



Brussels, 20.1.2022
COM(2022) 19 final

**REPORT FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN
PARLIAMENT**

Final report - sector inquiry into consumer Internet of Things

{SWD(2022) 10 final}

1 Introduction and main steps of the sector inquiry

- (1) On 16 July 2020, the Commission launched a sector inquiry into the consumer Internet of Things (IoT) in the EU. The aim was to gain a better understanding of the consumer IoT sector¹, its competitive landscape, emerging trends and potential competition issues. While the consumer IoT sector is still developing, the sector inquiry was prompted by indications of company behaviour that may be conducive to distortion of competition in this sector.
- (2) As the use of consumer IoT products is increasingly becoming part of everyday life for Europeans, the consumer IoT sector is expected to grow significantly in the coming years. It is predicted that overall consumer IoT revenue worldwide will grow from EUR 105.7 billion in 2019 to approximately EUR 404.6 billion by 2030². European smart home revenue will also more than double between 2020 and 2025 (from approximately EUR 17 billion to approximately EUR 38.1 billion)³.
- (3) For the purposes of the sector inquiry, requests for information ('questionnaires') were sent to stakeholders in July 2020. Different questionnaires were addressed to companies active in four consumer IoT segments in the EU: (i) the manufacturing of smart home devices; (ii) the provision of voice assistants; (iii) the provision of consumer IoT services; and (iv) the manufacturing of wearable devices. A fifth questionnaire was sent to standard-setting and industry organisations.
- (4) The type and number of questions varied across the five questionnaires, but focused on the following topics of particular interest in examining possible competition issues in the consumer IoT sector:
 - a. The characteristics of respondents' consumer IoT products and services;
 - b. The main features of competition in the consumer IoT sector, including potential barriers to entry and the role of various business strategies;
 - c. The role of standards in the consumer IoT sector, including the importance of standards and standard-setting organisations (access conditions and competition among standards);

¹ Industrial IoT is not within the scope of the sector inquiry. One of the special characteristics of consumer IoT is that the type of data collected by smart devices typically includes personal data. The development of this sector can therefore be expected to have a particularly significant impact both directly on consumers and on society as a whole. Connected cars are also not part of this sector inquiry due to their distinctive regulatory and factual characteristics.

² Transforma Insights (22 December 2020), 'Internet of Things (IoT) revenue worldwide from 2019 to 2030 (in billion U.S. dollars), by vertical' [Graph], *Statista*, retrieved on 23 March 2021, from <https://www.statista.com/statistics/1183471/iot-revenue-worldwide-by-vertical/>

³ Statista (11 September 2020), 'Smart Home - revenue forecast in Europe from 2017 to 2025 (in million U.S. dollars)' [Chart], *Statista*, retrieved on 23 March 2021, from <https://www.statista.com/forecasts/528116/revenue-in-the-smart-home-market-in-europe>

- d. The interaction between devices, services and voice assistants in the consumer IoT sector, including questions on interoperability, pre-installation and default settings, exclusivity and other preferential treatment;
 - e. The role of data in terms of the consumer IoT sector, including questions on the collection of data, how it flows between parties, how it is used and potentially monetised by companies, and the interoperability and portability of data.
- (5) While the selection of addressees was not intended to correspond to a statistically representative sample of the EU consumer IoT sector, it covered a variety of consumer IoT products and services and represented different types of companies in terms of size, activities and range of products offered.
- (6) The Commission received responses to the questionnaires from more than 200 companies active in the manufacturing of smart devices, the provision of voice assistants and/or the provision of consumer IoT services, as well as from 14 standard-setting and industry organisations. These responses constituted the main source of information for the preliminary report on the sector inquiry, which was published on 9 June 2021⁴ and presented the Commission’s preliminary findings.
- (7) The publication of the preliminary report was followed by a public consultation open to all interested stakeholders. It ended on 1 September 2021, with 26 submissions received⁵.
- (8) This report is accompanied by a staff working document that summarises the main findings of the Consumer IoT sector inquiry and incorporates comments submitted by stakeholders during the public consultation.

