6. The governance of technology in the digital world

Some emerging technologies follow an exponential growth and adoption rate and adopting them demands governance adapted to complexity and rapid change. In the case of the Internet, the model based on a combination of international cooperation and collective participation has so far –despite the internal debates– responded to the most significant challenges and may therefore serve a benchmark for governing other exponential technologies.

Governance of the Internet and its critical resources

The digital world is not independent from our lives; technological evolution is leading to a fusion between the physical and virtual worlds[26]. We cannot conceive of our everyday world without the internet, just as we cannot conceive of it without electricity. Internet access has been included in the Declaration of Human Rights since 2016 and, if that right is to be effective, it will require universal accessibility and affordability. Bridging the digital divide must be one of the objectives, but also internet use should be based on respect for human rights and democratic values. The Internet must guarantee citizens' ownership of data, and the protection of privacy and ensure diversity, pluralism and freedom of choice [27]. Protecting these values requires governance that is based on clear, inclusive and transparent rules.

Governance has been a subject of debate since the Internet's inception, and as the Internet has increasingly become the world's neural network, so the way it is governed has evolved. Compared to telecommunications governance models –the latest technological leap before the Internet– the contrast is radical, with centralized, often monopolistic models and strong state control, as opposed to the open and decentralized model that dominates Internet governance.

The start date of the Internet is usually given as 1969, when ARPANET was created; however, until e-mail and the TCP/IP protocol appeared in 1973, its size was insignificant; and even the in 90s, with the World Wide Web and hypertext, it barely reached beyond the scientific environment. The pre-eminence of this protocol over others, thanks to the "network effect" and its American origins, determined a governance model centred on the USA, which held sway until 2016 despite criticism and opinions in favour of a multi-stakeholder model led by the ITU (International Telecommunication Union). As the Internet grew, standardization processes gained more weight within the decentralized critical resource management model, and the outlook grew more complicated, involving many institutions in which the political powers had no direct representation but were seeking speedy technological action. We can see three layers in the digital governance: Infrastructure, logical layer and governance models.

The Infrastructure: the growth of the Internet has required the deployment of broadband lines over existing telecommunications infrastructures, with their own governance model, coordinated through the ITU (in which the

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26: Shab, Klaus (2016), The fourth industrial revolution: what it means, how to respond, World Economic Forum
27: Overton, David (2017), Final report for The next Generation Internet initiative consultation, European Commission

private sector participates, in addition to 191 countries). The telecommunications sector is looking for greater profitability to obtain the return on investment required by extending the networks, while the **net neutrality** model (non-discrimination in data traffic) limits the attainment of part of the potential gains. While the European Union has spoken out on their behalf,[28] the current US government, which has not taken action against it, does not seem to offer much support.[29]

Because of the investment they require, infrastructure is one of the critical factors in bridging the **digital divide:** broadband coverage reaches two thirds of the world's population [30], but the new technologies require 5G networks in order to progress and allow access to thousands of devices on the Internet of things. The extension of these networks is already a priority for the developed countries [31].

The logical layer is managed by multiple independent actors that ensure the security and stability in a consensus-based approach.

- **Protocols and technical standards.** the institutions that currently govern these technical standards are:

  - IETF (Internet Engineering Task Force), founded in 1986 is an engineering group aim to develop technical standards under the supervision of IAB (Internet Architecture Board)
  - The Internet Society (ISOC) manage non purely aspects, as financial, fiscal and legal support to the IETF.
  - The World Wide Web Consortium (W3C), created in 1994 by Tim Berners Lee at MIT, created standards and recommendations to ensure the long-term growth of the web.

- **Domain name (DNS) and IP address management.** To operate the web requires a unique identifier for each address. In the early years these resources were managed in different ways until in 1998 ICANN (Internet Corporation for Assigned Names and Numbers) was created as a private non-profit organization based in California to manage domain names and IP addresses . Initially, ICANN was to report to the US government until 2000, but this mandate has been extended to 2016. In October of that year the transfer of IANA to the community of stakeholders was formalized. [32] There are also five regional agencies (RIRs) that manage the domains of each zone.

Governance: The debate between a US-centred model and organizations advocating a multi-stakeholder model (including ITU) took place in the first decade of this century. Some of the milestones are:

- The World Summit on the Information Society (WSIS), held in two stages (2003 and 2005), raised the importance of Internet governance as the basis for the Information Society, creating the WGIG (Working Group on Internet

28: Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access
29: Granados, Nelson, The FCC Hints At The Future Of Net Neutrality Under Trump, *Forbes*, 1 February 2017
30: ITU (2016), ICT Facts and figures
31: Véase por ejemplo: 5G for Europe action plan o A 5G strategy for the UK
32: IANA (2016), Stewardship of IANA Functions Transitions to Global Internet Community as Contract with U.S. Government Ends

Governance). Other issues, such as reducing the digital divide, respect for freedom of expression and cybersecurity were raised.

● The Governance Forum (Internet Governance Forum, IGF): created in the second stage of the summit, involving all stakeholders. This aimed to internationalize internet governance. Its first meeting, held in Athens in 2006, focused on openness, security, diversity and access.

