

IMPLEMENTATION AND USAGE OF THE OECD RECOMMENDATION ON BROADBAND DEVELOPMENT

OECD DIGITAL ECONOMY
PAPERS

September 2021 **No. 318**

Foreword

This report on the “Implementation and Usage of the OECD Recommendation on Broadband Development” was prepared by the Working Party on Communication Infrastructure and Services Policy (WPCISP) and informed the review of the 2004 *Recommendation of the Council on Broadband Development* (“the 2004 Broadband Recommendation”). It summarises the outcome of an implementation questionnaire on the 2004 Broadband Recommendation that was sent in early 2019 to delegates of OECD Member countries, Participants and Observers to the Committee on Digital Economy and Policy (CDEP) and the WPCISP. The aim of the questionnaire was to gather information on: i) the usage and implementation of the OECD Recommendation, and ii) national experiences with broadband development in general. The Secretariat would like to thank the countries that replied to the questionnaire. This document provides a synthesis of the 33 responses received.

After the adoption by Council of the *OECD Recommendation on Broadband Connectivity* in February 2021 [[OECD/LEGAL/0322](#)], this report was approved and declassified under the written procedure by the Committee on Digital Economy Policy (CDEP) on 31 August 2021 and was prepared for publication by the OECD Secretariat.

This document was drafted by Maximilian Reisch from the OECD Secretariat. It was prepared under the supervision of Verena Weber.

This publication is a contribution to IOR 1.3.1.2. “Strengthening the foundations for digital transformation” of the 2019-2020 Programme of Work of the CDEP.

Note to Delegations:

This document is also available on O.N.E. under the reference code:

DSTI/CDEP/CISP(2019)3/FINAL

This document, as well as any data and any map included herein, are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area. The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

© OECD 2021

The use of this work, whether digital or print, is governed by the Terms and Conditions to be found at <http://www.oecd.org/termsandconditions>.

Executive Summary

In 2016, the Standard Setting Review Action Plan of the Committee on Digital Economy Policy's (CDEP) listed the 2004 Recommendation on Broadband Development for review and possible revision. To support the review of the Recommendation, an implementation questionnaire was sent out early 2019 to delegates of OECD Member countries, Participants and Observers to the CDEP and its Working Party on Communication Infrastructures and Services Policy (WPCISP). This synthesis report presents a summary of the responses received from 31 countries and 2 stakeholders.¹

Responses to the questionnaire suggested that the review of the Recommendation would be timely and useful, especially in light of continuous developments in technology, broadband markets, and broadband policy and regulation since its adoption in 2004. Although, overall, the Recommendation was still considered relevant and its principles continued to serve as valuable input for policy makers around the globe, respondents provided detailed suggestions as to additional topic areas that could be addressed by the Recommendation. These areas ranged from digital inclusion to incentive mechanisms for broadband deployment.

Responses to the questionnaire were informative and provided valuable input to inform the review of the Recommendation that resulted in the adoption by Council of the revised 2021 *OECD Recommendation on Broadband Connectivity* [[OECD/LEGAL/0322](#)]. Respondents have implemented various measures to further the deployment and the use of broadband networks. Many countries have adapted their monitoring and assessment of the broadband services market based on a changing environment and the convergence of communication services over IP networks. For example, a number of countries were planning – or had already started – to analyse over-the-top (OTT) markets and their potential substitution effects on traditional audio-visual and communication services. In addition to monitoring, assessing, and regulating the supply-side of the broadband market, many governments were also active on demand-side policies. This was reflected in the growing number of countries that had implemented specific policies to promote the adoption of broadband services, as well as in the number of countries that were engaged in monitoring and assessing, for example, broadband affordability.

Feedback from countries with respect to intellectual property, research and development (R&D), privacy and security were not as extensive as on other sections of the questionnaire. A number of respondents viewed that some of these topics were already covered in other OECD legal instruments. This suggested that the content of the Recommendation could be redirected to focus on the main objective of broadband development: spurring connectivity as the basis for digital transformation.

Implementation and Usage of the OECD Recommendation on Broadband Development

Introduction

Broadband plays a critical role in economy and society: it connects consumers, businesses, and governments and facilitates social interaction. Hence, broadband policies are a vital instrument to ensure the competitiveness of OECD Member countries and to address pressing societal concerns. Without connectivity, there is no digital transformation of economies and societies.

With this in mind, the OECD Council adopted the *Recommendation of the Council on Broadband Development* on 12 February 2004 (hereafter “the Recommendation”) [C(2003)259 and C(2003)259/CORR1]. The 2004 Recommendation consisted of a set of ten key policy recommendations, ranging from ensuring effective competition and continued liberalisation of broadband markets, to encouraging investment in new infrastructure recognising the primary role of the private sector in expanding coverage.

At present, broadband development is as critical a topic for OECD Member countries – and beyond – as it was when the Recommendation was adopted. Since 2004, broadband markets, the underlying technologies, and the policies in place to spur the development of broadband networks have undergone significant changes. To ensure that the Recommendation took account of these changes, and in line with the conclusions of the 2008 report “Monitoring the Recommendation of the Council on Broadband Development” [C(2008)51] and the Committee on Digital Economy Policy’s (CDEP) 2016 Standard Setting Action Plan [DSTI/CDEP(2016)8], a review of the Recommendation was undertaken.

The aim of the review was to assess the extent to which the Recommendation had been implemented and to gather insights around new broadband developments, to determine if and how Recommendation would be revised. A key input to this review was the information on the experience of OECD Member countries concerning broadband development, in general, and their experience implementing the Recommendation, in particular.