2 Characteristics of consumer IoT products and services

- (9) The findings of the sector inquiry confirm that, overall, an increasing number of devices and services are becoming ‘smart’⁶. This enables users to access a progressively wider range of interconnected devices and services in and outside their homes. The respondents’ replies also point towards a trend of further increasing the overall number of consumer IoT services available on smart home and wearable devices and via voice assistants. In addition, the respondents indicate a trend towards greater availability of

⁴ European Commission, *Commission Staff Working Document: Preliminary Report – Sector Inquiry into consumer Internet of Things (SWD(2021) 144 final)*, European Commission, Brussels, 9 June 2021, retrievable from https://ec.europa.eu/competition-policy/system/files/2021-06/internet_of_things_preliminary_report.pdf

⁵ European Commission, *Public consultations - Commission Staff working document - Preliminary Report - Sector Inquiry on Consumer Internet of Things*, retrievable from https://ec.europa.eu/competition-policy/public-consultations/2021-internet-things_en

⁶ For example, “smart devices” have been defined for the purposes of this sector inquiry as wireless electronic consumer Internet of Things devices, such as wearable devices, smart speakers and other smart home devices, capable of connecting to other devices or networks, exchanging data with them and operating to some extent interactively and autonomously. This definition does not include smart mobile devices (i.e. smartphones and tablets).

voice assistants as a user interface enabling interaction with smart devices and consumer IoT services.

- (10) The leading voice assistants in the EU are Amazon's Alexa, Google's Google Assistant, and Apple's Siri. They are general-purpose voice assistants as they enable users to access a broad range of features such as playing music, listening to the radio, news or podcasts, controlling smart home devices, providing information or helping in planning and executing daily routines.
- (11) Other voice assistants are considered specialised voice assistants as they have more limited functionalities. They mostly allow access to and interaction with the provider's own smart devices and/or services.
- (12) Despite the growing popularity of voice assistants, smart mobile applications or companion apps remain the most popular user interfaces to access smart devices and consumer IoT services. In that sense, smart mobile devices and their operating systems also play an important role in the consumer IoT sector. Google's Android and Apple's iOS are the leading operating systems for smart mobile devices.

3 Main features of competition

- (13) The majority of respondents point to the cost of the technology investment and the competitive situation as the main barriers to entry or expansion in the consumer IoT sector, alongside various interoperability issues, the lack of access to data as well as regulatory barriers.
- (14) The cost of the technology investment is seen as a particularly important barrier to entry and/or expansion in the market for voice assistants. In fact, respondents find it unlikely that there would be new entrants in the market for general-purpose voice assistants in the short term, given that the costs of developing and operating new general-purpose voice assistants are seen as almost prohibitively high.
- (15) As a result, most respondents' business strategies for the near future focus on expanding their consumer IoT offering, in particular the accessibility of their smart devices and consumer IoT services, via the leading general-purpose voice assistants⁷. The general expectation is one of continued or increasing growth in the consumer IoT services, the smart home device and the wearable device segments.
- (16) On the competitive situation, a large number of respondents consider the inability to compete effectively with the leading providers of smart (mobile) device operating systems and voice assistants to be the main obstacle to developing new products and services. This is because these companies are vertically integrated and have built their

⁷ General-purpose voice assistants enable users to access a broad range of functions, for example listening to music, controlling smart home devices, providing information, or helping in planning and executing daily routines.

own ecosystems within and beyond the consumer IoT sector by combining their own and integrating third-party products and services into an offering with a large number of users.

4 Interoperability in consumer IoT ecosystems

- (17) The ability to interconnect and communicate with the different components of an ecosystem, that is interoperability among smart devices, voice assistants and consumer IoT services, is essential for the full deployment of functionalities that a consumer IoT ecosystem can offer to users. Interoperability between different brands is equally important as it allows users to build consumer IoT ecosystems with heterogeneous products, thereby improving consumer choice and preventing lock-in into a certain provider's products.
- (18) Two important nodes for connecting the different hardware and software components of a consumer IoT ecosystem are a) the operating system, which runs on the smart devices or their user interfaces and b) voice assistants, through which users can access different consumer IoT services and devices. Both are consumer IoT technology platforms⁸, enabling communication between those hardware and software components and increasing their complementarity. These consumer IoT technology platforms also allow for centralised access to and control of the products and services that they integrate and as such have played a significant role in advancing technology integration.
- (19) Access to leading consumer IoT technology platforms and good performance on them is considered essential to compete. The findings of the sector inquiry show that, in practice, integration processes that enable interoperability between different components of a consumer IoT ecosystem are largely driven by the leading providers of smart (mobile) device operating systems and voice assistants, namely Amazon, Google and Apple. These providers govern integration with their products by imposing certification processes, which they control unilaterally in most cases. The various specifications and types of software⁹ that enable interoperability with the leading operating systems and/or voice assistants are typically made available to third parties subject to the conclusion of agreements. Such agreements are usually standardised terms and conditions, and are generally not open to negotiation with counterparties, with the exception of prominent players with strong negotiating power.