The governance model remains on the agenda with the upcoming celebration in April 2017 in Brazil of the Global Multistakeholder Meeting on the Future of Internet Governance (NETMundial)

In March 2017 the European Union published the findings of its consultation on "*Next Generation Internet*"[33], which lays great importance on the values on which the network is based, and the need for proper governance. Earlier this month China also released its *International Strategy of Cooperation on Cyberspace* [34], which affects security and cooperation in cyberspace and the need for a shared strategy.

Figure 6.1 The three layers of Internet governance
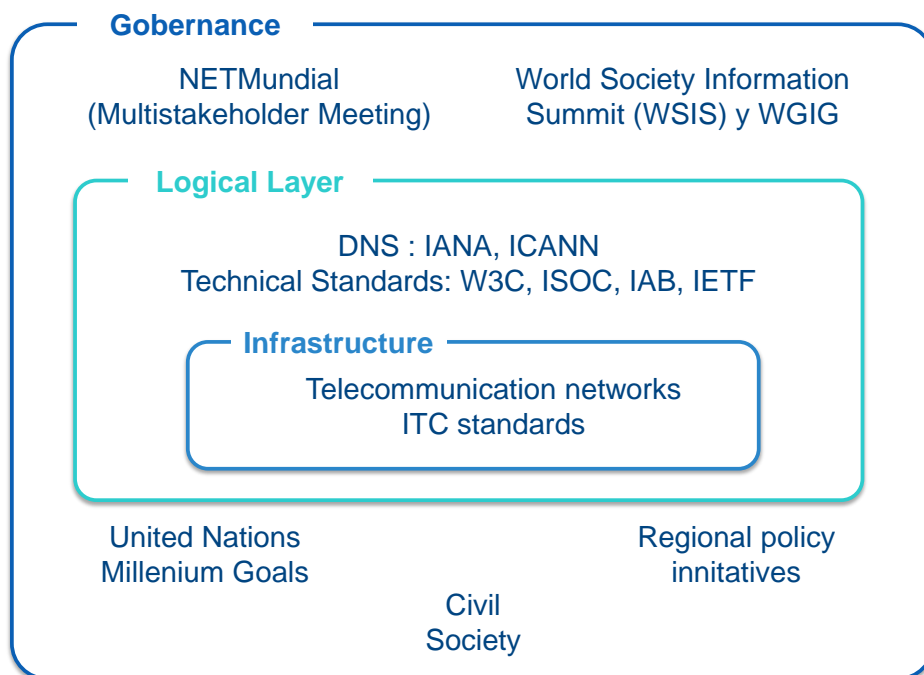
Source: BBVA Research, base don ISOC and The Royal Institute of International Affairs

From the earliest years, the digital divide, security, privacy, freedom of expression and protection of the rights of citizens (including intellectual property) emerged as the main challenges of governance. Part of the debate has shifted from the technical aspects of network management to the problems posed by **content.** Privacy and security are at the heart of the debate, especially in the wake of the Snowden case[35]. The increase in worrying phenomena – such as the

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33: Overton, David (2017), Final report for The next Generation Internet initiative consultation, European Commission
34: International Strategy of Cooperation on Cyberspace, Xinhua net, 17 March 2017
35: In 2013, Edward Snowden, a former employee of the CIA and the NSA leaked documents on massive surveillance programs developed by NSA.

transmission of false information and using networks to express hatred– have led to new discussions about the freedom provided by the Internet versus the need for control.

The future: governance of exponential technologies

The emerging technologies are Internet-base, are growing exponentially, and the adoption rate is growing every more rapidly. The combination of different technologies and developments is taking us to a world of unprecedented change. Blockchain may be the new Internet; artificial intelligence and advances in robotics are giving rise to new moral dilemmas and a rethinking of the labour market. Virtual reality is blurring the boundaries of perception, while advances in biotechnology are bringing us closer to an unknown universe.

Maintaining technological advances with open protocols is a requirement if the development of new technologies, such as the Internet of things, is to safeguard the fundamental rights of individuals., The problems these new technologies face are similar to those faced by the Internet: the governance of infrastructures and standards, security, privacy, data control, the participation of civil society and the defence of ethical values.

Exponential technologies are global by nature, so a regulatory framework containing the minimum principles for development and governance that allows shared standards that respect values such as freedom, human dignity and privacy and encourage development of the technologies themselves is necessary. The world's largest companies are Internet-based, and therefore global. The growth of the digital economy requires a global technological and regulatory framework.

We can take the Internet as a model of exponential technology and governance, based on a combination of international cooperation and collective participation which, despite the internal debates, has, to date, responded to the main challenges. It should serve as a model in areas such as:

- Establishing open protocols, with standards governed by clear rules of competition, developed with the participation of expert communities. This openness allowed the triumph of the TCP / IP protocol.
- Extension of the infrastructure to develop these technologies, avoiding inequality.
- Avoiding a concentration of critical resources across distributed architectures.
- Ensuring that new technologies have an neutral regulatory framework.

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