In order to gather this input, an extensive questionnaire was sent in 2019 to delegates of OECD Member countries, Participants and Observers to the CDEP and its Working Party on Communication Infrastructures and Services Policy (WPCISP), covering a large number of issues around broadband development. Those ranged from experiences with the Recommendation to new topics that could be considered in the review of the Recommendation. The questionnaire was broadly structured around the provisions of the Recommendation. It covered general questions with respect to the experience of countries with the Recommendation. It then continued with questions about the relevance of the Recommendation and issues that should be addressed in the review. The questionnaire was also designed

to gather information about broadband markets, the underlying technologies and broadband policies with respect to supply-side, demand-side, digital divide, intellectual property, R&D, privacy and security issues.

The questionnaire was sent on 8 January 2019 and the Secretariat received responses from 31 countries and 2 stakeholders.² This document provides a synthesis of the responses received. The report follows the structure of the questionnaire, providing key information derived from survey responses. The full questionnaire can be found in the Annex.

Synthesis of Responses to the Questionnaire informing the Review of the 2004 Council Recommendation on Broadband Development

Responses to General Questions

The majority of respondents considered the 2004 Recommendation to continue to be relevant and a number of countries explicitly state that the Recommendation provided guidance or has been a building block for their policy work (Box 1). Others mentioned that their national policy work had generally complied with the Recommendation. One interesting question was raised as to how to increase the usability and dissemination of the Recommendation. With respect to this, one non-OECD Member country stated they were unaware of the Recommendation, and therefore, could not use it. This suggested that more could be done to disseminate the Recommendation, irrespective of any potential need to revise its content. Many European Union member states mentioned that they were aiming to fulfil the broadband targets set by the European Commission for 2020 and 2025, and to implement all related European Union regulations and directives in a coherent manner to meet the targets.

Box 1. Recognition of the Recommendation in national policy

Australia

The Recommendation is consistent with Australia's regulation and policy making. For example, the recommendation on "effective competition and continued liberalisation in infrastructure, network services and applications [...]", is in line with Part XIC of the Competition and Consumer Act 2010. The Act includes non-discrimination provisions that apply to NBN Co., the Government Business Enterprise that is rolling out Australia's National Broadband Network on a wholesale-only basis. Under the Act, NBN Co. must not discriminate between access seekers. Furthermore, when the competition regulator decides to regulate a specific wholesale service, the regulated service needs to be available to all access seekers on a non-discriminatory basis.

Spain

Principles expressed in the Recommendation, such as the promotion of investment in new technological infrastructure and technologically neutral policy to encourage interoperability, have been cited to be at the core of the funding program PEBA-NGA (Programa de Extensión de la Banda Ancha de Nueva Generación) 2013-2019 and the continuation of this National Broadband Plan (NBP) for the period 2020-2022. The Aid Scheme PEBA-NGA was designed to bridge the digital divide as far as basic broadband was concerned and to build next generation access (NGA) facilities in areas where private investment alone is not sufficient. The continuation of the Aid Scheme, for the period 2020-2022, follows the same objective of bringing NGA broadband connectivity in areas where current networks are unable to satisfy the connectivity needs of citizens and businesses.

PEBA-NGA was defined in 2012 in line with EU Commission policy and the Europe 2020 Strategy. The flagship of this initiative, "A Digital Agenda for Europe", acknowledges the socioeconomic benefits of broadband by highlighting its importance for competitiveness, social inclusion and employment. The

PEBA-NGA 2013-2019 programme defined an ambitious objective for these years. This programme accounted for a total budget of EUR 340 million (USD 451.5 million) for this period, and the main objective achieved was to bring 100 Mbps broadband connectivity to nearly five million households in Spain.

The new Aid Scheme PEBA-NGA for the period 2020-2022 has the purpose to provide for very high-capacity networks, at least 100Mbps and upgradable to Gigabit speed, in order to build a Gigabit Society that will ensure the benefits of the European Digital Single Market for all.

Several issues were raised by respondents that were not addressed by the Recommendation, ranging from changes in terminology to the inclusion of additional topics, which may call for a revision of the Recommendation. With respect to terminology, it was suggested to replace, for example, the term “broadband services” by “digital services” or the term “broadband” by “superfast broadband”.

One country stated that the role of operators and content providers would have to be considered in the review as the Recommendation was written before the app economy took-off, and therefore, seemed to be based on the idea that operators would be the main providers of content and services. However, the “IP-ification” of networks, in combination with the digitalisation, means that all types of content is nowadays available over broadband networks and new players have entered the market.

A large number of countries pointed to the importance of including digital divide issues, especially with respect to affordability and accessibility as well as improved connectivity in rural and underserved areas. This could also include the promotion of ICT skills or guidance on the deployment of fixed wireless services or satellite technologies to extend coverage in rural and remote areas.

Many countries advocated for the inclusion of recommendations on incentive mechanisms for broadband development. This includes also the role of governments and potential government interventions in infrastructure development and deployment where private sector engagement is not sufficient, and guidance with respect to infrastructure sharing. Another topic raised was the closure of legacy networks and the role public policy should play in phasing out these networks.

It was suggested that the 2004 Recommendation had been formulated in a very general manner and that some more specific, technical guidance would be desirable. Additionally, some countries mentioned the need for guidance on network neutrality issues.

