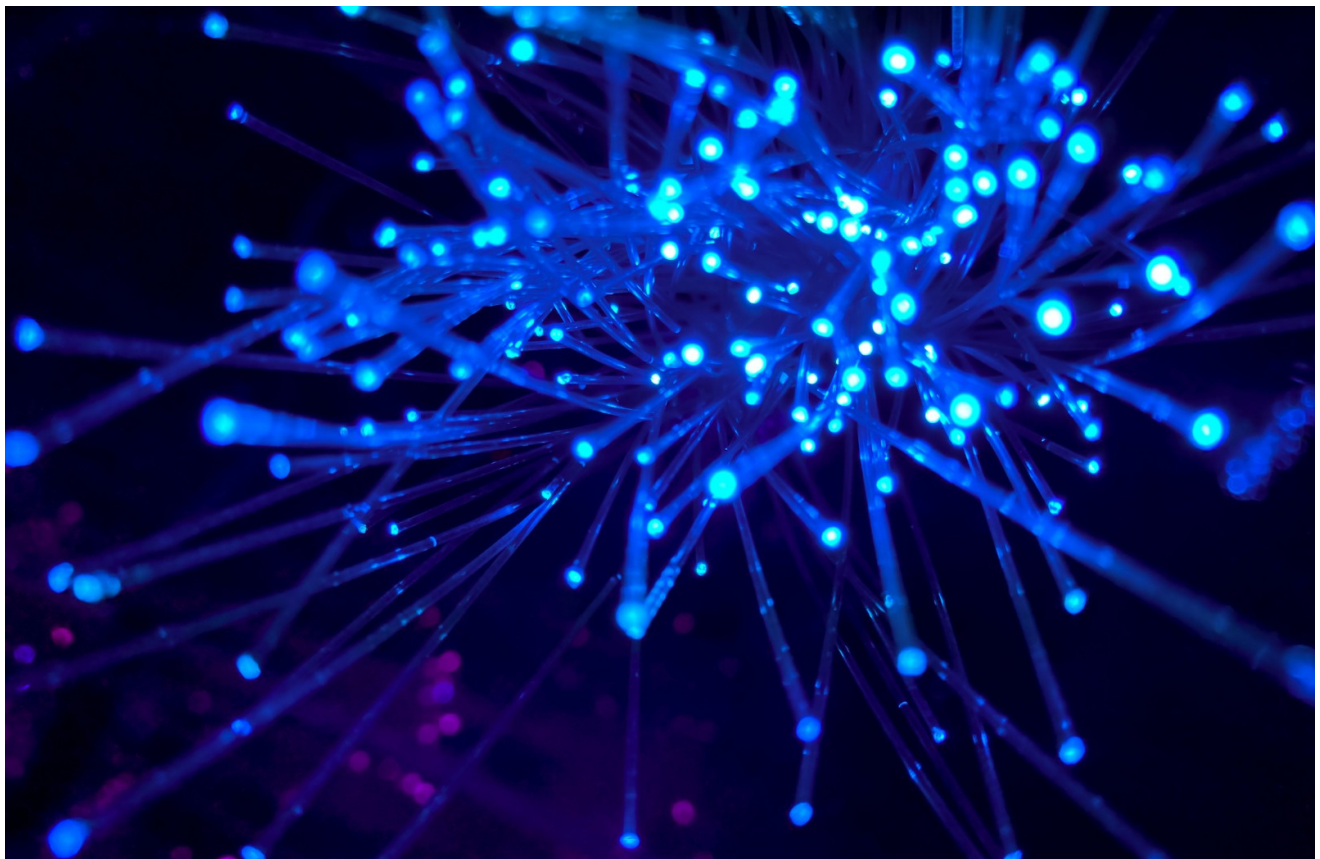


# Optical fibre in italy: which path to take?

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## EXECUTIVE SUMMARY

The following paper addresses the issue of optical fiber infrastructure, core asset and springboard for the digital revolution and all the benefits associated with it. The focus is the **national context** and the main objective of the work is to orient stakeholders and decision-makers towards the most appropriate choice to meet the objectives of connectivity required to take advantage of the services that the new technologies offer in a widespread manner.

To this end, the paper is divided into **three parts**. The **first part** consists of a historical description that allows the reader to grasp the complexity of the subject. It is attempted to understand the rise of telecommunications networks in Italy between political and managerial choices. This is done by focusing in particular on the developments that took place from the mid '90 onwards, when technological and political-economic revolutions hit our country from manifold directions, drawing a picture at times disordered that led us up to the current state with the “unique network”'s project, which is briefly exposed in its dynamics. In the **second part**, the work aims to provide the reader with some key elements to understand the debates around modern telecommunication networks: their technical structure and the different types of fiber infrastructure, what are their benefits and how they are currently deployed in Italy and the rest of Europe. In the **third** and last **part** the various governance proposals that have emerged in the public debate to exploit the potential of modern telecommunications networks are listed. A critical analysis is carried out, and this leads to the proposal of the solution that we believe is preferable to reach the connectivity objectives: the **maintenance of infrastructure competition, developing the strengths and correcting the strengths and correcting weaknesses**. In this report some in-depth study boxes relative to specific topics like the managerial actors involved in the single network process or the structure of the Ultra Broadband government plan will be provided.

## INTRODUCTION

The demand for innovation is becoming increasingly central and fundamental to the future economic and social framework of nations. The multitude of services that the digital revolution can offer needs technologies that guarantee the highest possible degree of connectivity. Not differently from how means of transport need increasingly advanced and widespread networks to guarantee communication between the centers of a system, the steam engines of modernity (i.e. who collects and transmits data) need the latest generation of digital highways. If, in fact, today more than ever physical infrastructures may seem superfluous in the face of the evaporation of information into clouds and its dematerialization into bits, they are actually even more indispensable. There is no such thing as a 5G network without a cutting-edge cable infrastructure connecting towers and hubs, just as there is no such thing as the Internet of Things (IoT) without adequate Data Centers to manage the enormous amount of data. **Digital infrastructures**, hence, remain the core asset of the digital revolution, its springboard. Cable networks in their most modern form, optical fibers, represent the fundamental framework to ensure its diffusion, with all the social, political and economic benefits that this entails.

In Italy, the problem of infrastructure is a long-standing one, dating back even before the Unification of Italy. In one of his writings of 1846<sup>1</sup>, Cavour (one of the founding fathers of Italy) stressed the backwardness of Italian railways in the face of "the greatness of the task that these new lines of communication are called to perform in the world's future". While today rails, road and electric networks have reached a high level of development, digital infrastructures are struggling to establish themselves in the public debate, even though they face a task which is not dissimilar to the one that the Italian politician expected for the railways. Italy ranks below average in the digitization indexes of society and economy, despite the benefits that a more widespread and faster connectivity could guarantee to the country system, from the educational sector to the industrial, from the medical to the technological in the strict sense.

The central theme of this work is therefore precisely the latest generation **telecommunications networks and their diffusion in our country**. The dossier, in fact, has returned in recent years to the center of debate for the proposed integration of the TIM network with Open Fiber's one in a single national infrastructure. It's a proposal that branched out into hundreds of intricate rivulets. The objective of this paper is therefore to orientate the reader in the complexity of the subject by initially proposing a historical perspective that allows to understand the rise of telecommunications networks in Italy between political and managerial choices. This will be done by focusing on the developments that took place from the mid-90s onwards, when technological and political-economic revolutions hit our country from more than one direction, drawing a disordered picture at times that has led us up to the current state with the above mentioned event. Then, in the second part, the paper aims to provide the reader with some key elements fundamental to understanding the debates around modern telecommunication networks: how they are made, what are their benefits and how they are currently distributed in Italy and the rest of Europe. Finally, the paper

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<sup>1</sup> This illuminating document is available here: <https://dizionariapiu.zanichelli.it/storiadigitale/media/docs/0276.pdf>

aims at listing the various governance proposals emerged in the Italian public debate to exploit the potentialities of modern telecommunication networks. A critical analysis of these proposals will be carried out, leading to the proposal of the solution we believe is preferable to achieve the connectivity goals: the maintenance of infrastructure competition, developing its strengths and correcting its weaknesses.

### 1.1 Methodological premise

In order to better frame the current debate on fiber network infrastructure and understand its reasons, tools and objectives, it will be useful in this section to present the historical evolution of the telecommunications industry in Italy and of the industrial policies aimed at it. Focusing on the fiber optic network, the chapter aims at identifying the multiple causes related to political and managerial choices that have contributed to outline the current network architecture in the peninsula and therefore, indirectly, the state of the art relative to the exploitation of its capacities and the reduction of the risks coming with it, both listed in the second part of this report.

It is important to clarify something first: phenomena rarely are monocausal. We will observe that to the realization of the current situation of the fiber infrastructure have contributed, at the same time, political choices (domestic and foreign) with disparate aims and managerial choices. Consequently, it is impossible to attribute successes or failures solely to the action of one of these two elements. We will see, in fact, how some political decisions have negatively influenced (with respect to the achievement of the opportunities mentioned in chapter 2) the development of the fiber network, while we will also observe how some managerial realities have not always demonstrated the possession of the Schumpeterian "entrepreneurial function"<sup>2</sup> of generative innovation that could have guaranteed the necessary technological advances. The present analysis will therefore refrain from expressing judgments of value, but will limit itself to provide the analytical tools to understand how we got to the current situation of fiber infrastructure.

### 1.2 Network infrastructure from the early years to mid 80's

The telecommunications infrastructure sector, similarly to other sectors, has undergone considerable mutations between liberalization and privatization. However, in Italy as in other countries, it can be distinguished in two periods.

The first period, which lasted from the advent of the first modern forms of telecommunications up to about mid 80's, is characterized by the decisive role of the state in managing the development of the network infrastructure. Being it considered in fact as a "natural monopoly", the concessionary companies which were dedicated both to the development of the infrastructure and to the supply of services needed a "patient" investor like the state to avoid market failures, the inefficient duplication of investment and to manage the returns on infrastructure investments, which usually

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<sup>2</sup> Schumpeter, J. A.(1942) *Capitalism Socialism & Democracy*. Routledge



require more time<sup>3</sup>. This was also the case in Italy, where in 1925, the government privatized the few existing public networks and entrusted them to five private concessionaires divided by area. The public ASST (Azienda di Stato per i Servizi Telefonici) was then created and was involved in the construction and management of the long-distance network, construction and management of the interurban network in areas of market failure (this service was contracted out by SIRTl), and in the management of the international service. The sector soon entered a crisis following the financial crash of 1929 and the newly founded Institute for Industrial Reconstruction, (IRI, a state-led holding for industrial companies) founded STET (Società Torinese per l'Esercizio Telefonico) and through it it incorporated the network owned by the SIP (owner of Stipel operating in Piedmont and Lombardy), the Telve (operating in the triveneto) and the Timo (operating in Emilia, Marche, Umbria, Abruzzi and Molise). Of the remaining two licensees, Teti (operating in Liguria, Tuscany, Lazio and Sardinia) was controlled by Centrale (of the Orlando and Pirelli families) and SET (operating in the South) was linked to the Swedish Ericsson. In 1957, at the expiring time of the concessions, these last two were also incorporated into STET owned by IRI. In 1962 the five concessionaires were incorporated into a new single concessionaire, SIP, which was compensated with a reimbursement for the nationalization of electricity companies. The chain of control of the TLC was therefore IRI-STET-SIP, with STET formally becoming the financial company of the IRI group for the telecommunications sector. From the post-war period the Italian infrastructure coverage, thanks to the industriousness of SIRTl and SIELTE (another company dedicated to network engineering absorbed into the IRI-STET group in 1957), developed in various dimensions: urban, interurban, submarine, through radio bridges, satellites. The optical-fiber appeared for the first time in 1979, when SIRTl realized the first 16 km long connection between some power plants in Rome<sup>4</sup> and from there on it underwent exponential development.

