should be on ensuring:

1. Complete territorial coverage of basic voice and data services (66%)
2. Seamless high-quality experience between different users, devices and wireless objects everywhere (59%)
3. Seamless high-quality experience between different users, devices and wireless objects in populated areas (where people live, work and gather) and along transport routes (40%).

This sends strong messages to the European Commission – and indeed to all public players – as the expectations are quite high and multi-faceted if it is to define a new policy target by 2025.

7.1. Policy measures

Respondents supporting policy measures could specify in an open question, by what means and at what level initiatives should be taken.

Many emphasised:

- A priority on tackling connectivity in rural "white" areas. Many stress that rural areas should not be neglected and ask for public measures to specifically focus on rural areas since this is not attractive for private operators.

- Fibre deployment. Many criticise the upgrade of copper networks, in particular vectoring, and ask for the replacement of copper by fibre.

Concerning the level at which initiatives should be taken, the European and national levels are the two most often mentioned, followed closely by the regional level. In most cases, respondents do not favour any single level, but their combination either because they consider that action is needed at all levels, or because they consider competences vary between levels (e.g. regulating, financing, implementing).

Overall, respondents who advised on specific measures stressed that public authorities could or should take action on:

- Use of public funding / subsidies, especially in remote / rural areas. Some stress that only fibre should be subsidised.
- Use of regulatory tools.
- Roll-out and/or management of networks by public authorities, especially where telecom operators do not deliver / in white areas. Different mechanisms are suggested – notably deploying a publicly owned network leasing it to private operators.
- Recognise connectivity as a universal service / a utility like electricity or water. Overall, respondents who suggested such measure link it to the need to provide rural / remote areas with better connectivity.
- Many respondents call for net neutrality to be ensured.

While there is no specific trend as to which level should tackle those measures, some specific suggestions are addressed to the European level, in particular:

1. to set up European objectives or guidance for the minimum connectivity requirements to be reached;
2. to support local community-led initiatives to deploy broadband, including through regulation.

Many responding organisations that sent documents in addition to or besides the questionnaire expressed wide-ranging views on whether some connectivity objectives should be set up beyond 2020. A small minority of respondents argued against setting further broadband targets, primarily on the ground that it may hinder competition and technological neutrality, claiming that future needs are difficult to predict, and that the investment in connectivity infrastructure should be driven by demand for connectivity on which more effort should be put. On the other hand, others called for specific EU targets beyond 2020, going from 30 Mbps to symmetrical Gigabit connections, from a focus on download speed only to a call for much more connectivity features to be defined, related to quality and not only to speed.

Among those organisations that mention technological neutrality in their position papers, most call for keeping the principle. Some advocate for policy measures to focus on fostering demand for connectivity, some also strongly support market competition and call for policy measures to keep promoting it. Some others ask for support through funding / financing tools, including new financing models such as Public Private Partnerships. As far as white / rural areas are concerned, some respondents ask for policy measures to focus specifically on these, including adapting the regulatory environment (telecom and state aids frameworks) to improve connectivity in market failure areas.

7.2 Additional aspects for future connectivity needs to be fully fulfilled

When asked about what else should be done, respondents primarily call for the roll-out of fibre networks. Many also stress the importance of net neutrality.

Some advocate a number of actions / solutions to increase probability that their future connectivity needs are fulfilled, such as: improved connectivity along transport routes and in transport, including trains; management of networks by public authorities; increased competition; lower prices; more public funding; setting (mandatory) targets; facilitating community-led initiatives, including through regulation.

7.3 Actions for monitoring connectivity in Europe

Respondents were asked what action if any, the European Commission can take to monitor the development and take-up of connectivity in Europe in line with future needs.

Respondents suggest monitoring a wide range of aspects, such as coverage, speed and the match between the advertised and delivered speed, competition and anti-competitive practices, take-up, the evolution of prices, etc.

Many call for the definition – mostly at European, sometimes at national level – of minimum connectivity requirements / standards / targets, e.g. minimum speed to be provided.

On the tools that could be used for monitoring, many call for getting the data directly from the end-users, preferably regularly and in a time-saving way. They suggest for instance regular surveys / consultations, media campaigns to raise awareness or the wide availability of a measurement tool, e.g. a test app.

Some stress that the Digital Economy and Society Index ([DESI](#)) is an appropriate tool to monitor the state of connectivity in Europe. Most of these respondents called for EU monitoring to go into greater detail on the indicators used.