⁸ For the purposes of this sector inquiry, a consumer IoT technology platform is the underlying technological solution for integrating consumer IoT services and smart devices in a connected system, in particular voice assistants and smart device operating systems. Consumer IoT players develop specific applications to make their services and devices compatible with these consumer IoT technology platforms.

⁹ Although there is no common approach to integration, interoperability, from a technical perspective, is generally based on application programming interfaces (APIs), developed or made available by one of the parties, which allow the exchanges of data and functionalities through software interfaces. Parties frequently make software development kits (SDKs) and hardware technical specifications available to facilitate implementation.

5 Standards and the standard-setting process

- (20) Standards in the consumer IoT sector include those needed to integrate and connect devices and applications, as well as standards that ensure the quality and security of the IoT communications.
- (21) An important number of formal Standards Developing Organisations (SDOs), such as the European Committee for Standardization (CEN), the European Committee for Electrotechnical Standardization (CENELEC)¹⁰, the European Telecommunications Standards Institute (ETSI)¹¹, as well as private partnerships/independent alliances, are currently active in the development of technologies that consumer IoT devices and services may rely on to ensure and facilitate interoperability in the sector. The leading players in the consumer IoT sector are typically involved in formal SDOs as well as in private partnerships/independent alliances such as Matter¹² or the Voice Interoperability Initiative.
- (22) These SDOs and private partnerships/independent alliances apply different intellectual property rights (IPR) policies for the licensing of the specifications they develop. While many organisations, including the formal SDOs, stick to high-level definitions, typically limited to a general FRAND¹³ licensing commitment, a number of SDOs have developed their IPR policies further. Some of them commit themselves to the outcome (for instance warranting a royalty-free outcome), while others introduce different rules without committing to a specific outcome, for instance by offering an optional choice (typically (F)RAND commitment or royalty free or non-assertion covenant¹⁴)¹⁵.
- (23) The findings of the sector inquiry indicate that the consumer IoT sector is a highly heterogeneous environment when it comes to standards: devices and services rely on a combination of open standards, protocols, and proprietary¹⁶ and open source technologies. The combination of standards, proprietary and open source technologies

¹⁰ CEN and CENELEC are two distinct private non-profit international organisations. They are also official European standardisation organisations recognised by the EU and by the European Free Trade Association (EFTA) as being responsible for developing and defining voluntary standards at European level. The CEN and CENELEC members are the national standard bodies and the National Electrotechnical Committees in the EU, EFTA and official candidate countries to the EU.

¹¹ ETSI is a leading standardisation organisation for Information and Communication Technology (ICT) standards. It is an officially recognised European standardisation organisation. ETSI has more than 900 member organisations worldwide, drawn from 65 countries and five continents. Members comprise a diverse pool of small and large private companies, research bodies, academia, and government and public organisations.

¹² Previously known as the CHIP Project.

¹³ Fair, reasonable, and non-discriminatory licensing. Licensing is also commonly granted on RAND (reasonable and non-discriminatory) terms.

¹⁴ Agreement not to seek to enforce a patent or other intellectual property right against another party or parties.

¹⁵ The most typical approaches of SDOs are (i) FRAND/RAND or other reasonable non-discriminatory licensing commitment, (ii) royalty-free licensing only, typically with other terms being (F)RAND, (iii) royalty-free licensing with possibility to opt out and (iv) commitment to either FRAND/RAND, or royalty-free licensing, or non-assertion covenant.

¹⁶ For the purposes of this report, proprietary technology refers to technology owned by a company and not subject to an open source licence. Proprietary technology may be licensable or not licensable to third parties.

largely varies depending on the different technology layers incorporated in devices and software programmes.