### 1.3 Technological, social and liberalization changes

The second period in the history of the telecommunications industry can be framed from the mid-1980s onwards, precisely when new technologies, such as optical fiber, were making their appearance. In fact, the growing technological innovation in the sector, together with the progressive unfolding of globalization and the diffusion of neo-liberal political and economic paradigms, directed global policymakers towards the need to open up the sector to the laws of the free market. Therefore, the telecommunications sector did not escape the liberalizing trend of reform that affected the world political-economic order starting from the 80's and that resulted in Italy with the substantial dismantling of the mixed economy system based around the IRI. A fundamental role was also played by the European Union, which in those years consolidated its pro-competitive political and economic positions with the Single European Act (1987). The Act

<sup>3</sup> Humphreys, P. e Simpson, S. (2005) *Globalisation, Convergence and European Telecommunications Regulation*

<sup>4</sup> Caroppo, A. e Gambero, R. (2011). Le infrastrutture delle telecomunicazioni. In V. Cantoni, G. Falciasecca e G. Pelosi (Eds.). *Storia delle telecomunicazioni* (p.722). Firenze University Press. This volume is useful for a more elaborated history of telecommunications in Italy.

accelerated the decision-making procedure aimed at the effective completion of the single market, in fact tightening up the laws on competition and paving the way for the centralization in the Commission of the powers of guardian of competition. In the telecommunications sector, the United States led the way with the dismemberment of the Bell system, which split AT&T's monopoly on North American telephony. On our continent, since 1984, when the European Commission outlined its first action plan in the sector, a series of directives have followed one another aimed at "gradually reducing, with regard to telecommunications services and infrastructures, the scope of applicability of art. 90 paragraph 2 of the Treaty, thus determining the illegitimacy of the legal monopoly positions recognized, in many Member States, to the so-called telecommunications organizations, i.e. <<public or private entities, including subsidiaries controlled by them, to which a Member State grants special or exclusive rights for the installation of public telecommunications networks and, possibly, for the provision of telecommunications services>>".<sup>5</sup>

The implementation of these directives in Italy was not long in coming: Law n. 58/1992 fixed the criteria for the reform of the telecommunications structure aimed at rationalizing the fragmented governance of telecommunications in Italy in order to face the challenges of a rapidly evolving market. Iritel was created, in which the telephony and radio services managed until then by the State through ASST were transferred.

In 1994 the Board of Directors of IRI approved the "Plan for the Reorganization of Telecommunications" which led to the merger of Iritel, Italcable and Telespazio into SIP.<sup>6</sup>

SIP then changed its name to **Telecom Italia**, which remained state-owned. The fledgling telecommunications industry embarked on the development of modern network infrastructure through the Socrate project, with the goal of connecting 10 million homes to broadband and related multimedia services via mixed fiber-coaxial technology. However, the ambitious project was halted by the advent of other technologies such as ADSL, which allowed for performance comparable to coaxial cable in the last mile while using the cheaper traditional copper telephone wires.<sup>7</sup>

#### 1.4 Telecom Italia between success and crises

In 1997, with the law DPR. 318, the fixed telecommunications sector was liberalized authorizing the entry of other operators both in the services and in the infrastructures market infrastructures. The first entrepreneurial project of the second group is that of eBiscom/Fastweb, founded in 1999 with the aim of spreading alternative telecommunications networks, which started to wire the Milan area

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<sup>5</sup> Vitale, M. (2004). *L'impresa di telecomunicazioni nella disciplina comunitaria*.

<sup>6</sup> Gamberale, V. (2007). *Le telecomunicazioni in Italia: da un passato autorevole ad un presente incerto. Quale futuro?*. Lectio magistralis all'Università degli Studi di Roma "Tor Vergata".

<sup>7</sup> Corriere della sera (1998):

[https://web.archive.org/web/20120803020641/http://archiviostorico.corriere.it/1998/gennaio/18/Telecom\\_ad\\_dio\\_piano\\_Socrate\\_co\\_0\\_980118997.shtml](https://web.archive.org/web/20120803020641/http://archiviostorico.corriere.it/1998/gennaio/18/Telecom_ad_dio_piano_Socrate_co_0_980118997.shtml)

with optical fiber and achieving considerable success. Alongside the liberalization project, the newborn Telecom Italia was meanwhile facing **privatization**, with the Treasury intending to sell its share of about 45% in the "financial Telecom Italia from the merger with the previous holding STET. The transfer followed according to the discipline contained in legislative decree 332/1994, which sanctioned the norms for the divestment of State shareholdings, indicating the possibility of identifying a "stable reference shareholder committed to certain financial and management conditions and the faculty to maintain a golden share in certain companies operating in the public service sectors<sup>8</sup>. The government's objective was, therefore, to find a financial "hard core" that could guide the group. This core, however, turned out to be 6.6% where the highest relative share was the 0.6% of IFIL, the Agnelli family's holding company. The Treasury reserved for itself a "golden share" of around 5.2%. However, stability was slow to appear. In 1998, a group of investors known as "capitani coraggiosi" (brave captains), led by Roberto Colaninno, launched a takeover bid for Telecom and obtained control of the company.

The operation, however, loaded on Telecom Italia a considerable amount of debt that was accentuated by the subsequent acquisition of the latter by Olimpia (a group with famous entrepreneurs as Tronchetti Provera and Benetton behind it). The demobilization of Telecom's foreign activities that took place in those years, although it guaranteed cash returns in the short term, exposed the group to a considerable erosion of revenues, dragging it into a spiral from which it is still struggling to emerge.<sup>9</sup>

Another operation that contributed in those years to increasing the group's exposure to debt was, as former CEO Franco Bernabè points out<sup>10</sup>, the sale of real estate assets to re-rent them after that. The proceeds, rather modest, did not compensate for the cost of renting the premises, which was mainly represented by the very long term lease contracts that still today prevent the divestment of a large number of plants which are now obsolete for the new infrastructure projects. The result was a further worsening of the conditions that prevented (and still prevent) TIM from investing heavily in modern network infrastructure. The current Chairman of Open Fiber and former Minister for the Civil Service Franco Bassanini lists<sup>11</sup> **four critical issues**: the indebtedness of the company due to leveraged buy-outs, the lack of demand for these technologies on consumers' (families and businesses) side, the economic convenience of maintaining the previous copper infrastructure with its already amortized costs, less expensive than a new fiber infrastructure, and the weakness of the shareholding structure, also recalled by Bernabé. After the exit of Olimpia, it was the turn of the Spanish management of Telefonica, which placed itself at the head of a vehicle company (Telco) also formed by Generali, Intesa Sanpaolo, Mediobanca and Sintonia. Nonetheless, in the eye of the financial storm of those years (2007-2008), the necessary cut in costs and dividends decided by the new management (led by Bernabè) due to the debt situation worsened by the crisis, was not greeted with particular enthusiasm by shareholders. The plan to spin off the access network (requested by

<sup>8</sup> Cassese, S. (1996) Le privatizzazioni in Europa. Il Mulino n.47(2), pp. 323-349

<sup>9</sup> Sacco, F. (2020). Rete unica TIM-Open Fiber, a chi conviene? Tutti i punti su cui riflettere. Agendadigitale.eu

<sup>10</sup> Bernabè, F. (2020). A conti fatti: quarant'anni di capitalismo italiano. Feltrinelli, Milano.

<sup>11</sup> Bassanini, F. (2019). Le TLC in Italia fra competizione infrastrutturale e infrastruttura unica. Astrid n.17/2019

the competition and telecommunications authorities) was also coolly welcomed by Telefonica. The interests of the Spanish group thus proved to be rather misaligned from those of cost containment, which could have been a springboard for network modernization, alleviating at least the problem of debt that prevented such expensive investments.

### 1.5 The need to innovate

The looming need to stay abreast of the evolutions of Industry 4.0 and the Gigabit Society have made the development of the optical-fiber network more necessary than ever, placing the issue at the center of the national and European public debate. With respect to the European plan, the Union mobilized with the approval of the **Digital Agenda for Europe**<sup>12</sup>, part of the Europe 2020 strategy approved in 2010. A notable impulse in this sense was that of Commissioner for the Digital Agenda Neelie Kroes, who in 2012 issued a series of recommendations aimed at simplifying the regulatory framework of the sector. Telecom benefited from this simplification and of the progressive increase in demand by beginning to accelerate the deployment of the FTTC technology, which is less expensive and slightly less efficient than FTTH. However, critical issues remained. Faced with the challenges imposed by Fastweb's dynamic infrastructure competition the Board of Directors of TIM approved the separation of the infrastructure with the idea of bringing CDP in the new company, but the project was scuttled by Agcom, which reduced the cost of access to TIM's network. The uncertainty also led Telefonica to abandon TIM, decreeing the entry in 2015 of **Vivendi**, still today the majority shareholder of the group (see in-depth study Box). Contextually, under the Renzi government, the reality of Open Fiber appeared.

The new industrial reality, shared halfway between Cassa Depositi e Prestiti and Enel, immediately configured itself as wholesale-only, that is dedicated only to the realization of fiber network in FTTH (Fiber to the home) model and then "renting" it wholesale to service providers. The birth of Open Fiber is closely linked to that of the **BUL Plan**<sup>13</sup> (Banda Ultra Larga, Italian for Broadband) approved at the same time, winning all the calls for tender of Infratel (in-house company of the Italian Ministry of Economic Development for the realization of telecommunications networks) for the drafting of the network. Inshort, the plan envisaged the diffusion of Ultra Broadband technology through targeted and interventions targeted and weighted according to the population density of certain areas, called clusters (for further references to the plan please refer to the in-depth Box contained in the second chapter). The new company was created with the idea of accelerating infrastructural competition in order to reach the objectives of coverage of the new generation network.

Contextually to the presentation of the BUL Plan and the creation of Open Fiber, in fact, the debate on what was the best solution to ensure the coverage of the connectivity on the national territory with all the benefits it entails started. Many argued that TIM's vertical integration (management of

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<sup>12</sup> The Agenda is available at: <https://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0245:FIN:EN:PDF>

<sup>13</sup> Available, in Italian, at: [http://www.governo.it/sites/governo.it/files/strategia\\_banda\\_ultralarga.pdf](http://www.governo.it/sites/governo.it/files/strategia_banda_ultralarga.pdf)

the existing infrastructure and provision of supply of services) slowed down the modernization of the network and for this reason they positively greeted the entry of another company such as Open Fiber for the competitive push that it could give. However, the competition soon turned out to be far from the objectives that it intended to pursue due to the different technical nature of the networks that led to a duplication of investments. In fact, infrastructural competition, as had happened for Fastweb, led TIM to focus on a mixed fiber-copper infrastructure, rather than on a complete fiber infrastructure like Open Fiber's. Moreover, as Franco Bassanini recalls, TIM still held a clearly dominant position (and vertically integrated, remembering that TIM is also active in the services market) that discouraged the migration of end users from the mixed network to the all-fiber network.