Some countries suggested that the baseline speed for broadband should be reviewed periodically in the modified Recommendation. However, baseline speeds to define broadband services vary heavily across countries. On the one hand, this stems from countries not explicitly implementing definitions, but targets. On the other hand, different stages of broadband development lead to different baseline speeds. Korea for example categorises broadband services into “High Speed Internet” (download speed of 100 Mbps or below), “Giga Internet Service” (download speed over 100 Mbps and below 2.5 Gbps), and “10 Giga Internet Service” (download speed over 2.5 Gbps), while the current OECD reference baseline speed is 256 Kbps.

A narrow majority of countries indicated that it would not be helpful to include the monitoring of Quality of Service (QoS) indicators in any revision of the Recommendation. Two countries that did not support the monitoring of QoS indicators stated that issues related to QoS indicators are too specific, and therefore, this topic goes beyond the scope of the Recommendation. Another country noted that any increase in the amount of data that has to be collected would have to be well justified. One country that advocated for the inclusion of QoS indicators stated that these policies should be established in each country by the appropriate authority (e.g. communication regulators, ministry or other government authority), and should be monitored when needed. This country put forward that including QoS monitoring in the Recommendation would consequently help the development of QoS policies in different countries.

Regarding the need for further reporting to Council on the implementation of the Broadband Recommendation, independently from the question of whether its content should be revised, respondents had very diverse views. A majority of countries either considered the current reporting to be sufficient or did not provide an answer. One country suggested a yearly reporting, while another suggested a report every other year, in conjunction with the preparation of the Digital Economy Outlook. Two other countries preferred a report at least every five years. A minority of countries considered any further reporting not to be relevant or did not see its benefits.

Supply-side Policies

This section reviews the experience with supply-side policies and regulation such as the promotion of investment in broadband infrastructure and the promotion of competition. Box 2 summarises the supply-side principles of the Recommendation.

Box 2. 2004 Broadband Recommendation: Supply-side Policies

Recommendations

- Effective competition and continued liberalisation in infrastructure, network services and applications in the face of convergence across different technological platforms that supply broadband services and maintain transparent, non-discriminatory market policies.
- Policies that encourage investment in new technological infrastructure, content and applications in order to ensure wide take-up.
- Technologically neutral policy and regulation among competing and developing technologies to encourage interoperability, innovation and expand choice, taking into consideration that convergence of platforms and services requires the reassessment and consistency of regulatory frameworks.
- Recognition of the primary role of the private sector in the expansion of coverage and the use of broadband, with complementary government initiatives that take care not to distort the market.

In general, countries have implemented a wide range of regulations and policies to promote broadband deployment. Box 3 presents Ireland as an exemplary case for a European country. Responses suggested that countries took measures to embrace the convergence of digital services over the Internet to promote competition in the provision of broadband infrastructure and services. Many countries indicated that regulations and policies have led to a competitive environment in their communication sector. One country stated that instead of implementing new regulations and policies, it focuses on removing regulatory barriers that may hinder the free market economy.

Box 3. Measures taken by Ireland to promote broadband deployment

In line with the European Union's Broadband Cost Reduction Directive (Directive 2014/61/EU), Ireland has adopted regulation on the reduction of costs of deploying high-speed public communication networks. The regulation aims to facilitate and incentivise the deployment of high-speed communication networks by reducing its cost. It includes measures, such as the sharing and re-use of existing physical infrastructure. These measures are expected to create conditions for a more cost-efficient network deployment.

In line with the European Commission's list of Recommended Markets, Ireland regulates a number of markets at the wholesale level, to protect competition.

In addition, the new European Electronic Communications Code (EECC) attempts to promote further deployment of very high capacity networks (VHCN). Among others, the code will allow national regulatory authorities (NRA) to refrain from imposing obligations on operators designated with Significant Market Power (SMP), in some circumstances, for example, where co-investment in very high capacity networks is present. The deadline to transpose the EECC into Irish law was 21 December 2020.

Many countries indicated that their regulatory or policy measures might have increased investment beyond of what might be expected otherwise. Some countries enabled additional investments through special opportunities to finance investments in infrastructure, such as preferential loans. Other measures included relaxing foreign investment restrictions or other legal barriers to investments. Some countries, such as the United States, mentioned that some of their policies have led to savings that could be used by operators to undertake investments (Box 4).

Box 4. Initiatives to increase investments in broadband infrastructure

Japan

In Japan, the government issues guarantees for debt financing through the *Temporary Measures Act for Telecommunications Infrastructure Improvement* in order to enable the funding of investments required by the private sector for its improvements of the communication infrastructure. In addition, the Ministry of Internal Affairs and Communications (MIC) has been aiming to improve communication regulations taking into consideration appropriate investment costs. For instance, optical fibre local loops owned by the dominant carriers NTT East/West have been unbundled and opened for other operators under an interconnection regulation since 2001. In this regulation, a certain level of profit is allowed when calculating the interconnection fee, but future cost reductions and demand increases are also considered.

United States

In 2018, the FCC focused on creating smart infrastructure policies to enable next-generation broadband. First, the FCC updated its approach to the federal historic and environmental rules that govern the buildout of broadband infrastructure for small cells to enable 5G technology. Second, the FCC examined impediments to infrastructure buildout imposed by city and state governments and pushed to limit government charges for siting small cells in rights-of-way. The estimated savings of these two regulatory measures was USD 3.6 billion, that could be re-invested in new towers and poles.