- (24) Typically, standardised technologies in the consumer IoT sector still prevail at the level of basic enabling technologies (such as connectivity standards like WiFi or Bluetooth), while formal standards are currently not in a position to effectively compete with proprietary technologies of the leading providers of operating systems and voice assistants for other types of technologies such as device definitions, application layers and user interfaces. Moreover, certain proprietary technologies in the areas covered by the sector inquiry have been highlighted as *de facto* standards, including certain voice assistants, smart home devices and wearable devices. Nearly all respondents find full interoperability with these technologies and ecosystems essential to compete.
- (25) However, the owners of these ‘must-have’ technologies generally stress that their proprietary nature does not mean that any IP rights would prevent third parties from developing and/or implementing technologies with comparable functionality.
- (26) In terms of the future evolution of standards in the consumer IoT sector, stakeholders’ views differ. Some call for further standardisation, while others argue that standardisation is not necessarily the best solution for interoperability in this sector¹⁷.

6 Consumer IoT data: user- and business-related aspects

- (27) Manufacturers and providers of consumer IoT products and services collect a wide range of data, through the manual input of a user, in the context of the use of a specific device or service, or automatically, for example as part of them functioning in the background.
- (28) The types of data collected vary per consumer IoT segment. This data can include personal or other user data, whether in the form of information input by users, or of user behaviour information collected by operating the device or accessing the service. In addition, smart devices and consumer IoT services gather data about how they function themselves and about their surroundings. For example, a smart thermostat or heating system can collect data on household temperature and air quality, movement, the heating system being switched on and off, and can register when users leave and arrive home. In many cases, the data collected falls under the definition of personal data for the purposes of the EU General Data Protection Regulation (GDPR)¹⁸. The collection of data from

¹⁷ Approximately 60% of the respondents to the different questionnaires express the need for further standardisation in consumer IoT (such as typically the telecommunication service providers, but also various smart device manufacturers and IoT service providers), while approximately 40% would not prioritise further standardisation over proprietary developments (such as typically the owners of major proprietary technologies, but also various other respondents).

¹⁸ Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation), OJ L 119, 4.5.2016, pp. 1–88.

terminal equipment, that is a device connected to a public communications network, is subject to the rules of Article 5(3) of the ePrivacy Directive¹⁹.

- (29) The findings of the sector inquiry show that companies give users access to their data in different ways (for example via user accounts, user interfaces, or via specific tools or technology), depending on factors such as the type of smart device or consumer IoT service that the company provides and its intended use. The majority of consumer IoT service providers and smart device manufacturers surveyed indicate that they allow users to access and download their personal data so they can port them to other service providers and device manufacturers under Article 20 GDPR.
- (30) A few providers of consumer IoT services also state that their data could be ported *directly* from one service provider to another by automatically transferring the data between the applications of the two service providers, in line with Article 20(2) GDPR. However, such direct portability of data between different companies (or data controllers) is not common.
- (31) In particular, data portability possibilities appear to be more limited for data collected via voice assistants. One reason put forward is that voice commands may not be easily imported into other voice assistants. Moreover, several respondents explain that voice assistant providers are part of their own ecosystem and limit the transfer and portability of data outside of this ecosystem.
- (32) With regard to business-related aspects²⁰ of consumer IoT data, the sector inquiry findings indicate that data flows between the different parts of a consumer IoT ecosystem typically have a very functional nature. They are designed to make the system work properly for the user, for example by processing and executing a voice command.
- (33) Other types of data that may be shared between companies include non-aggregated data in relation to errors and aggregate performance data. When data collected by one company can be accessed by a third party, this data is usually made available via central dashboards. When personal data is shared, for example by linking several user accounts, the consent of that user is required.
- (34) Even in the absence of active data sharing, some consumer IoT players have access to data in relation to a third party's activities. These are typically the smart device operating system provider and/or the voice assistant provider, which are able to collect certain

¹⁹ Directive 2002/58/EC of the European Parliament and of the Council of 12 July 2002 concerning the processing of personal data and the protection of privacy in the electronic communications sector (Directive on privacy and electronic communications), OJ L 201, 31.7.2002, p.37, as amended by Directive 2009/136/EC of the European Parliament and of the Council of 25 November 2009, OJ L 337, 18.12.2009, p. 11.

²⁰ Such business-related aspects include (i) the circumstances in which data flows between third-party devices, services and/or voice assistants, (ii) how the data is processed and what format it takes, (iii) the purposes for which the respondent companies use the data, and (iv) whether and to what extent respondents monetise the data they collect.

information about a user's interaction with for example a consumer IoT service by virtue of their position in a consumer IoT ecosystem.