### 1.6 The “unique network” hypothesis

Faced with the slow progress of the BUL Plan due, in addition to the reasons listed above to the still high costs of migration (the vouchers for families foreseen in the Plan have been unblocked only in mid-2020), another policy proposal began to hover in the public debate: the spin-off of TIM's infrastructure network and its possible merger with that of Open Fiber, in order to create a single national and neutral network on a wholesale-only model. This would essentially be a return to the situation of the 1990s, where there was a single state-owned operator controlling the national telecommunications network. The various modes of governance will be listed and critically discussed in the last chapter of this paper. Here only a brief historical overview will be given, focusing on the actors involved and the development of the different visions about it. The idea of a single network actually cyclically appeared within the public debate since the liberalization of the telecommunications market. Projects of unbundling of the network infrastructure of TIM date back to the Rovati Plan, from the surname of the advisor in Romano Prodi's government who first proposed network separation as a solution to TIM's problems. This project was started by Bernabé's management with OpenAccess, which, however, remained an internal division of the company and did not manage to separate due to the opposition of Telefonica's shareholders. Another experience was the one launched in 2009 by the vice-minister of Economic Development Paolo Romani, who proposed the separation and the constitution of a new company owned by CDP and the F2i fund to create a modern fiber infrastructure. When the Board of Directors of TIM then decided to approve the spin-off and begin negotiations with CDP, as we have seen, it was Agcom that scuttled the attempt. As far as the most current dossier, the idea of the Minister for Economic Development, Carlo Calenda, to set up a single network became manifest when CDP decided, in April 2018, to enter in Telecom with a share of 4.26% and, in the assembly of May 4, to support the list presented by the U.S. fund Elliott (in favor of the network integration project), which won with 49.84% of the votes (which earned it 10 out of 15 seats on the board), despite Vivendi having the majority and the CEO expressed by Vivendi, Gemish, reiterated the irrationality of the agreement with an entity as small as Open Fiber. Between the end of 2018 and the beginning of 2019, Vivendi continued the pressing until the BoD of March 29, 2019, which sanctioned a truce between the French and the

Americans, with Vivendi withdrawing the proposal to remove five directors in the Elliott quota. Vivendi in the meanwhile, in fact, said it was ready to support the single network project with Open Fiber "in case the conditions are correct and fair from an operational point of view, financial and regulatory point of view and supervised by a Board of Directors composed in majority of independent Directors." Vivendi's openness to the project was then followed by a Memorandum of Understanding<sup>14</sup> signed in August 2020 by TIM and CDP equity, which increased CDP's equity to 10% and manifested the two operators' intentions to create a single wholesale-only network by merging the infrastructure of Open Fiber and that of FiberCop. The latter is a company in which TIM (which owns 58%, together with 37.5% of the fund KKR and 4.5% of Fastweb) has already unbundled its entire secondary network (from cabinets to users), including the existing fiber network built through the joint venture with Fastweb FlashFiber. The company resulting from the merger of Open Fiber and FiberCop should be called AccessCo and TIM should own 50,1%, not without some perplexities about the neutrality of this ownership share. This was before ENEL decided on the offer of the Macquarie fund to buy 49% of Open Fiber<sup>15</sup>. In December, in fact, Enel, probably dissatisfied with the turn the project was taking (far from the simplicity with which it had been presented in 2016 by the Renzi government), mandated its CEO Francesco Starace to proceed with the sale of 40-50% of its stake in Open Fiber to the Australian Macquarie fund, which, however, will not take place before June 20, 2021. Meanwhile, CDP is trying to exercise a right of first refusal on 5 or 10% of ENEL's share in order to be able to manage the merger in AccessCo. In addition, the Antitrust Authority has initiated an investigation against Telecom, Fastweb, FiberCop, Tiscali and Kkr (via Teemo Bidco) in order to evaluate "the contracts that regulate the constitution and operation of FiberCop and the supply agreements with Fastweb and Tiscali", which should close no later than December 31, 2021<sup>16</sup>. TIM's Board of Directors scheduled for February 23 will serve as a yardstick to gauge Vivendi's mood regarding the events of Mediaset (see box) and the slowdowns due to the Enel-Macquarie case.

The project of a single network, long sponsored by the government of Rome (especially through Stefano Patuanelli, Minister of Economic Development, proved in the end to be decidedly more complicated in its realization compared to the apparently unquestionable benefits that it should have entailed. Now, with the transition to the mixed technical-political government headed by Mario Draghi, it will be seen what the fate of the dossier will be, while the position of the European Antitrust Authority on the matter is still to be verified.<sup>17</sup> Political positions have influenced the course of the project, at times branding it as the solution to all the country's ills and at other times as a recklessness to be avoided. As we shall see later, then, the plan also proved to be complicated

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<sup>14</sup> The document is available at: <https://www.gruppotim.it/it/investitori/report-presentazioni/presentazioniwebcast/2020/fiber-cop-cdpe-mou.html>

<sup>15</sup> On ENEL's reasons: <https://it.businessinsider.com/open-fiber-banda-ultra-larga-rete-unica-enel-timtelecom-macquarie/>

<sup>16</sup> On the antitrust inquiry: <https://www.fortuneita.com/2021/01/21/fiber-cop-antitrust-vuole-vederci-chiaro/>

<sup>17</sup> We refer here to Commissioner Vestager's last declarations:

<https://www.lastampa.it/economia/2021/02/11/news/rete-unica-eccocosa-ha-detto-la-vestager-1.39888527>

from a technical and managerial point of view. The debate should therefore transcend the classic public-private dichotomy. In our opinion, it is true that the process of liberalization of the sector and privatization of Telecom should have been better managed, perhaps envisaging from the outset the exercise of the golden share and constituting in the sector a reality similar to that of ENI, Leonardo etc., sectors no less "strategic" than that of telecommunications. However, times and conditions have changed and some progress has been made. Now we need to ask ourselves, with a pragmatism that does not pretend to cancel political dialectics, what is the best solution for the country.

We will try to outline it in the next few pages.



### Box 1: The players involved in the Italian fiber infrastructure

#### Vivendi

The French group Vivendi SA currently holds 23.94% of the shares of TIM, configuring itself as a relative majority shareholder. It expresses 5 directors in the Board of Directors. The group began to take an interest in TIM in 2014, with the arrival at the helm of the company of Vincent Bolloré in the role of chairman. The Bolloré group is still majority shareholder of the Vivendi Group, of which Yannick, son of Vincent. Bolloré has not been in Italy since yesterday: in fact, the financier has been on the Board of Directors of Mediobanca since 2003 (and still owns around 5% of it). Bolloré is one of the many faces of the intertwining of Italian and French capitalism. He joined TIM in June 2015 and has increased participation progressively scaling up to today's percentage. The group also holds 28.8% of Mediaset, for which it ended up in the eye of the storm of Agcom.

Vivendi began to take an interest in TIM in 2014 and tightened its grip on it in 2017, appointing current Vivendi CEO Arnaud de Puyfontaine to the presidency and the Israeli manager Amos Gemish as CEO, who is then replaced by Gubitosi, a man close to CDP and Elliott. In the same period TIM is scrutinized and subjected to the discipline of the so-called governmental Golden Power, consisting of a series of prescriptions and controls on the controls on the work of the company motivated by the presence in TIM of companies such as Telecom Italia Sparkle and Telsy elettronica, considered important for national security.

Vivendi has then not well digested the slap of the government that, in an amendment to DL Covid approved by the House on November 25 2020 hatched by Minister Patuanelli, has inserted a paragraph save-Mediaset that allows Agcom to carry out investigations on possible incompatibilities with Telecom. This challenge with Mediaset has been going on for some years, after Vivendi succeeded in having the Court of Justice of the European Union reject the

the Gasparri law, through which Agcom had responded to Mediaset's request for help by declaring illegitimate the participation of the French company in the Italian media group. Also in this case, Bolloré and de Puyfontaine did not hesitate to write a letter to EU commissioner Thierry Breton. All this could put the brakes on the dialogues that have been resuming for a year with CDP on the single network after the progressive disengagement of the Elliott fund.

#### Elliott

The Elliott Management Corporation fund, led by Paul Singer, entered TIM in March 2018 and immediately stands out for its harsh criticism of Vivendi's management, accusing it of mismanagement. He has seen eye to eye from the beginning with the



network project proposed by Minister Calenda, siding with CDP and helping to determine Vivendi's turnaround in this regard.

### **The KKR fund**

Private equity fund, considered a systemic player in the USA and interested in strategic sectors such as energy and infrastructure, holds 37.5% of FiberCop. Its entry was the subject of scrutiny by the Golden Power Committee, which imposed stringent requirements as a condition for entry into the newco. The president of the Kkr Global Institute, a division that provides geopolitical risk analysis for investors, is David Petraeus, legendary four-star general of the Marines, formerly head of troops in Iraq, Afghanistan and Pakistan, then director of the CIA.<sup>18</sup>

### **Macquarie**

The Australian financial group has already appeared in the Italian news because of its interest in the Benetton family's stake in Autostrade per l'Italia. Now it is interested in the 50% of Open Fiber put up for sale by Enel. Through its subsidiary Macquarie Infrastructure and Real Assets (Mira), Mam is the largest asset manager of infrastructure in the world with a portfolio of over 150 assets worth 125 billion (57 of which are in Europe)<sup>19</sup>.

### **Enel**

The Italian energy giant immediately entered into Open Fiber under the auspices of the Renzi government, so much so that the company was initially called Enel Open Fiber. The idea was that of exploiting Enel's cable ducts and electricity meters to lay the new fiber infrastructure, exploiting the revenues from the electricity meters to finance it. However, the project was rejected by the antitrust authorities. The mood of the big energy group then became darker also in the face of the ambiguities of the management of TIM led by Vivendi, who seemed to be open to the single network only in the face of the guarantee of maintaining the majority stake.

### **CDP**

The financial arm of the Ministry of Economy and Finance has tried in this game to play the role of pivot, launching with ENEL the Open Fiber project and entering the capital of TIM to accompany the political initiatives to unbundle the network and merge it into a single network. In fact, the change of direction of TIM management, initially opposed to the single network but then signatory of the letter of intent of August 2020 with CDP, seems to be due to the moral suasion of the Cassa Depositi e Prestiti.

## 2. The current state of fiber networks in Italy and Europe

### 2.1 The different types of fixed network

Data transfer to the Internet happens through fiber optic cables. These cables connect the different continents and are rolled out on the bottom of the oceans by ships. It's a job that is largely financed by companies that have a business need for a large network that involves the highest possible number of countries. Such companies, however, are not responsible for the realization of an infrastructure that reaches extensively the end users. This work is left to single private and public players in the single countries. Therefore, before analysing in detail what fiber networks have to offer, it's worth dedicating some time to understanding the different technologies that enable fixed Internet connections. In particular, this section will discuss four types of connections: ADSL, FTTH, FTTCab and FWA.

**ADSL:** In the mid-90s, when the mass diffusion of the Internet started, fixed networks were extremely slow if compared to the current standards. Internet connections were enabled by an instrument called *modem*, and it was impossible to receive or make phone calls while surfing the Net. Then, in the 2000s, ADSL (Asymmetric Digital Subscriber Line) technology replaced the old system, allowing for faster connections and the contemporary use of Internet and other phone services. ADSL connections therefore had a primary role in the growth of the Internet, and the number of households that are currently connected through ADSL is still high, both in Italy and the rest of the world.

**FTTCab:** As fiber networks started to become more popular thanks to their better performance, the need for the realization of a fiber infrastructure became clear. FTTCab technology represents a hybrid solution that makes use of fiber cables from the centrals to the street cabinets, and leaves the final stretch (the one that reaches the single household) in copper. In Italy, this has been the solution preferred by TIM, as it avoided the former monopolist to build an entirely new, fiber-only infrastructure.

**FTTH:** FTTH (Fiber to the Home) connections rely on an infrastructure which is entirely in fiber, both the section going from the centrals to the cabinets and that connecting cabinets to end users. This is the technology that currently offers the best performances among those that are widely available

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<sup>18</sup> Bechis, F. (2020). Kkr, tutto quello che c'è da sapere del super fondo che investe in Italia. formiche.net <https://formiche.net/2020/08/kkr-fondo-usaitalia/#:~:text=La%20societ%C3%A0%20di%20private%20equity,Kohlberg%20Kravis%20Roberts%20%26%20Co.>

<sup>19</sup> Canguri su Open Fiber. Il metodo Macquarie. Rumors. affaritaliani.it <https://www.affaritaliani.it/economia/canguri-su-open-fiber-il-metodo-macquarie-rumors702010.html#:~:text=Macquarie%2C%20gruppo%20finanziario%20australiano%20attivo,Italia%2C%20per%20Ola%20quale%20Macquarie>

to the public. A better overview of the advantages offered by FTTH connections is provided in Section 2.2. A slightly different solution is represented by FTTB (Fiber to the Building). Here, fiber cables only reach the basement of the building, leaving a small, final part in copper.