Respondents had diverse views with respect to the question on whether wireless and fixed broadband services are considered complete (perfect) substitutes or partial (imperfect) substitutes, complements or separate markets in the respective countries. In Austria, for example, fixed and mobile broadband services are considered substitutes in the residential segment. At the same time, in Belgium, fixed and mobile broadband are not considered as substitutes in competition law. In Brazil, these services are regarded as being complementary. In France, wireless and fixed broadband are considered to be separate wholesale markets. However, in Estonia and the United States, wireless and fixed broadband are considered partial (imperfect) substitutes. Nevertheless, many respondents noted that the market structures might change with the deployment and expansion of 5G networks.

With respect to network neutrality, the majority of countries had put in place regulations and/or laws. For example, European Union member states have to follow the provisions on net neutrality that are set out in Regulation (EU) 2015/2120 on open Internet access. In Switzerland, parliament has put in place network neutrality provisions in the context of a revision of the Swiss telecommunications act (22 March 2019). Other countries, as for example the United States, aim to improve transparency about network management practices by companies and oblige companies to disclose information on these practices. A minority of countries that provided a response to the questionnaire, such as for example Costa Rica and Turkey, had no specific network neutrality measures.

In general, countries considered access to passive infrastructure and rights of way as highly relevant. Germany, for example, stated that the shared use of passive infrastructure is very important for broadband development. Through the shared use of passive infrastructure, the costs for broadband deployment (e.g. civil engineering) can be significantly reduced by addressing inefficiencies and using existing passive infrastructure. With the exception of Luxembourg, for which rights of way have presented no major interest nor impact in the past, many countries had implemented regulations and/or rules with respect to passive infrastructure and rights of way. Box 5 shows measures implemented in Korea, a country that regards passive infrastructure and rights of way as indispensable to broadband deployment, and in Canada, where rules and regulations that exist with respect to passive infrastructure occur at different levels of government, depending on the asset class in question.

Box 5. Passive infrastructure and rights of way in Korea and Canada

Korea

In Korea, an operator's right of infrastructure installation (e.g. use of land) is defined in the Telecommunications Business Act (Chapter V). The obligation of providing telecommunication facilities (Telecommunications Business Act, Article 35-2) and joint establishment (Telecommunications Business Act Article 63) have been defined in laws to promote competition and an efficient use of communications resources. An operator who possesses facilities that are indispensable for a provision of telecommunication services has an obligation to provide (lease) facilities such as for poles, pipes, and cables, upon the request of other operators. Additionally, when building facilities, key communication operators have the obligation to negotiate with one another to decide whether they will jointly establish the facilities.

Canada

In Canada, rules and regulations that exist with respect to passive infrastructure occur at different levels of government, depending on the asset class in question. In October 2018, the Government of Canada together with provincial-territorial levels of government agreed to the principles of a Canadian broadband strategy, including addressing deployment barriers that can help reduce the cost of digital infrastructure expansion, such as facilitating access to passive infrastructure. Additionally, a Government's Terms of Reference document to an expert panel, established to modernise Canada's communication legislation, notes the importance of passive infrastructure and ensuring effective governance is in place.

Note:
Source:

On over-the-top (OTT) markets, the replies suggested that a number of countries were planning or had already started to use methodologies to analyse such markets and their potential substitution effects on traditional audio-visual and telecommunications operators. Some countries, as for example Belgium and

Italy, consider OTTs in their market analyses. Other countries, such as Germany and Colombia, developed methodologies to assess potential substitution effects of OTTs and published the results. A minority of countries explicitly said they were not planning to monitor respective markets and substitution effects. However, a number of countries did not provide an answer.

Most respondents agreed on the principle of technology neutrality. Consequently, many of the respondent countries integrated the principle of technology neutrality into their legislative process. However, a number of respondents also stated that in certain parts of the transmission network, fibre technology deployment is encouraged through government support. Hungary noted that the support for fibre does not necessarily violate the principle of technology neutrality, as any forward-looking technology solution, including the development of mobile networks, is based on fibre optical networks, and new solutions based on copper or coaxial systems are not offered.

A majority of respondents agreed on the need for regulatory frameworks to be consistent across all networks. As the International Telecommunications Users Group (INTUG) stated in its response, consistent regulatory frameworks are critical for all sizes of business users seeking to harness communications internationally to participate fully in the digital economy. INTUG further stated that inconsistent regulatory environments make the full deployment of innovative applications and the removal of legacy systems more expensive and time consuming and in some cases invalidate the business case for implementation. Nevertheless, some countries such as Argentina, Brazil, and Costa Rica noted that there are exceptions made to general regulatory frameworks. In Costa Rica for example, each market is analysed independently, and the regulation depends on the existing conditions of the market, as some markets are more developed or mature than others. Colombia noted that the increasing convergence of services on data networks makes it more and more difficult to have a standardised regulatory framework. Given that the substitution among services is not perfect and that the technical means of provision is vastly different, diverging regulatory needs arise.

The synthesis of the questionnaire responses suggested that in the majority of countries, the private sector has been the main driver for broadband development. In many countries, private sector investments are complemented by governmental or community support. Box 6 shows how private sector engagement has been complemented by government initiatives in Lithuania through the Law of Electronic Communications. In Austria, for example, the private sector is the main driver for broadband development. However, there have been numerous initiatives by communities and/or regional administrations to roll out fibre networks in underserved areas, partly financed by state aid. An increased level of government involvement can be found in Estonia and Luxembourg. Estonia fosters public-private partnerships to develop fibre optic backhaul network in rural areas. State aid has been given to NGOs set up by telecom operators to build and manage the network as a service of general economic interest. In Luxembourg, the incumbent is the main driver for investments in fibre roll out. The state runs the incumbent as a fully publicly owned company. In some countries, public-private partnerships (PPPs) are used to deploy broadband. For example, this is the case in Greece for a flagship ultra-fast broadband project with a budget of EUR 700 million (USD 773 million). The European Union in its 5G Action Plan is also relying on PPPs to deploy 5G infrastructure.