- (35) There are no industry-wide standardised formats for collecting and sharing data between consumer IoT companies. Data is typically processed either in a company-specific proprietary format or in a non-standardised but commonly used non-proprietary file format. The APIs²¹ and/or SDKs²² of one company (for example the voice assistant provider) often determine which data formats should be used and may also contain relevant data processing and data sharing provisions.
- (36) Several contractual provisions seem to govern business-related aspects of consumer IoT data. Such agreements may include clauses in relation to personal data protection, processing, storage and use. Each company's privacy policy is also relevant for data (flow) management. Overall, the findings of the sector inquiry indicate that certain consumer IoT players, in particular the leading voice assistant providers, can impose standard terms and conditions that limit data access and use for third parties, while themselves having extensive data access and associated use possibilities.
- (37) In relation to data use cases within consumer IoT companies, respondents report that they use the data collected for: (i) the normal functioning of consumer IoT products and services; (ii) the personalisation of the user experience; (iii) business analytics; (iv) product maintenance and development; and (v) various other use cases (for example marketing communication, safety and fraud prevention).
- (38) Respondents report that they do not charge third parties for making data available. However, they refer to digital advertising and user profiling as monetisation possibilities. Using consumer IoT data for digital advertising purposes may be of particular value for those leading consumer IoT players with an existing digital advertising business. The pervasiveness of smart devices and consumer IoT services in users' homes and personal lives can increase the value of consumer IoT data for user profiling purposes. However, respondents indicate that this business opportunity is not very advanced yet and would need to comply with data protection rules.

7 Main competition-related and other concerns identified

- (39) The responses to the sector inquiry point to a variety of concerns about practices that could potentially have a negative impact on competition, innovation and consumer choice in the consumer IoT sector in the EU.
- (40) First, in relation to interoperability, respondents have raised specific concerns in relation to two main issues. Firstly, integration processes are largely determined by the presence of a few providers of leading proprietary voice assistants and operating systems relevant

²¹ See footnote 9.

²² See footnote 9.

for the consumer IoT sector. These companies are able to determine independently the requirements needed to achieve interoperability with their proprietary technology through unilaterally governed terms and conditions, technical requirements and certification processes. Secondly and in relation to this, by unilaterally governing the interoperability and integration processes, they may also be able to limit the functionalities of third-party smart devices and consumer IoT services, compared to their own, by imposing technical constraints, such as limited APIs.

- (41) Second, respondents to the various questionnaires identified concerns in relation to standardisation. These relate in particular to the standardisation process, SDOs' rules on membership and participation, standard essential patent²³ declarations, IPR policies and licensing terms. While these concerns are not specific to the segments covered by the sector inquiry, the complex standardisation landscape together with a similarly fragmented landscape of proprietary technologies is reported to adversely affect the growth potential of consumer IoT segments. Overall, respondents express the view that major technology companies mostly take the lead when it comes to technology solutions. This may enable them to leverage their market power as patent owners into downstream markets and may lock users into proprietary ecosystems. This may lead to a perpetuation of a fragmented technology landscape and increase the barriers to inter-system communication. In addition, many respondents suggest that such a perpetuation of parallel ecosystems would allow large ecosystems a significant margin of control over the level and quality of inter-system interoperability.
- (42) Third, in relation to data, smart device manufacturers and consumer IoT service providers express concerns about the position of voice assistants at the centre of data collection in the consumer IoT. One particular concern is that voice assistant providers can control not only data flows and user relationships, but are also able to leverage these advantages into adjacent markets, that is the provision of other consumer IoT products and services. Moreover, third-party manufacturers and service providers consider that the limits on the data they receive from the leading voice assistant providers hinder them in their own business development.
- (43) In terms of data sharing, it is important to take privacy considerations into account as a means to maintain consumer trust, confidentiality, access to and integrity of data. However, privacy protection claims may also be used by market players to justify 'locking up' certain data for themselves.
- (44) In addition, this privileged access to huge data volumes might enable leading voice assistant providers to improve the quality of their voice assistant/voice recognition technology more easily via algorithmic training and machine learning. Not having access to such data can raise barriers to new entrants on the voice assistant market and hinder the development of smaller competitors on that market. As a final data-related concern, a

²³ Standard essential patents are patents that cover technology to which a standard makes reference and that implementers of the standard cannot avoid using.

number of respondents indicated that the identified data monetisation opportunities are expected to benefit the leading consumer IoT technology platform providers and, in particular, the few consumer IoT players that are already present in the digital advertising market. According to some respondents, the data collected from consumer IoT products and services allow these companies to attribute advertising space to third-party advertisers in a more accurate manner taking into account user preferences.