**FWA:** Fixed Wireless Access technology is an innovative solution that can be seen as a hybrid between fixed and mobile connections. It can offer competitive performances, comparable to those of FTTH. FWA technology is made up of a physical part (i.e. cables connecting the centrals and radio towers) and a wireless one. In fact, the signal reaches the end users from the radio tower, without the need for an extensive physical infrastructure. Because of that, FWA is sometimes referred to as FTTT (Fiber to the Tower). This paper does not aim at discussing extensively the possibilities offered by FWA. However, it is worth noting that FWA is an interesting solution, particularly because it can provide connectivity even in remote areas where building a physical infrastructure is not easy.

## 2.2 Why FTTH is the best solution currently on the market

Fiber networks offer several advantages over the traditional copper ones. These advantages concern both speed of connection and higher bandwidth, but also other aspects such as security and environmental impact. In this section we will analyse in detail the benefits offered by fiber networks.

**1) Higher speed:** Fiber networks allow for a much higher speed than copper ones. In fact, FTTH allows for a data transfer speed of over 1 Gbps, while FTTB and FTTCab allow respectively for a speed of up to 1 Gbps and 100/200 Mbps. These numbers represent a stark improvement from the performance offered by ADSL connections, that does not go beyond 20 Mbps even in optimal conditions<sup>20</sup>.

**2) Bandwidth:** Fiber networks allow for a bandwidth of up to 60 Tbps, compared to only 10 Gbps for copper networks<sup>21</sup>. It is important to keep in mind that network speed and bandwidth are not the same. The first refers to the amount of time necessary to transfer data, while the latter refers to how much data can be transferred at the same time. Bandwidth is therefore key to workplaces that make an intensive use of services such as videoconferencing, streaming, sharing of cumbersome files and cloud services.

**3) Low signal attenuation:** The performance of a fiber network is only weakly influenced by the proximity of the next central switch, contrary to what happens with ADSL. This allows for homogeneous performances, regardless of the geographical position of the end user.

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<sup>20</sup> A comparison between fiber and ADSL network speed can be retrieved at:  
<https://openfiber.it/mondo-open-fiber/news/differenza-fttc-e-ftth/>

<sup>21</sup> An overview of the main advantages of fiber networks can be found at:  
<https://www.fiberplusinc.com/services-offered/benefits-fiber-optic-cables/>

**4) Higher resistance to external factors:** External factors that might reduce the performance of the fixed connection (i.e. electromagnetic interference from other machinery) have a much lower impact on fiber networks than they have on copper ones.

**5) Security:** Fiber networks allow for better security than that offered by copper networks. In fact, it is extremely hard to intercept data transferred through a fiber network without compromising the entire physical infrastructure and consequently shutting off the signal.

**6) Lower environmental impact:** By lowering the need for copper extraction, fiber networks can reduce the carbon footprint. Moreover, fiber networks have a lower need for maintenance and, as a consequence, a lower need for materials. Finally, they consume less electricity when transferring data<sup>22</sup>.

### 2.3. Fixed networks in Italy: an overview

The digitization process of society is advancing fast and cannot be stopped. Therefore, there is a need to offer citizens and enterprises connectivity services that can allow them to take part in the cultural life and economic future of their country. Moreover, in the business community, there is a growing need for the development of digital skills and infrastructures that can guarantee competitiveness at the global level. Within this framework, the realization of a modern and extensive fiber infrastructure represents an essential step for a country that is lagging behind on the digital agenda such as Italy. A fiber infrastructure which can guarantee universal coverage and accessible prices would allow citizens to, for example, benefit from the possibility of accessing online public and private services. Enterprises would get the chance to fully exploit the possibilities offered by cloud computing and remote working. However, the existing infrastructure in Italy is still not up to this task: even though ADSL coverage is nearly universal, with 99.6% of administrative units served, only 55.8% of households are reached by FTTCab and enjoy a connection speed of at least 100 Mbps. FTTH coverage is still at only 30%<sup>23</sup>. It is important to highlight that these numbers are coverage rates, and do not automatically translate into the rate of citizens that actually activated the connection. In fact, there is a large group of citizens that, for cultural or economical reasons, decided not to make use of an Internet connection. A 2019 OECD report estimated that 26% of Italians never surfed on the Internet<sup>24</sup>. Figure 1 shows how this number has a strong geographical

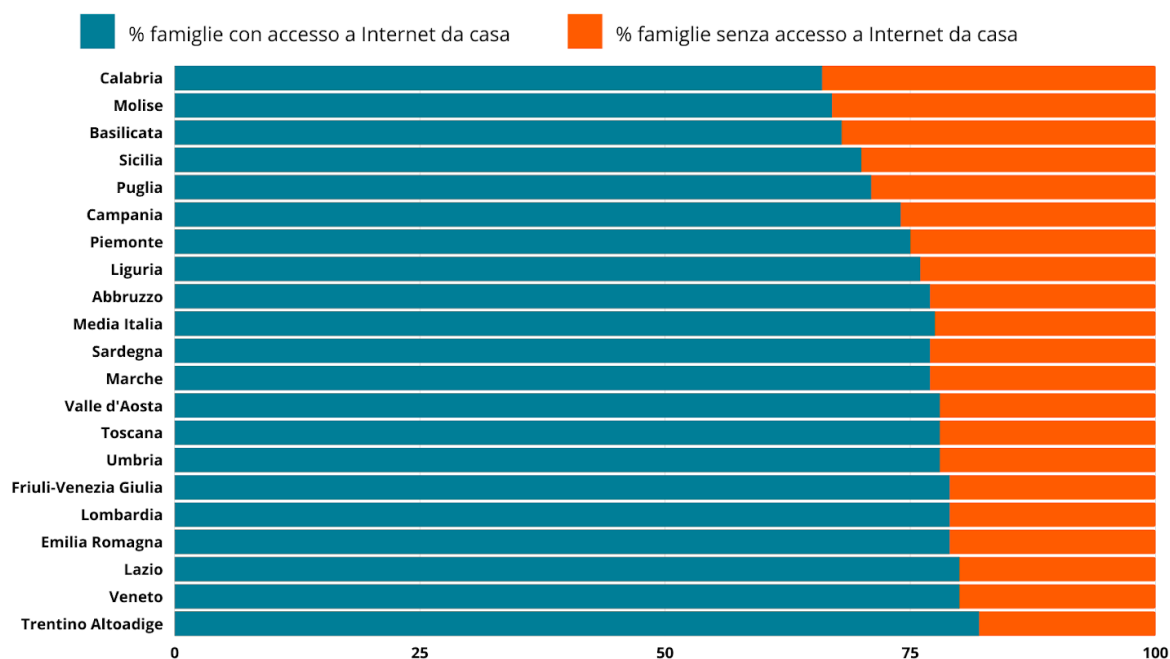
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<sup>22</sup> Open Fiber's guide to the environmental impact of fiber networks can be retrieved at: <https://openfiber.it/mondo-open-fiber/news/bollino-verde-rete-ftth/>

<sup>23</sup> AGCOM data available at: <https://maps.agcom.it/>

<sup>24</sup> The OECD report is available at: <http://www.oecd.org/education/oecd-skills-outlook-e11c1c2d-en.htm>

connotation, with the lower-income regions lagging behind the richer ones in this particular standing<sup>25</sup>.



Fonte: elaborazione openpolis - Con i Bambini su dati Istat

If economic considerations explain part of this *digital divide*, there is no doubt that there is also a demographic component to it. It is somewhat natural to expect the older segments of the population to be less interested and predisposed to the use of digital tools. This is an issue worth keeping in mind, especially in relation to the digitalization of the services that are essential to every citizen. However, a voluntary digital divide driven by citizens' age is less worrying than an involuntary one based on economic considerations. This is particularly true for young students that cannot afford to have a personal computer and Internet connection, a category that, according to an Openpolis study based on Istat data, currently represents 5,3% of Italian families<sup>26</sup>.

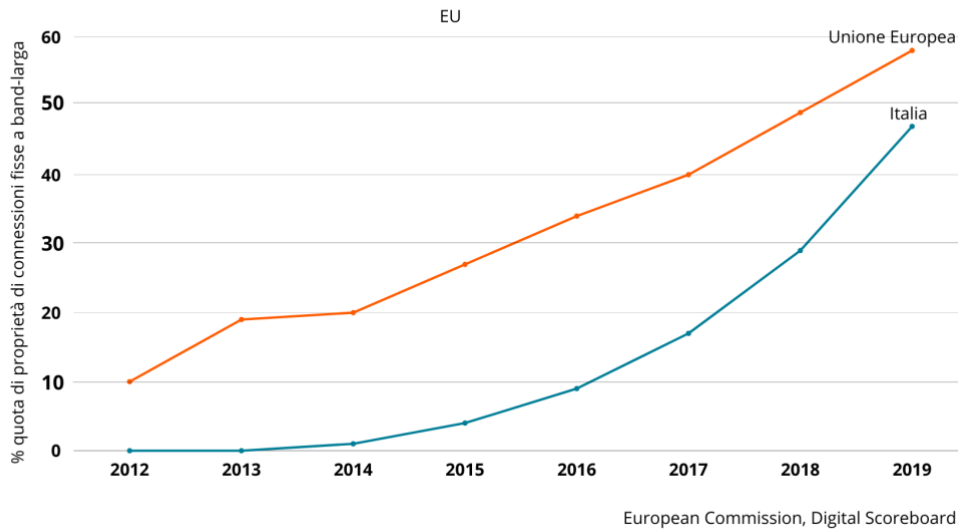
Finally, it must be stressed that this digital divide is not only an internal issue, but it also translates into a gap that separates Italy from many of its European partners. Figures 2 and 3 show how Italy is lagging behind other European counterparts in the number of families that enjoy a connection with a speed of at least 30 Mbps. The gap gets even bigger when considering the data related to Internet connection with a speed of over 100 Mbps<sup>27</sup>.

<sup>25</sup> ISTAT data, elaborated by Openpolis and available at: <https://d110erj175o600.cloudfront.net/wp-content/uploads/2020/07/Disuguaglianze-digitali.pdf>

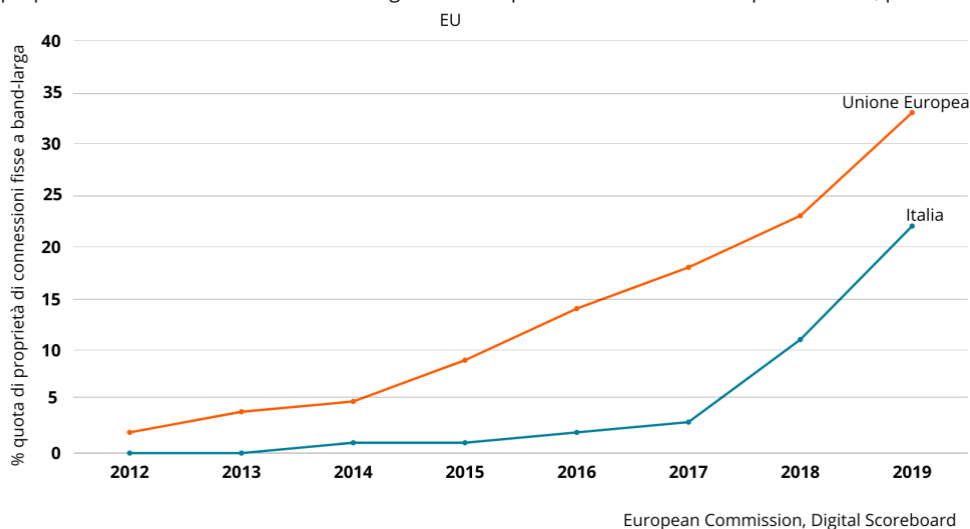
<sup>26</sup> Report available at: <https://d110erj175o600.cloudfront.net/wp-content/uploads/2020/07/Disuguaglianze-digitali.pdf>

<sup>27</sup> European Commission data, available at: <https://digital-agenda-data.eu/>

Quota di proprietà di connessioni fisse a banda larga  $\geq$  30Mbps - Velocità di download pubblicizzata, per il Totale



Quota di proprietà di connessioni fisse a banda larga  $\geq$  100Mbps - Velocità di download pubblicizzata, per il Totale



For what concerns FTTH connections alone, Italy currently sits at the third last spot in the standing made by the FTTH Council<sup>28</sup>, with only 7.1% of the households currently subscribed to FTTH connections.