Box 6. Broadband development in Lithuania

In Lithuania, the private sector has been the main driver for broadband development. This is also put forward at the legislative level. The Law of Electronic Communications sets the main principle, that the “State shall develop broadband infrastructure in areas where they do not exist, or where there is no competition in the provision of broadband services. Public broadband infrastructure development shall be coordinated and implemented by the institution authorised by the Government.” (Article 37.6).

Thus, publicly owned broadband networks are developed in Lithuania only in the areas where market failure exists that results in the absence of broadband infrastructure and services (specifically – in remote, rural areas).

In order to safeguard competition, public finance is used to build networks in underserved areas, but the networks are then used to provide wholesale services to retail operators, who, in turn, provide services to end users.

With respect to the advertisement of broadband services, some countries have applied guidelines or regulation, i.e. guidelines and regulation that go beyond competition law and respective provisions about misleading representations. In Belgium for example, a decision of the Belgian Institute for Postal services and Telecommunications (BIPT) from 2017 determined how the minimum, usually available, maximum and advertised download and upload speeds are specified in the contracts of the Internet Service Providers (ISPs). In Sweden, there has been voluntary agreements regarding how to market speed tiers for mobile services.

Only a small number of respondent countries indicated their predominant approach to fixed broadband market structure with respect to different types of operators. In the majority of cases, countries categorised their approach as end-to-end platform based infrastructure competition and/or with the requirement for unbundling or other open access/network sharing. In the United States, for example, telecommunication carriers have a duty to interconnect with other telecommunication carriers under the Telecommunications Act (TCA). Incumbent local exchange carriers (ILECs) are obligated to (i) interconnect with competing local exchange carriers (CLECs) on reasonable terms; (ii) make unbundled network elements available to CLECs on just, reasonable, and non-discriminatory terms; or (iii) make any service the ILEC offers at retail available to CLECs at a reasonable discount (Section 251). In recent years, the FCC has been taking a lighter approach through regulatory forbearance. Functional and structural separation has recently taken place in Mexico and the Czech Republic. In the latter case, the structural separation was voluntarily.

Digital Divide Policies and Demand-side Issues

This section reviews the experience with demand-side policies such as the promotion of extending broadband access and the positive effects of access to broadband networks. Box 7 exhibits the principles of the Recommendation with respect to bridging the digital divide and demand-side approaches.

Box 7. 2004 Broadband Recommendation: Digital Divide and Demand-side Approaches

Recommendations

- Both supply-based approaches to encourage infrastructure, content, and service provision and demand-based approaches, such as demand aggregation in sparsely populated areas, as a virtuous cycle to promote take-up and effective use of broadband services.
- Policies that promote access on fair terms and at competitive prices to all communities, irrespective of location, in order to realise the full benefits of broadband services.

The questionnaire results suggested that many countries conduct impact assessments of the effect of broadband access on economic growth and/or social well-being. While some governments conduct their own research, others rely on academic research or get private consulting firms involved. In general, the effect of broadband access on growth and well-being has been positive. However, approaches and observed variables vary with the respective impact assessment. In Turkey for example, in order to prepare the 2015 – 2018 Action Plan and Information Society Strategy, it was estimated that with an investment of USD 16 billion in network infrastructure over ten years, an additional GDP growth of between 0.13% and 0.41% could be achieved. In Korea, the impact assessments of the effect of Internet access on rural areas in 2017 show that the deployment of Broadband networks in rural areas saved KRW 28 billion (USD 24 million) in costs and increased people's incomes by KRW 132.45 Billion (USD 112 million). Additionally, there is evidence that the reduction in information gaps had large positive impacts on social and cultural aspects.

Some countries mentioned using specific policies to promote the expansion of broadband access and spur demand. In Hungary, for example, the VAT on Internet services decreased from 27% to 18% in 2017. This measure represents a 7-10% retail price reduction, which altogether represents FT 13-15 billion (USD 43 – 50 million) savings for Hungarian citizens. Some countries (e.g. Switzerland, the Slovak Republic, and Latvia) explicitly stated that they do not implement measures to stimulate demand for broadband access. Latvia argues that there are more and more governmental and private e-services, such as banking services, tax declaration services and many others available. These services play an important role in increasing the demand for broadband services.

A number of countries mentioned demand aggregation as a measure to facilitate deployment. Some countries mentioned that demand aggregation is a tool used by the private sector. Other countries mentioned demand aggregation as a tool used by municipalities, however not on the state level. In Canada for example, there are rural municipalities using a soft form of demand aggregation to publicise and document the demand in their communities for improved QoS.

A majority of countries answered that they measure affordability or at least monitor broadband prices. While some of the countries monitor their national broadband prices, others rely on the measurements of the International Telecommunication Union (ITU) to compare broadband affordability. For European countries, the European Commission includes a price index in its Digital Economy and Society Index (DESI). The Broadband Price Index measures the prices of twelve representative fixed broadband baskets as the percentage of household income. The baskets include three speed tiers (12-30 Mbps, 30-100 Mbps and at least 100 Mbps) and four types of products (standalone Internet, Internet + TV, Internet + fixed telephony and Internet + TV + fixed telephony). Furthermore, Brazil, Colombia, Finland, the Slovak Republic, Turkey and the United States review affordability on a periodical basis. Belgium and Canada are among the countries that monitor prices but does not measure affordability. The Australian Competition

and Consumer Commission (ACCC) is required to monitor and annually report on communication charges paid by consumers (under section 151CM of the Competition and Consumer Act).