- (45) Fourth, some respondents have raised a number of potential competition concerns in relation to the out-of-the-box features that are available to users. The findings of the sector inquiry reveal the existence of practices regarding pre-installation, default-setting and prominent placement of consumer IoT services on smart devices or in relation to voice assistants. While such practices may have potential benefits for users (for example in terms of convenience), they may also determine to a large extent the discoverability, visibility and findability of a consumer IoT service, and give competitive advantages to the provider of a service that is pre-installed, set as a default, or otherwise given prominent placement. The services allegedly favoured in this way are often the proprietary services of the leading providers of consumer IoT technology platforms, or those of large international creative content service providers, to the detriment of smaller and/or local players.
- (46) Fifth, concerns have been raised over attempts by leading voice assistant providers to secure exclusivity of their voice assistant on certain smart devices or to prevent the concurrent use of voice assistants. Some smart device manufacturers also report that voice assistant providers will only license their voice assistants together with other types of software, technology or applications and not on a stand-alone basis.
- (47) Sixth, respondents have raised several concerns over the role of the leading providers of voice assistants and smart device operating systems as intermediaries between the user and the smart devices or consumer IoT services that are controllable and accessible through the voice assistant and/or operating system. A first set of concerns relates to the control these providers have over the user relationship and user experience. As a result, respondents fear that they will lose their brand recognition and their direct relationship with users. A second set of concerns relates to how these providers control the access to consumer IoT services and related data. A third set of concerns relates to technical performance and processes. For example, respondents indicate that they are dependent on the technical support provided by voice assistants and operating system providers as well as the timely advance notice of software updates and other updates. By contrast, the leading providers of consumer IoT technology platforms fully control the experience relating to their first-party products and services from the very beginning of the user interaction, collect relevant user data and in most cases do not depend on a third party to solve technical issues.
- (48) Furthermore, the results of the sector inquiry show that the relevant consumer IoT agreements contain a variety of clauses, for example in relation to termination. According

to respondents, these amplify commercial imbalances between smaller players and the leading consumer IoT technology platform providers.

8 Policy conclusions on the consumer IoT sector inquiry

- (49) The findings of the sector inquiry confirm the rapid growth of consumer IoT markets, but also identify potential concerns put forward by the respondents to the questionnaires as well as in the submissions to the public consultation.
- (50) In terms of potential follow-up action to address those concerns, several submissions to the public consultation have emphasised the need for both competition law enforcement and regulation in relation to the identified concerns.
- (51) Where the concerns identified appear to be the result of potentially anti-competitive practices, the Commission may decide to open case-specific investigations under Articles 101 and 102 Treaty on the Functioning of the European Union. Any competition enforcement measure stemming from the sector inquiry would have to be based on a case-by-case assessment.
- (52) The results of the sector inquiry also inform the Commission's further work in implementing its digital strategy²⁴. In particular, they will contribute to the Commission's standardisation strategy²⁵ and upcoming legislative and non-legislative initiatives aimed at clarifying and improving the standard essential patent (SEP) framework²⁶. The findings of the sector inquiry will also feed into the ongoing legislative debate on the scope of the Digital Markets Act²⁷ (DMA) and specifically into some of the obligations proposed.

²⁴ The sector inquiry was announced in the Commission's *Communication on Shaping Europe's digital future*, Luxembourg, Publications Office of the European Union, 2020, retrievable from https://ec.europa.eu/info/sites/default/files/communication-shaping-europes-digital-future-feb2020_en_4.pdf

²⁵ In June 2021, the Commission published its roadmap for the upcoming standardisation strategy, retrievable from https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13099-Standardisation-strategy_en

²⁶ For additional information on these initiatives: https://ec.europa.eu/growth/industry/policy/intellectual-property/patents/standards_en

²⁷ European Commission. *Proposal for a Regulation of the European Parliament and of the Council on contestable and fair markets in the digital sector (Digital Markets Act) (COM/2020/842 final)*. European Commission, Brussels, 15 December 2020, retrievable from <https://eur-lex.europa.eu/legal-content/en/TXT/?uri=COM%3A2020%3A842%3AFIN>