## 2.4 The deployment of fiber in Europe

<sup>28</sup> The full report can be accessed at:  
<https://www.ftthcouncil.eu/documents/FTTH%20Council%20Europe%20-%20Forecast%20for%20EUROPE%202020-2026%20AFTER%20COVID19%20-%20FINAL%20Published%20Version.pdf>

Section 1 and 2 described the historical reasons that led to the Italian delay in fiber networks. However, it must be stressed that market failure areas are an issue that each country, interested in having its own fiber infrastructure, has to deal with. This section aims at going deeper into the decisions and dynamics that underpinned fiber deployment in other European countries. In this way, we hope to put the Italian case into better context. In particular, we will focus on Spain and Sweden, two of the European countries where FTTH penetration is the highest, and Germany, a country that resembles more Italy for its current level of fiber deployment and telecommunications market structure.

In Spain, competition contributed to the development of a fiber network that connected 31 millions of household units already in 2017. At the time, this was a number only lower than that of South Korea and Japan<sup>29</sup>. The reasons behind the Spanish success are manifold. First of all, Spain does not have street cabinets and therefore buildings are directly connected to the centrals. Therefore the hybrid solution represented by FTTCab was not available to incumbent operators that own a copper infrastructure<sup>30</sup>. Moreover, regulation allowed owners of newly built fiber infrastructures to exclude third parties from accessing the full potential of their network. Telecommunications companies were therefore incentivized to build their own networks, thanks also to laws that simplified access to the necessary civil infrastructure.

In Sweden, fiber networks were deployed according to a bottom-up logic. The national infrastructure is therefore the sum of numerous, smaller local networks. Municipalities, independent investors and regional authorities independently started to build networks, putting pressure on the operators that reacted by building their own fiber infrastructure. In the Stockholm metropolitan area the infrastructure was realized by Stokab, a wholesale only operator. The Swedish model is similar to that of other Nordic countries such as Norway and Denmark, where utilities and cable networks operators built local networks. However, in these latter cases, the specific weight of incumbents remained considerable.

In Germany, the deployment of fiber might have reached a turning point in November 2020, when the European Commission approved a new plan that will allocate 6 billion euros to market failure

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<sup>29</sup> An overview on the Spanish case can be accessed at: <https://news.itu.int/spain-case-study-super-fast-broadband/>

<sup>30</sup> Bassanini, F. (2019). Le TLC in Italia fra competizione infrastrutturale e infrastruttura unica. Astrid n.17/2019

areas<sup>31</sup>. As of today, Germany is at the bottom of the list when it comes to FTTH penetration<sup>32</sup>. This is partly due to the presence of a politically influential legacy operator, Deutsche Telekom, that slowed down the deployment of new networks in order to keep profiting from the existing copper infrastructure. The new public funds and the sheer dimension of its market make Germany an attractive investment opportunity. Therefore, we might observe a quick deployment in this country. Private operators have already started showing their interest, as testified by a new joint venture by Telefonica and Allianz, which aims at entering the market as a wholesale only operator<sup>33</sup>.

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<sup>31</sup> The statement from the European Commission on this matter is available at:  
[https://ec.europa.eu/commission/presscorner/detail/en/ip\\_20\\_2132](https://ec.europa.eu/commission/presscorner/detail/en/ip_20_2132)

<sup>32</sup> <https://www.ftthcouncil.eu/documents/FTTH%20Council%20Europe%20-%20Forecast%20for%20EUROPE%202020-2026%20AFTER%20COVID19%20-%20FINAL%20Published%20Version.pdf>

<sup>33</sup> The announcement on Telefonica's own website can be retrieved at:  
<https://www.telefonica.com/en/web/press-office/-/telefonica-and-allianz-create-a-partnership-to-deploy-fibre-in-germany-through-an-open-wholesale-company>



### Box 2: cluster division planned by the BUL plan

The existence of sparsely inhabited areas represents the main obstacle to the realization of private fiber infrastructures. In fact, in these areas the number of potential subscribers is not sufficient to cover the initial investment. The BUL plan divide Italy into four different clusters, according to the level of private investment the were expected in each of the clusters<sup>34</sup>.

**Cluster A** is made up of the most densely inhabited areas of the country and the main industrial areas, covering an overall 15% of the Italian population. Here, the deployment of a fiber network that can guarantee a connection speed of 100 Mbps requires only limited public intervention (fiscal breaks, guarantees on debt).

**Cluster B** comprehends the areas where the sole market forces would allow for a connection speed of 30 Mbps. Public intervention is therefore needed to reach the target 100 Mbps. This cluster covers the largest share of the population (45%).

**Cluster C** makes up for 25% of the population. Here, a stronger public intervention than that needed in Cluster B is needed to reach the target 100 Mbps.

**Cluster D** concerns market failure areas where a strong and substantial public intervention is needed to guarantee residents an adequate connectivity. This cluster makes up for 15% of the population, mainly located in rural areas.

Another distinction that is often used in the debate is the one between black, grey and white areas. These three areas correspond to Cluster A (black areas), Cluster B (grey areas) and Clusters C and D (white areas). This division stresses the number of operators that showed interest in investing in each area: more than one for black areas, one for grey areas and no operators in white areas.

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<sup>34</sup> For more information, see the official document available at:  
<https://www.camera.it/temiap/documentazione/temi/pdf/1104721.pdf>

### Box 3: Innovation in ICT: EBWorld's solutions

Although the world of telecommunications and ICT is often known for companies such as Tim and Open Fiber, it is important to convey to the reader the depth of the value chain connected to the telco sector. In this regard, in our country there is a very interesting reality for the combination of innovation and respect for the territory: EBWorld. The company, founded in 1983, uses forms of intelligence applied to the territory (intelligence in maps) to create Geospatial Information Systems (GIS), also integrating them with external applications and databases. EBWorld, thanks to its unique and special knowledge of geographical data and the processes characteristic of the life cycle of infrastructure networks, is therefore a natural partner for all major telecommunications operators, who can also take advantage of the geomarketing, business intelligence and automated operations management services offered by the Pesaro-based company. Analysis of physical space, demographic and market data, as well as any other geo-referenced data, are features that make EBWorld's solutions particularly unique in supporting the investment planning and development phases. These assets have enabled the company to play a leading role, since the 2000s, in the first implementations of FTTH networks in our country and to develop know-how in the design and deployment of latest generation fibre optic networks.

An interesting concrete example of a project carried out by EBWorld for the telco sector concerns an application capable of integrating cartographic layers, cadastral maps and other information referring to the territory to support the processes of design, maintenance and asset management of infrastructure networks and real estate.

## 3. From the single network hypothesis to the maintenance of infrastructural competition

### 3.1 The three dimensions of the Italian telecommunication infrastructural issue

In the light of the elements that emerged in the previous paragraphs, this last section aims at analysing the main solutions able to maximise opportunities and minimise risks deriving from the roll-out of ultra-broad band and from the hypothetical single network. The range of choices can be placed in a space of three dimensions: the first, relative to the models of infrastructural architecture, vertically integrated or wholesale only; the second, characterised by the partition between a competitive system and a pseudo-monopolistic one; the third, regarding the selection of the controlling subject, whether public or private (or hybrid).

Starting from the first dimension, it is useful to clarify first of all the main differences between the two architectures. In the vertical integration model, the controller of the infrastructure is the same

as the one providing the final services to the consumer. Tim, for example, is a vertically integrated reality, being the owner of the primary and secondary network (now through FiberCop)<sup>35</sup> and having a consolidated presence in the retail market. The wholesale-only model, on the other hand, envisages a separation between the operator who holds the infrastructure and the final service provider. Open Fiber is a representation of this model: simply think of the fact that, as consumers, we do not see Open Fiber shops around our cities, while we meet TIM sales points at every corner. We anticipate what will be a fundamental conclusion: we do not believe that the wholesale "single network" is a plausible hypothesis. Tim, in fact, has always defended the model of vertical integration, a rational and legitimate choice for the incumbent. Consequently, the only "single network" hypothesis that we will consider below will be the vertically integrated one.

However, despite the above description, the European legislator has not clearly defined the precise details of wholesale-only operators, leaving open insidious questions in case the whole infrastructure ends up in the hands of a single entity (as could happen in Italy): 1) will the single wholesale entity sell purely passive services, or also active ones? 2) Will this entity be able to sell wholesale services to large companies that do not need a traditional provider? 3) Will decisions on the equipment to be installed be the responsibility of the wholesale operator or of the operators requesting access?<sup>36</sup> These three simple, unresolved questions show how simple it is to say wholesale-only, but behind this simplicity lie many pitfalls.

The second dimension is crucial and diriment: to choose a pseudo-monopolistic system or to guarantee infrastructural competition between various operators? The answer to this question requires a careful analysis, avoiding ideological dogmas of unlimitate liberalism or returning statalism. Preliminary remark: both solutions have as many advantages as drawbacks. Franco Bassanini, current president of Open Fiber, has listed some reasons in support of the single infrastructure solution:<sup>37</sup>

- It would avoid duplication of investment;
- It would accelerate the deployment of ultra-broadband;
- It would make it easier to impose universal coverage obligations, avoiding a new digital divide;
- It would allow investments to be spread over almost twice as many users.

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<sup>35</sup> <https://wdc.wholesale.telecomitalia.it/fibercop/>

<sup>36</sup> Genna I., (2020). *Le incognite della rete unica di telecomunicazioni, tra nazionalizzazione e controllo di Tim*. La Stampa <https://www.lastampa.it/economia/2020/08/26/news/le-incognite-della-rete-unica-di-telecomunicazioni-tra-nazionalizzazione-e-controllo-di-tim-1.39233173>

<sup>37</sup> Bassanini, F. (2019). *Le TLC in Italia fra competizione infrastrutturale e infrastruttura unica*. Astrid n.17/2019

However, not everything would be good. The elimination of infrastructure competition would give rise to a number of problems, some of which have been highlighted by Franco Bernabè, former CEO of Telecom:<sup>38</sup>

- The network structures of Tim and Open Fiber are different, in particular as regards the secondary network. Consequently, the integration of the two networks would not be easy;
- The process of infrastructural and corporate integration would risk slowing down the country's cabling efforts;
- Open Fiber and TIM have profoundly different corporate cultures, the merger of which could be problematic;
- The European Commission could find flaws of competition rules and of the European Communications Code if the entity is not fully a neutral operator;
- Corporate governance: who would be the controlling shareholder? Tim, CDP?

These last considerations are closely related to the third dimension, concerning the controlling entity of a possible single network. It is useful to remember that, until 2015, Italy had a single network: that of the former monopolist TIM. The creation of Open Fiber, in December of that year, was motivated by the perceived need of sending a signal to the monopolist. Tim, in fact, had an interest in delaying the divestment of the copper network, which is a key asset of the company, thus slowing down the roll-out plans for ultra-broadband. The company led by Gubitosi has always justified low investment in fiber on the grounds of insufficient demand, an unconvincing pretext for masking the lack of convenience of replacement. Competition in infrastructure and the abandonment of a pseudo-monopolistic model with private traction are therefore a direct consequence of the approval of the BUL plan and the establishment of Open Fiber, a company owned by two giants such as Enel and CDP. Open Fiber was conceived as a wholesale-only infrastructural operator, able to invest with its own resources in medium-large cities, resorting instead in part to European structural funds for investments in clusters C and D, considered to be 'market failure'.

### 3.2 Open Fiber's asymmetrical competition and Tim's reactions

So why today, scarcely 5 years later, is there a debate on the necessity to change the telecommunications structure in Italy once again? What has it not worked? Why has the infrastructural competition guaranteed by the constitution of Open Fiber not been sufficient? Has everything really gone so wrong?