The majority of countries have policies in place that promote access on fair terms and at competitive prices to all communities, irrespective of location. Some countries, such as Sweden and Latvia, highlight that fair terms and affordable prices are achieved through competition. In some countries, for example in Brazil, access on fair terms and competitive prices was promoted through the National Broadband Programme (PNBL), which aimed to expand the use and provision of information and communication technology goods and services, to increase access to broadband services, promote digital inclusion, and reduce social and regional inequalities, among other goals for society. In June 2011, the Terms of Commitment were signed between the Ministry of Communications, the National Telecommunications Agency and the operators. By the end of 2016, when the Program ended, more than 5 000 Brazilian municipalities were served through retail offers. Additionally, broadband is included or under consideration for inclusion in universal service policy in a large number of countries that responded to the respective question. In the European Union, the European Electronic Communications Code was adopted in December 2018 (Directive EU 1972/2018), and had the deadline to be transposed into national law by all European Union Member countries by December 2020. The Directive aims at ensuring that all European Union consumers, regardless of their location or income, are connected to be able to participate in the digital economy and society. The aim of these provisions is to ensure that universal service broadband and voice communications be available to all end-users at affordable prices. In addition, broadband connections must have sufficient bandwidth to support important online services used by the majority of consumers (e.g. Internet banking and e-government services). Box 8 presents the case of universal service provision in Austria.

Box 8. Universal service in Austria

The Austrian Telecommunications Act defines universal service as the provision of a minimum set of public services to all users at an affordable price, regardless of their place of residence or work. It includes access to a publicly available communication network and to a publicly available telephone service via which last mile equipment can also be operated, including the transmission of data at rates that allow for functional Internet access. However, there is no designated universal service provider anymore, because connection to a public communications network is provided by the market under competitive conditions.

The large majority of respondent countries have national broadband targets. However, as with baseline speeds, broadband targets vary significantly across countries, as different stages of broadband development lead to different targets. Some countries aim for short-term targets while others define long-term targets (5-10 years). In Norway, 90% of households should have access to 100 Mbps by the year 2020. In Germany, for example, the Network Alliance for a Digital Germany, initiated by the Federal Ministry of Transport and Digital Infrastructure, as well as the Federal Ministry for Economic Affairs and Energy, postulated gigabit networks for Germany until 2025 ("Zukunftsoffensive Gigabit-Deutschland" and "Digitale Strategie 2025"). The German coalition parties agreed on the target to provide the population with at least 1 Gbps until the end of 2025. Some countries aim for several targets and different groups of households and businesses. For example, Sweden set targets for 2020, 2023 and 2025, respectively. In 2025, 98% of all Swedish households and businesses should have access to 1 Gbps, 1.9% should have access to 100 Mbps and 0.1% should have access to 30 Mbps.

Broadband Infrastructure Market Assessment**Box 9. 2004 Broadband Recommendation: Market Assessment****Recommendation**

Assessment of the market-driven availability and diffusion of broadband services in order to determine whether government initiatives are appropriate and how they should be structured.

The questionnaire responses suggested that not all countries undertake assessments comparing their broadband prices with other countries. If countries undertake respective studies, they sometimes use external suppliers. OECD baskets are cited by over a third of countries either to be the reference in terms of methodology, or to be a source that is considered when prices are compared. In addition, the European Commission asks a contractor to carry out a yearly assessment of mobile and fixed broadband prices for all European Union member states. Two separate studies (one for fixed and the other one for mobile broadband), compare the pricing performance of the European Union with other economies, such as the United States, Japan, Korea, and Norway. The contractor of the European Commission uses the OECD price basket methodology. The studies of the European Commission additionally include baskets based on market research and recent developments to further present a representative assessment of broadband prices across Europe, which are comparable between the different European member states and other countries. The European Commission is considering re-assessing the methodology and merge both studies into a single one based on a household baskets' approach.³ On the other hand, Korea, for example, does not carry out its own studies on comparisons of broadband prices, but uses the OECD Broadband Portal to compare Korean prices to those of other countries.

The majority of countries that answered the question on which key indicators they collect undertake analyses of subscriptions, geographical coverage, population coverage, prices, and QoS. Table 1 summarises how often indicators have been stated to be collected by the countries that provided a response.

Table 1. Key indicators on coverage, subscriptions and prices

	Subscriptions	Geographical Coverage	Population Coverage	Prices	Quality of service (downstream speed)	Data usage (downloaded)	Household surveys: Internet usage by households
Incumbent telecommunication operators	92%	68%	60%	60%	80%	48%	40%
Cable broadband operator (Yes/No)	88%	72%	60%	52%	76%	40%	40%
New entrant fixed network (Yes/No)	88%	64%	60%	52%	68%	36%	36%
National broadband network (Yes/No)	60%	60%	55%	30%	50%	30%	30%
Municipal networks (Yes/No)	40%	50%	45%	35%	35%	15%	15%
Cellular wireless operators (Yes/No)	80%	64%	68%	60%	72%	60%	48%

Note: Percentages indicate how often the 25 countries that completed the table in Question 4.2 of the questionnaire answered with "Yes". Blank spaces have been counted as "No". Percentages for "National broadband network" and "Municipal networks" exclude five countries that explicitly stated that the categories are not relevant to their countries.