Basically, TIM, instead of investing in FTTH (fibre to the home) architecture, chose to focus mostly on FTTCab (fibre to the cabinet), in order to reduce investment costs and at the same time extend

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<sup>38</sup> Sacco F. (2020). *Rete Unica Tim-Open Fiber, a chi conviene? Tutti i punti su cui riflettere*. Agenda Digitale

the life of the copper network. In addition, end-users were discouraged from switching from the copper network to the fiber network through advertising and anti-competitive practices. These practices led to an antitrust investigation in 2017, which ended with a €116 million fine imposed on Tim, for remodelling its offer in order to drain the pool of demand contestable by other operators<sup>39</sup>. These actions by the incumbent were welded to the timing of Italian bureaucracy, slowing down Open Fiber's investment plans in white areas and hindering the migration of households and businesses to a higher-performance network.

The infrastructural competition generated by Open Fiber has in fact two specificities: 1) it does not yet concern the whole country, given that there are still areas where there is no alternative to Tim's network; 2) it is not fully symmetrical, in light of the market power that the incumbent retains and the costs of migration from copper to fiber, which prevent the creation of a true level playing field. We are therefore in the presence of a competition model partially asymmetrical, an element that characterises our country compared to other European countries.

### 3.3 The impossible "Terna model" for Italy's telecommunications structure

This brings us to the question of the hypothetical single grid. In an interview given to Il Sole 24 Ore last September, Minister for Economic Development Patuanelli stated that the government's project envisages a wholesale operator, where the State retains a relative majority, based on the "Terna model", cited by the Minister himself as an example to be followed<sup>40</sup>. This project, however, has at least two obvious critical points that complicate its implementation:

- Terna was born as a company within Enel, which maintained a controlling stake until 2005, when Cassa Depositi e Prestiti took over as relative majority shareholder. Thus, the Terna model concerns entirely state controlled companies, an element that is missing when it comes to Tim;
- Tim itself has no intention of giving up control of AccessCo, the possible newco resulting from the integration of FiberCop and Open Fiber. In this regard, Minister Patuanelli, in the same interview mentioned above, said of the project that "we certainly cannot impose it".

### 3.4 Why the single network would be more of a problem than a solution

Is there really a need for a Tim-Open Fiber merger to achieve the objectives of the BUL plan? In the analysis reported here, we suggest addressing this question on three different levels: the purely technological one, the economic-financial one and the political one. The analysis of the last two points is beyond the scope of this research, which instead focuses on the aspect of maximising national connectivity. Ultimately, from a careful analysis of opportunities and risks, the single

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<sup>39</sup> PUNTO 1-Tim, multa da 116 mln da antitrust per pratiche anticoncorrenziali su fibra. Reuters (2020)

<sup>40</sup> Anastasio P. (2020). Rete Unica; Patuanelli 'Il modello è Terna. Ma nel rispetto delle norme Ue'. Key4biz

network would generate more problems than opportunities for the country-system, for a number of reasons:

1) First of all, are we really sure that having two networks is a huge problem? In all industrialised countries there are always two networks, the telephone network and the cable TV network. In the light of the legislator's choice to prevent the development of the cable TV network<sup>41</sup>, Open Fiber could take its place without creating any particular anomalies or problems. It is therefore difficult to understand what would be the risks of replicating in Italy what is a consolidated practice elsewhere;

2) Secondly, the time required for the merger would probably be very long, given the series of knots to be resolved for the transaction to be successful, starting with the far from obvious issue of corporate governance. Such bureaucratic delays would cause further delays to the country's cable effort, freezing Open Fiber's investments while waiting for the deal to be completed. Elisabetta Ripa, Open Fiber's CEO, stated that "any merger or acquisition now would freeze the activities and investments that Open Fiber is making. The result would be a delay"<sup>42</sup>. In addition, appeals on the tenders won by Open Fiber and/or on the specific treatment reserved to wholesale operators could not be excluded, as well as possible interventions by the European Commission to verify consistency with the new Communications Code and with antitrust law. Commissioner Vestager, replying to a question by a Dutch MEP, essentially recalled that the Commission will eventually be called upon to assess the merger after the mandatory notification: the judgement on the legitimacy of a merger cannot in fact be anticipated by the Commission, but requires a formal communication by the parties, which has obviously not yet taken place<sup>43</sup>;

3) In addition, the competition present since 2016 does not seem to have produced negative results, far from it. It is true that Open Fiber has lagged behind, but from 2016 we have gone from being the penultimate European country in terms of FTTH network growth to being in third position, with +72.9% growth from 2018 to 2019, and 47% from 2019 to 2020, first place in Europe. So this competition is not as bad as some want us to believe;

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<sup>41</sup> Nel 1975 il legislatore ha infatti impedito la realizzazione di reti TV via cavo multicanale, imponendo contestualmente limiti all'estensione territoriale delle reti monocanale. L'intento era quello di blindare il duopolio Rai-Fininvest.

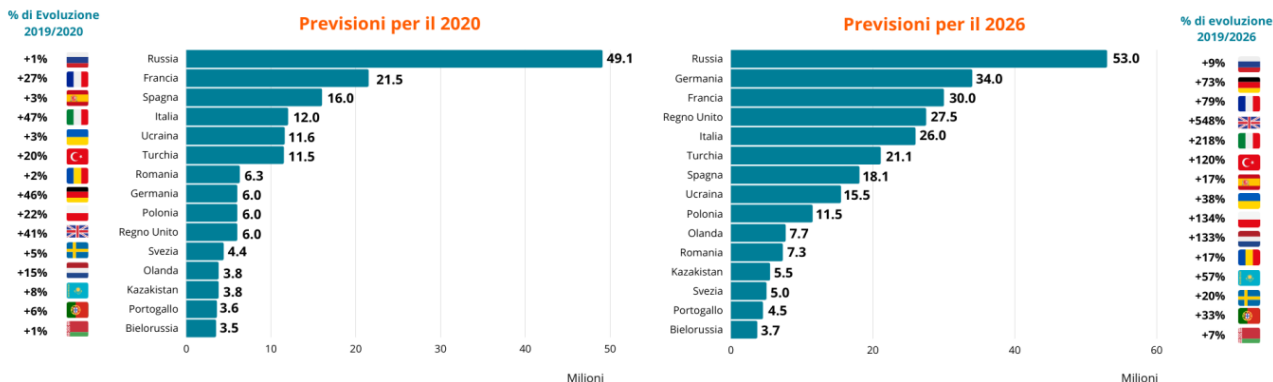
<sup>42</sup> Ripa: "La rete unica? Non serve al Paese: bloccherebbe gli investimenti". Corcom (2020)

<sup>43</sup> Genna I. (2020). *Rete Unica, ecco cosa ha detto la Vestager*. La Stampa

**Top 15 Paesi per numero di case toccate dall'FTTH/B nel 2021 & 2026**

Classifica dei paesi Europei in termini di case toccate dall'FTTH/B (in milioni)

**Previsioni per il 2026**  
 EU28 : ~202m FTTH H.P.  
 EU39 : ~317m FTTH H.P.



FONTE: IDATE for FTTH Council EUROPE

4) The networks of Open Fiber and Tim have few points in common, so their integration would be difficult given the scarce presence of synergies. Even with regard to the secondary network already spun off by Tim into FiberCop, synergies would be practically low. Francesco Sacco, professor of Digital Economy at the University of Insubria and SDA Bocconi, argued that "unbundling only the section from the cabinet to the house makes sense for a purely financial investor. It does not make sense at all for an industrial investor whose goal is to cable the country"<sup>44</sup>. As regards the FTTH network that FiberCop intends to build through the co-investment formula, the potential points of contact would be greater: the infrastructure will in fact be semi-GPON in a secondary optical network. Moreover, it will adopt the Point2Point (P2P) system up to the customer's home, the same that characterizes the Open Fiber infrastructure. Therefore, this could appear as an element in favour of the single network, but it is necessary to remember that within the perimeter of FiberCop remains the Flash Fiber network, totally GPON with distributed splitters<sup>45</sup>;

5) Open Fiber's delays, which are often cited to justify the need for a single network, are motivated more by bureaucratic reasons than operational ones, from Tim's appeals to delays in granting municipal permits. According to research by Astel, bureaucracy is in fact the real ballast holding back the BUL plan: to start a telecom infrastructure site in rural areas, authorisations are needed

<sup>44</sup> Sacco F. (2020). *Rete Unica Tim-Open Fiber, a chi conviene? Tutti i punti su cui riflettere*. Agenda Digitale

<sup>45</sup> <https://www.youtube.com/watch?v=wQIWKUBotIs>

from six different administrations and take up to 250 days<sup>46</sup>. Therefore, even a single network, far from solving the above problems, would face a similar situation;

6) Finally, if the hypothesis of a single wholesale network is excluded for the reasons mentioned at the beginning of this chapter, it follows that the alternative is between maintaining current competition and returning to a vertical integration model led by Tim. The latter hypothesis, in the opinion of the writer, would be convincing and desirable only for the shareholders of the company led by Gubitosi, less so for citizens and the Government. In fact, vertically integrated operators, as recalled by the telecommunications expert Innocenzo Genna<sup>47</sup>, have historically failed to make the technological leaps necessary to keep up with innovation.

#### **Box 4: A proposal to overcome the bureaucratic impasse**

The development of ultra-wideband is slowed down by bureaucracy and 'bad execution': a radical reform is therefore urgently needed to promote the digitisation of the country in a short period of time. The situation is undoubtedly better than in 2015, the year in which the National Ultra-Broadband Strategy was launched, but no measure (Decreto Scavi, DL Semplificazioni, etc.) has really solved the problem. The before mentioned Francesco Sacco, professor of Management Consulting at Bocconi University, has proposed the creation of a single "national platform for the management of permits, documents, tenders and project management for all major infrastructure projects"<sup>48</sup>. A centralisation, therefore, aimed at avoiding duplication in the supply of documents and authorisations, as well as limiting the discretionary margins of interpretation of the rules, could be the right solutions.

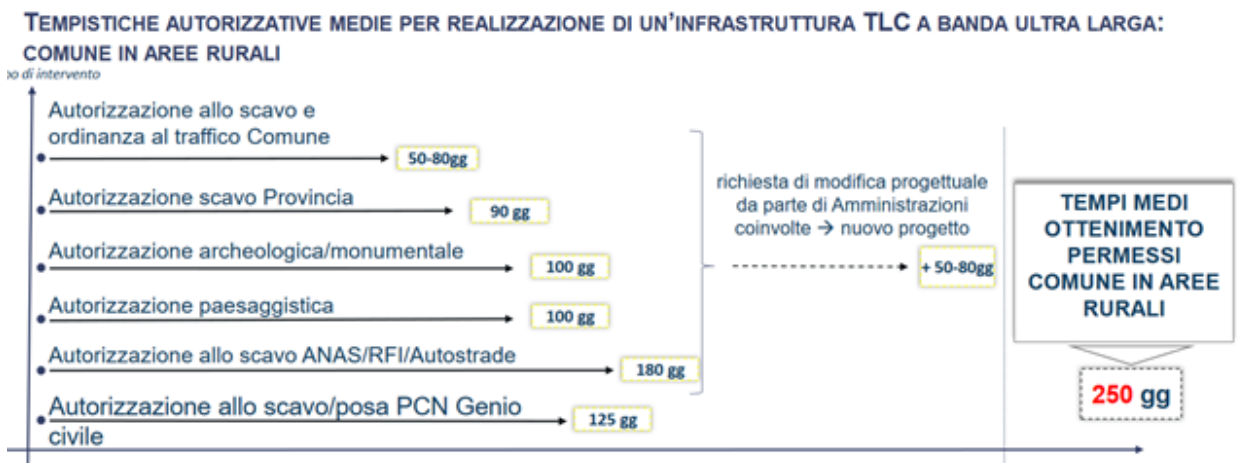
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<sup>46</sup> *La burocrazia zavorra la banda ultralarga: 250 giorni per avviare i lavori*. Corcom (2020)

<sup>47</sup> Genna I. (2020). *Rete unica, mito e pericoli dell'integrazione verticale*. Huffington Post

<sup>48</sup> Sacco F. (2020). *Banda ultralarga, tutti i danni di burocrazia e "bad execution": una proposta per evitare l'ingorgo*. Agenda Digitale





In conclusion, the single network looks more like an attempt to cover the pursuit of different political, economic and financial objectives behind specious technological motivations. In our opinion, the best solution for achieving maximum ultra-wideband coverage involves maintaining infrastructure competition between Tim and Open Fiber, removing bureaucratic obstacles and keeping a constant watch to ensure that anti-competitive practices are not repeated. The current telecommunications set-up needs to be corrected, not overturned. In this regard, Tim's recent decision to open its FiberCop subsidiary to forms of co-investment seems to be an acknowledgement of the inevitability of a competitive system. In fact, the coverage plan presented clearly overlaps with Open Fiber's coverage plans, an element that could put an end to the merger project between the two operators. Paolo Anastasio, on Key4biz, rightly asked: "if the final objective of the single network project is to merge the network infrastructures of FiberCop and Open Fiber to create AccessCo, what sense would there be in merging two companies that cover the same cities? With two infrastructures in the same cities, is it not, on the contrary, promoting competition in the wholesale broadband market?"<sup>49</sup>. It therefore seems that Tim, through FiberCop, is gearing up to compete with Open Fiber in the grey and black areas in the implementation of FTTH networks, demonstrating that few still believe in the single network project.

#### 4. Conclusions

The Covid-19 reminded us how important it is to guarantee equal access to internet services, in order to avoid the accentuation of a digital divide with deep repercussions on the right to education and the right to work, protected by our Constitution. Therefore, broadband cannot be left to a few specialists, but must be made accessible to all citizens, so that a greater awareness develops within the country. The objective of this research was precisely this: to take a picture, as clear as possible, of the state of the art of the telco sector in Italy. The historical overview, described in detail in the

<sup>49</sup> Anastasio P. (2020). *TIM, il piano di coinvestimento di FiberCop manda in soffitta la rete unica?*. Key4biz

first part, provides us with the necessary tools to understand the present and develop some modest suggestions for the future. The urgency to privatise everything that could be privatised led to the unresolved Telecom crisis, a factor which caused the company to become financially overloaded, thus slowing down the investments needed to update the ageing copper networks. The birth of Open Fiber seemed to represent a palingenesis for the sector, but the country's chronic problems (see "bureaucracy") were welded to the historical anomalies of the Italian technical system, slowing the full deployment of all the potential of the company in the hands of Enel and CDP. The objectives set out in the BUL Plan have therefore been postponed by three years (2023) compared to the deadline originally envisaged (2020): it is therefore urgent to ensure that the mistakes of the past are not repeated, by looking for alternative solutions.

We therefore believe that it is appropriate to look at the good side of the country system, putting in second place the legitimate political and financial reasons of the various players that make up the varied puzzle of telecommunications in Italy. The path of the single network is fraught with obstacles and does not represent a real solution to the problems of rolling out ultra-wideband: the elimination of competition in deference to the mantra "one network is better than two" appears to be a very fragile argument for the reasons we have already analysed. A single network with a shareholders majority (or corporate governance) of Tim would not guarantee any certainty of future investments in the FTTH network, would not ensure third party status with respect to the various competitors in the retail market and would block the unexpressed potential of Open Fiber. The best solution, as already mentioned, therefore requires correcting the correctable and accepting the inevitable. Infrastructural competition belongs to the latter category, which now represents a reality that is difficult to abandon, in light of the role played by Open Fiber and the consolidated presence of Tim. This competition should not be justified by ideological pro-market principles, but rather by the observation of the good results that Italy has obtained in the growth of the FTTH network in recent years. That said, not everything is rosy: the BUL plan has not yet been completed and the country continues to lag behind other European partners, so corrective action is needed. The merger between the first and second operator, rather than the solution would be the cause of further delays, which could put a tombstone on the ambition to definitively complete the BUL plan by 2023. Moreover, having discarded the hypothesis of a single wholesale network due to Tim's understandable hostility, it is necessary to avoid going down the road of vertical integration, noting that "the large vertically integrated operators have now turned into powerful commercial machines, which buy technology but do not develop it, and are highly dependent on technology suppliers"<sup>50</sup>. It would be more useful to focus on resolving the bureaucratic impasse that blocks the obtaining of permits and authorisations, creating a centralised platform that streamlines the process, thus avoiding inefficient duplications and excessive margins of discretion. In addition, the European directive on the Electronic Communications Code, which provides for advantages for wholesale-only operators, incentives for fiber investments and facilitations for co-investment, needs to be transposed as soon as possible (infringement proceedings have just been initiated against Italy and

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<sup>50</sup> Genna I. (2020). *Rete unica, mito e pericoli dell'integrazione verticale*. Huffington Post

24 other EU countries)<sup>51</sup>. Finally, it is necessary to ensure that Open Fiber proceeds swiftly in the municipalities where permits have been obtained and that Tim does not adopt anti-competitive practices again, focusing instead its investments on FTTH and no longer on FTTCab.

Infrastructural competition is the only way to avoid delays, avoid lengthy disputes, ensure equal treatment of all operators and avoid anachronistically reintroducing a model of vertical integration that has already demonstrated its ineffectiveness. It may not be the perfect solution to satisfy everyone equally, but let us remember that in life the best is the enemy of the good. And this delicate and complex dossier makes no exception.

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<sup>51</sup> *Tlc: procedura di infrazione norme Ue a 24 Stati tra cui l'Italia*. Il Sole 24 Ore (2020)

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## 1. HOW 5G CAN INCREASE PRODUCTIVITY AND SPUR INNOVATION IN THE BUSINESS WORLD

*Lucas Willegoda*

The 'International Telecommunications Union<sup>52</sup> (ITU) highlighted three macro-areas where 5G technology can offer growth opportunities to businesses who will be ready to take advantage of them. These are *enhanced or extreme mobile broadband*, *ultra-reliable low latency communication* and *massive machine type communication*. An overview of them is presented in the following.

The first of these three areas is **enhanced or extreme mobile broadband (eMBB)**. 5G technology can be seen as a natural development of already-existing 4G networks, and it will therefore allow for better performances than the ones that are currently possible. Improvements will manifest themselves under three different profiles<sup>53</sup>:

- a. Increased broadband capacity. This will allow 5G networks to guarantee high performances also within densely populated areas such as urban centers and public spaces that host big events;
- b. Increased connectivity. Remote areas will finally enjoy widespread access to broadband;
- c. High performances even within moving vehicles, such as trains and automobiles.

These changes will not only improve the navigation experience of end-users, but also open up new possibilities for enterprises and businesses. In the past, 4G created the conditions that allowed the consumption of multimedia content from mobile phones. The spreading and the success of social media such as Instagram and applications such as Uber are results of opportunities provided by 4G. In this sense, 5G technology will represent a further step towards the creation of a digital society where it will be possible to stream a movie in 4K definition while on the bus without buffering issues. The potential benefits provided by this development in terms of improved product quality and *user experience* are clear, especially for those companies whose business models rely on the offering of media services to their users. Another advantage offered by eMBB concerns the improvement of workplace productivity resulting from the possibility to have smooth and professional communication even outside the office. 5G technology will therefore favour the transition towards practices such as smart working and distance learning, which have already gained traction during the COVID-19 pandemic.

Lastly, eMCC will enable new and innovative products and applications requiring a high-performing connection in order to succeed in going mainstream. Among these, we find products that exploit *virtual reality* (VR), *augmented reality* (AR) and live translation services. The technological know-how behind these innovations is in fact already available. However, their potential for commercial success is severely limited by the lack of mobile networks fast enough to support them. 5G mobile networks are set to change this.

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<sup>52</sup> [Setting the Scene for 5G: Opportunities & Challenges](#), International Telecommunications Union, 2018

<sup>53</sup> [What is enhanced Mobile broadband \(eMBB\)](#), Sacha Kavanagh, 5G.co.uk

The second macro-area is represented by **Ultra Reliable Low Latency Communications (URLLC)**. 5G is set to drastically decrease network latency, which in turn will open up a wide range of potentially high-impact economic and business opportunities. Network latency is defined as the time lag within which data is transferred from an original source to its intended final destination. A low latency, paired with a high precision in the information transfer process, allows for real-time communication among objects connected to the same wireless network. This condition represented the major hurdle towards the realization of IoT (*Internet of Things*)<sup>54</sup> systems, i.e., systems of interconnected devices that exchange data over a network. An example of technological transformation promoted by URLLC is represented by autonomous drive systems for self-driving vehicles. In this case, it is clear how speed and accuracy in the transfer of information is of primary importance. Other examples are the somminstration of health services from remote or work processes automation and *smart manufacturing*. In the latter case, whereas work processes automation is certainly not a new concept in business, 5G technology will allow for the robotization of even extremely complex operations. The most cited case is the production of semiconductors.

Finally, the last macro-area is **Massive Machine Type Communications (mMTC)**. While URLLC stressed the importance of 5G's precision in the real-time transfer of data, mMTC is based on the possibility, enabled by 5G, to cover wide geographic areas. Hundreds of thousands of devices per square kilometer, each with a low-mid level of technological sophistication, will be allowed to exchange data among each other. The main field of application of mMTC will be within *smart cities*. Within this context, mMTC will allow a multitude of interconnected devices to monitor a metropolitan city's air quality or to collect data to predict extreme weather events.

To sum up, the coming of 5G has the clear potential to boost profit margins thanks to increased productivity and efficiency, to improve communications both within-companies and between companies and clients as well as open up new business opportunities.

## 1.1 5G IN ITALY: THE UNCERTAINTY AROUND THE ESTIMATION OF COSTS AND BENEFITS

5G technology is set to have a significant impact on the world economy. Widely reported figures estimate the increase in global GDP directly determined by the implementation of 5G to be around 13.2 trillion dollars by 2035. Within the same period, 22.3 million new jobs will be created just in the value chain of 5G<sup>55</sup>. In Europe, a research commissioned by the European Commission estimated the economic benefits brought by 5G to be as high as 113.1 billion euros per year starting from 2025<sup>56</sup>. The number of new jobs created, according to the same research, will be 2.3 millions. Lastly,

<sup>54</sup> [5G systems: enabling the transformation of industry and society](#), Ericsson.

<sup>55</sup> [The 5G Economy](#), IHS Markit, 11/2019

<sup>56</sup> [5G Deployment could bring millions of jobs and of euros benefits, study finds](#), European Commision, 09/2016



in Italy, a study commissioned by Huawei and carried out by Ernst & Young<sup>57</sup> estimated an 80 billion euros increase in GDP in the next 15 years.

The other side of the coin is represented by the costs related to the creation of the 5G infrastructure and to the purchase of licenses from telecommunication operators. These investments are far from negligible: The European Commission<sup>58</sup> expects those costs necessary to reach its connectivity targets (among which we find 5G coverage in all urban areas) to be around 500 billions euros. In Italy, according to the above-mentioned Ernst & Young study, costs for the deployment of 5G infrastructure and purchase of licenses will amount to 25 billion euros.

It is worth remembering that these numbers should be treated with caution, as they are the result of computations carried out in conditions of high uncertainty. The benefits of 5G are merely potential, and it will be the task of single companies to reap them. The digital readiness of each country's industrial and entrepreneurial systems, together with the single implementation strategies taken by public authorities, will be the key to a successful 5G strategy. On this issue, a report by Nokia<sup>59</sup> investigating the 5G readiness of enterprises can help us better under the business context around 5G. The report focused on eight countries (Australia, Finland, Germany, Japan, Saudi Arabia, United Kingdom, South Korea and US) and highlighted how only 7% of the surveyed companies are currently at the deployment stage of 5G. These 5G ready companies are the same ones which better navigated the current COVID-19 pandemic and, more in general, registered higher growth rates in the last years than their counterparts. This result highlights how the 5G revolution will accelerate a pre-existing process of polarization between companies which are better equipped to face the challenges of the digital era and companies which are not. This is further supported by the fact that one third of the surveyed companies expressed their concern about the possibility of being put out of business because of their lack of tempestivity in implementing 5G.