Intellectual Property and Research and Development (R&D)**Box 10. 2004 Broadband Recommendation: Intellectual Property and R&D****Recommendations**

- Regulatory frameworks that balance the interests of suppliers and users, in areas such as the protection of intellectual property rights, and digital rights management without disadvantaging innovative e-business models.
- Encouragement of research and development in the field of ICT for the development of broadband and enhancement of its economic, social and cultural effectiveness.

The majority of respondents did not provide answers to questions concerning the principles on intellectual property and R&D (Box 10). This could be due to intellectual property and R&D not being directly linked to broadband policy and regulation and its core issues. Nevertheless, some countries mentioned some of the challenges that arise to ensure protection of intellectual property rights and other digital rights while avoiding to disadvantage innovative e-business models. Some countries, for example Austria and the Czech Republic, mentioned that it is important to find a proper balance between protecting intellectual property rights and fundamental freedoms, on the one hand, and protecting legitimate business interests of commercial users, on the other hand, while keeping up with technological developments. Other countries, such as Colombia, highlighted the global nature of the enforcement fight against online piracy, which requires multilateral cooperation. The majority of respondents did not provide information with respect to initiatives that have encouraged ICT R&D for the further development of broadband and enhancement of its economic, social and cultural effectiveness. Countries that provided an answer, engage in a number of different activities to encourage R&D in ICT. These activities range from regulation and policies on patents to education programmes on ICTs and government funded testing of technologies (Box 11).

Box 11. ICT R&D in Canada and the Czech Republic

Canada

The Government of Canada has recognised the potential of 5G to stimulate innovation by investing in ENCQOR. ENCQOR stands for “Evolution of Networked Services through a Corridor in Quebec and Ontario for Research and Innovation.” The ENCQOR project, led by five anchor companies—Ericsson, Ciena Canada, CGI, IBM Canada and Thales Canada—engaged large and small companies, academia and not-for-profits. Its goal was to establish a strategic large-scale technology demonstration project. This project included a pre-commercial digital testbed—a virtual living lab—to advance the development of 5G networking solutions and next-generation technologies and applications. The aim was to allow Canadian companies and researchers in Ontario and Quebec to test innovative ideas and solutions.

Czech Republic

The Ministry of Industry and Trade of the Czech Republic implemented a programme called TRIO, focused on the development potential of the Czech Republic in the area of key enabling technologies (KETs). Through this programme, projects focused on R&D in the field of ICT were encouraged. The Ministry of Industry and Trade of the Czech Republic was preparing a new programme (TREND) to support industrial research and experimental development focused on initiative Industry 4.0 and KETs. Digitalisation was one of the programme’s objectives.

Privacy and Security

Box 12. 2004 Broadband Recommendation: Privacy and Security

Recommendation

A culture of security to enhance trust in the use of ICT by business and consumers, effective enforcement of privacy and consumer protection, and more generally, strengthened cross-border co-operation between all stakeholders to reach these goals.

The questionnaire results suggested that the majority of countries believe that privacy and security issues are sufficiently covered by the existing OECD Privacy and Security Recommendations.⁴ While the majority of countries did not provide responses to this section, some respondents provided constructive input on how the current recommendations in the area of privacy and security could be improved. INTUG, for example, stated that there are still many areas which are not satisfactorily covered by current recommendations, and that there remains a degree of uncertainty as businesses have to cope with differing and, at times, contradictory regulations in different countries. In addition, INTUG stated that well-known examples of security breaches, and either inadvertent or deliberate transfers of personal information to third parties, may point to the fact that existing recommendations might be insufficient, or might not be held in sufficient regard to prevent occurrence.

Annex A. Questionnaire on the 2004 Broadband Recommendation

General Questions

1. Is the Council Recommendation still relevant?
2. If still relevant, should the Recommendation nevertheless be modified and, if so, what issues should the revision address? Are there issues you believe are less relevant today?
3. If still relevant, should there be any further reporting to Council on its implementation and, if so, under what timeline?
4. Can you indicate the most important developments in your country that made use of the Recommendation? Are aspects covered by the Recommendation also covered in regulation and policy in your country without referring to the Broadband Recommendation?
5. If the Recommendation has not been used or is not considered relevant, please indicate the reasons why.
6. If the Council Recommendation is to be modified, should the modified recommendation include that the baseline speed for broadband should be periodically reviewed? Do you have a baseline speed for download and upload speeds to define broadband in your country? Please indicate the current baseline speeds.
7. Should the Council recommendation include the monitoring of additional quality of service indicators?
8. Please provide any other comments you would like to make in relation to the Council Recommendation and on broadband developments in your country or internationally.

Supply-side Policies

9. Are there regulations and/or rules your country has implemented in order to promote broadband deployment?
10. Are there any initiatives or approaches in your country you believe have increased infrastructure investment over and above what would otherwise have been expected?
11. How has your country taken advantage of convergence of digital services across the Internet to promote competition in the provision of broadband infrastructure and services?
12. How is the level of competition in the provision of broadband access? Is the market for fixed respectively mobile/cellular/wireless broadband access characterised by efficient competition in the provision of retail services? How is the level of competition on the wholesale market for fixed respectively mobile/cellular/wireless infrastructure?
13. Are wireless and fixed broadband considered complete (perfect) substitutes or partial (imperfect) substitutes, complements or separate markets in your country? How do you see this changing over the next 5 to 10 years? What effect would the competitive substitution have for competition analyses in your national market?
14. Are there regulations and/or laws in place in your country with respect to net neutrality?
15. How important are passive infrastructure and rights of way for broadband development? What regulations and/or rules are currently in place with respect to them?

16. Does your country contemplate or started to use methodologies to analyse over-the-top (OTT) markets and their potential substitution effects on traditional audio-visual and telecommunications operators?
17. Does technological neutrality remain a good practice or do governments need to promote some types of technologies (e.g. fibre, 5G)? Are there any particular policy initiatives on fibre or 5G? If yes, does this create tensions with the principle of technological neutrality?
18. Do regulatory frameworks need to be consistent across all networks and services or are there exceptions?
19. Has the private sector been the main driver for broadband development in your country or have other approaches been used such as municipal or publicly owned networks? Does your country foster public-private partnerships to deploy broadband? If yes, do you have examples of sustainable partnerships?
20. Has your country utilised public funds to extend connectivity? If yes, was it restricted to specific areas (e.g. rural areas) in your country? Could you please indicate the amount of public investment?
21. Have guidelines or regulation been applied in your country on the advertising of broadband services (e.g. the advertisement of broadband speed, advertisement on the cost of handheld mobile devices)?
22. Has your country put in place regulations and/or laws with respect to white spaces or community (rural) networks?
23. If you were to categorise your country's predominant approach to fixed broadband market structure, where would it be placed in the following table for fixed networks (more than one indication is possible):

Table 2. Predominant approach to fixed broadband market structure

Please add some text and links where relevant

	End to end platform based infrastructure competition	Unbundling or other open access/network sharing requirement	Functional separation	Structural separation
Incumbent telecommunication operator(s)				
Cable broadband operator				
New entrant fixed network				
National broadband network				
Municipal networks				

Digital Divide Policies and Demand-side Issues

24. Have you conducted impact assessments of the effect of broadband access on economic growth and/or social well-being?
25. Are there any specific policies used in your country which have effectively promoted the expansion of broadband access as well as demand? Did you carry out studies on the impact of such policies? If so, please identify the studies and summarise their key findings.

26. Has demand aggregation been a tool used in your country to facilitate network deployment? If yes, was this driven by the private or public sector (or both)?
27. Do you measure how affordable broadband services are in your country? If yes, please indicate how you measure affordability.
28. Do you have policies that promote access on fair terms and at competitive prices to all communities, irrespective of location?
29. Please summarise business and residential take-up of broadband, including the main characteristics of the broadband service (e.g. speeds in Mbps, technology).
30. Do you have national broadband targets? If so, please elaborate (i.e. per cent of population with access at a certain speed by a certain date and so forth).
31. Is broadband now included, or under consideration for inclusion, in universal service policy for your country? If so, please indicate the characteristics of the broadband service in question, and how it is (or is expected to be) priced.

Market Assessment

32. Do you undertake your own assessment of broadband prices in your country compared to other countries? If yes, do you also work with external suppliers in order to do so? If you undertake your own analysis, do you compare it to results of the OECD baskets?
33. What data collection and reporting does your country undertake to assess the development of broadband services? Please indicate in the table below if indicators are collected once or more times in a 12-month period ("Yes/No") and provide further information in the cell below ("Comment"). For prices and speed, please indicate the metric used (e.g. type of price basket, minimum, average speed, and peak speed) in the comment.

Table 3. Collection of indicators

	Subscriptions	Geographical Coverage	Population Coverage	Prices	Quality of service (downstream speed)	Data usage (downloaded)	Household surveys: Internet usage by households
Incumbent telecommunication operator(s) (Yes/No)							
Incumbent telecommunication operator(s) (Comment)							
Cable broadband operator (Yes/No)							
Cable broadband operator (Comment)							
New entrant fixed network (Yes/No)							
New entrant fixed network (Comment)							
National broadband network (Yes/No)							
National broadband network (Comment)							
Municipal networks (Yes/No)							
Municipal networks (Comment)							
Cellular wireless operators (Yes/No)							
Cellular wireless operators (Comment)							

Intellectual Property and R&D

34. What do you see as some of the key challenges to protecting intellectual property rights and other digital rights while not disadvantaging innovative e-business models?
35. What initiative(s) would you like to highlight in your country, which have encouraged research and development in the field of ICT for the development of broadband and enhancement of its economic, social and cultural effectiveness?

Privacy and Security

For this question, please coordinate with your SPDE delegate:

36. Do you think privacy and security issues are sufficiently covered by the existing privacy and security recommendations? If this is not the case, which area is lacking in your country's view?

End Notes

¹ The Secretariat received responses from the following countries. Argentina, Australia, Austria, Belgium, Brazil, Canada, Colombia, Costa Rica, Czech Republic, Estonia, France, Finland, Germany, Greece, Hungary, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Mexico, Norway, Portugal, Slovak Republic, Korea, Spain, Sweden, Switzerland, Turkey, United States. Additionally, the Secretariat received a response from the European Commission and INTUG.

² See end note above.

³ The published reports can be found here: <https://ec.europa.eu/digital-single-market/en/connectivity>

⁴ Recommendation of the Council concerning Guidelines Governing the Protection of Privacy and Transborder Flows of Personal Data [C(2013)79]. Recommendation of the Council on Cross-border Cooperation in the Enforcement of Laws Protecting Privacy [C(2007)67/FINAL]. Recommendation of the Council concerning Guidelines for Cryptography Policy [C(97)62]. Recommendation of the Council on Electronic Authentication [C(2007)68]. Recommendation of the Council on the Protection of Critical Information Infrastructures [C(2008)35]. Recommendation of the Council on Digital Security Risk Management for Economic and Social Prosperity [C(2015)115].