The Nokia study also highlighted the regional dimension of this phenomenon of polarization. If 12% of US companies are classified as 5G ready, the same numbers for German, Finnish and British firms are 3%, 2% and 4% respectively. Whereas Italy is not considered in the Nokia study, its well-known lag in the creation of a digital economy suggests the percentage of Italian 5G ready companies to be even lower. This is even more evident when we examine the main barriers to the implementation of 5G highlighted by the Nokia report: the limited availability of infrastructures (especially in rural areas) and the lack of the digital competences that are necessary to understand and exploit the potential of this new technology. The issue of the lack of digital competences is of particular salience in the Italian context. Italy, in fact, is at the very bottom of Europe in the category *Human Capital and Digital Skills*, according to the 2020 edition of the Digital Economy and Society Index (DESI)<sup>60</sup>. Finally, on the infrastructure side, it must be noted that a good fiber infrastructure is a prerequisite to unlock the full potential of 5G technology.

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<sup>57</sup> [5G, per l'Italia impatto economico senza precedenti](#), CorCom, 05/10/2019

<sup>58</sup> [5G deployment: State of Play in Europe, USA and Asia](#), Policy Department for Economic, Scientific and Quality of Life Policies (commissioned by the ITRE Committee of the European Parliament)

<sup>59</sup> [Business readiness for 5G](#), Nokia, 2020

<sup>60</sup> [Human Capital and Digital Skills](#), Digital Economy and Society Index Report, 2020



The most optimistic forecasts on the impact of 5G in Italy need to be read in the context of the digital gap that still separates Italy from other European and global actors. Such a gap can impact the upside potential of 5G. Another consideration concerns the costs associated with the purchase of 5G services from the telecommunications operators. These costs will reflect those sustained from the telcos when purchasing the licenses for the use of 5G frequency spectrum - the higher the initial investment from a telco, the higher the price it will be forced to charge to compensate the initial expense. In Italy, these licenses have been auctioned to telco companies in 2018 for 6,5 billion euros<sup>61</sup>, a record in Europe<sup>62</sup>. Telco operators will have to make up for this initial investment, and charging higher prices will definitely be an option.

Finally, an assessment of the benefits and costs that 5G technology can bring to Italy cannot be complete without an analysis of how the current geopolitical situation might affect the strategic choices on 5G. The market for the supply of 5G equipment is currently dominated by three companies: Ericsson, Huawei and Nokia. Among the three, Huawei seems to be the readiest and the one that can offer the most competitive prices. However, its close ties to the Chinese government, increasingly perceived as a threat in the Atlantic bloc, might determine its exclusion from the construction of 5G networks in Italy and in Europe. If geopolitical considerations will prevail on economic ones, the additional costs to be sustained by European countries, as a result of the restriction of Huawei, are estimated to be around 3 billions euro per year in the next decade<sup>63</sup>. In Italy, according to the EY report, a delay of twelve and eighteen months in the realization of 5G infrastructure will result in additional costs for the telcos of 4-5 billions euro. Italian firms would also be expected to lose between 2,9 and 4,3 billions because of a decrease in their competitiveness. Estimating the impact of 5G in Italy is not straightforward, and to do so one needs to consider the current situation in the country and the sensitivity of costs to several factors. In particular, geopolitical issues surrounding 5G networks and their realization have the potential to increase costs and cause delays in the rollout of the infrastructure. Undoubtedly, the 5G revolution is a unique chance to develop a digital economy in a country that still lags behind its European peers in this aspect. Finally, it must be stressed that to refrain from investing in such a disruptive technology as 5G will negatively affect Italy's competitiveness *vis-à-vis foreign* competitors.

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<sup>61</sup> [Conclusa la gara del 5G: totale delle offerte 6.550.422.258,00 euro](#), Ministero dello Sviluppo Economico, 02/10/2018

<sup>62</sup> [5G: il record italiano al confronto con gli altri Paesi UE](#), Lorenzo Principali e Domenico Salerno, Agenda Digitale, 19/10/2018

<sup>63</sup> [The Economic Impact of Restricting Competition in 5g Network Equipment](#), Oxford Economics, 06/2020

## 2. 5G IN THE CLASH BETWEEN POLITICAL CAPITALISMS

*Edoardo Crivellaro*

5G represents the most evident manifestation of a recent, growing trend: the politicization of technology. Often, at our latitudes, we tend to observe technological development with the lenses of romanticism and idealism, hence motivated by a search for progress disconnected from the dimension of realpolitik and state power. It is frequent to hear about scientists and researchers as a global community, united by the same intentions and exclusively dedicated to improving the living conditions of human beings. However, reality is crueler and less ethereal: behind every investment in research and development there are States or private companies depending (at least in part) on them.

The 5G, both for reasons of relevance of the above-mentioned technology and for the historical circumstances, has the merit of bringing back the order of the addendums to its 'natural' state, i.e., to the pre-eminence of the strategy on the economy. The fifth-generation network can be framed as part of a clash between opposing political capitalisms, the Chinese and American ones, fighting for global primacy. In political capitalisms, economic cost-benefit analyses are subordinate to the national security needs of the respective actors: this is why the geopolitical aspect of 5G is the Gordian knot of the discussion. On the other hand, as Alessandro Aresu reminds us in his book "The Powers of Political Capitalism", Adam Smith clearly said that "defense is more important than wealth".

### 2.1 CHINESE STRATEGY, HUAWEI AND THE AMERICAN REACTION

As we have previously mentioned, the Chinese geopolitical strategy on 5G should be analyzed taking into account three key years: 2025, 2035 and 2049. The first represents the year by which the People's Republic intends to achieve global technological leadership, bridging the gap with the West, according to the Made in China 2025 plan; the second is contained in the China Standards 2035 strategy (to be published by the end of the year), through which Beijing aims to increase its weight in the institutions and bodies that set the standards for next-generation technologies (such as 3GPP and ITU); the third, finally, is the date of the centenary of the founding of the People's Republic of China, by which the Dragon must have surpassed the United States as the first power on the planet (in Xi Jinping's calculations). The U.S.' geopolitical power has been weakened by the financial crisis and the need to focus on the threat of terrorism. China, by thinking long-term and leveraging the amount of data generated in its internal market, hopes to take advantage of this and undermine the U.S.' technological leadership.

However, 5G is the most striking and surprising case of a total American underestimation and a contemporary Chinese advance: Huawei was in fact chosen as a valuable Trojan horse of Beijing telecommunications, to be used to penetrate the American sphere of influence and take away from Washington the exclusivity in the use of satellite country data. The Shenzhen company has quickly become the global number one in telecommunications thanks to loans, credit lines and tax benefits from the Chinese government, quantifiable in about 75 billion in State aid, according to the Wall

Street Journal. Regardless of the truthfulness of the numbers, it is not in question that Huawei has grown and developed in a protected and favorable environment, which allowed it to build a solid foundation before entering the international markets. In addition, the Chinese company has increased the connectivity of the African continent, which since its inception in Kenya in 1998 has enabled at least 50% of Africa to equip itself with a 4G network. The Chinese are still studying history, which teaches us how easily technological dependence can be converted into (geo)political dependence. When Washington became aware that the threat posed by Huawei was not only economic in nature, but profoundly strategic, it ran for cover: in December 2018, the arrest of Huawei's CFO in Vancouver has represented the start of an economic warfare and legal warfare (lawfare) with sanctions, pressure on Google to revoke Huawei's use of Android and block the supply of semiconductors to the Chinese giant. In addition, the U.S. has launched a campaign of pressure on allied countries to desist from the idea of giving Huawei the benefit of building the national 5G network, fearing risks to the security of citizens' data resulting from the link between the Shenzhen giant and the Beijing government. The last two countries to have succumbed to U.S. pressure by banning Huawei are Sweden and the Czech Republic, joining countries such as Australia, Great Britain, New Zealand, France, Japan, Taiwan and Singapore.

In the face of this situation, Italy is still very divided: some government factions are inclined to "wink" at China, while others which retain Atlanticism as a "polar star" are oriented towards the pro-American alternatives. Rome, however, may have launched a signal on October 22, when, according to Reuters, the Golden Power Committee of Palazzo Chigi has blocked a 5G network supply contract between Huawei and Fastweb<sup>64</sup>.

The debate in question is therefore eminently geopolitical: Huawei undoubtedly offers quality services at an advantageous price, but the decision will not be taken on the basis of a purely economic evaluation, in spite of the economicism that characterizes our ruling classes, but it will be a geopolitical choice concerning also the international position of our country.

Vulnus cogent in the credibility of the American demands, however, is the absence of an alternative made in USA to Huawei, an element that leads the United States to bet (at least in part) on two European companies, Nokia and Ericsson, aware that the first-mover advantage of Beijing is now a fact.

## 2.2 WILL THE US RELY ON MODULAR NETWORKS?

The U.S. administration launched last August the "Clean Network" program, which aims to create a network of countries united by the desire to defend themselves "from aggressive intrusions of malicious actors, such as the Chinese Communist Party", thus countering the influence of Beijing in the telecommunications sector. The Clean Network, in the vision of the European Council on Foreign

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<sup>64</sup> [Italy vetoes 5G deal between Fastweb and China's Huawei: sources](#), Reuters, 10/20

Relations, represents not only a form of containment, but also a real American roll-back against China<sup>65</sup>.

However, the search for a replacement for Huawei must start from a crucial question: why is an American Huawei not there? The answer lies in the consolidation processes of the telco industry occurred between the 90's and 2000's, which led to foreign acquisitions of U.S. operators like Motorola and Lucent. Just Motorola, in 2003, was about to acquire Huawei for 7.5 billion dollars, a deal that would have changed, and by much, the contemporary history of telecommunications. In the words of former CIA analyst Martijn Rasser and Ainikki Riikonen, research assistant at the Center for a New American Security (CNAS), "the U.S. has let the market forces act freely instead of implementing an industrial policy aimed at creating a national champion"<sup>66</sup>. In short, the USA rested on its laurels with an available 4G technology in their availability, underestimating the importance of investing in the next generation.

Today, the hypothesis of creating a U.S. industrial champion has waned, even after the refusal of Oracle and Cisco to enter the market again. The opportunity, suggested by the same attorney general William Barr, to subsidize or enter the capital of the two main European companies of 5G, Nokia and Ericsson, has gained consensus. A few days ago there was news of an interest in the acquisition of Nokia by Microsoft, which would be interested in the 5G business of the Finnish company<sup>67</sup>. This second hypothesis, although more attractive and less expensive with respect to the "endogenous" option, raises some perplexities to some experts in the field: first of all, on this ground the first-mover advantage of Huawei would remain almost scratched but, secondly, such a choice risks to feed a consolidated and inefficient oligopolistic industry. The limited number of suppliers generates, in fact, problems regarding the diversification of the supply chain, an element of crucial importance to ensure the resilience of the networks. Just the need to ensure integrity, security and diversification has led to the development of a third way, whose keywords are modular architecture and open interface. This new model would make it possible not to bind a State to a single supplier, leveraging the principle of interoperability of services and equipment offered. The modular nature of open interfaces makes possible what it has not been until now: replacing a single component of a supplier without having to restructure the network from scratch.

The Center for a New American Security has suggested that the United States should pursue a strategy based on the interoperability and modularity of fifth generation networks, considered as the only option to change the current status quo, which sees China in advantage<sup>68</sup>. The five benefits of this strategy would be the following:

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<sup>65</sup> ["The Clean Network Program: Digital Age Echoes of the "Long Telegram"?"](#) , Council on Foreign Relations, 10/20

<sup>66</sup> ["Open Future, The Way Forward on 5G"](#) , Center for New American Security, 07/20

<sup>67</sup> ["Microsoft In The Frame To Buy Nokia \(Again\), Analysts Forecast"](#) , Forbes, 10/20

<sup>68</sup> ["Open Future, The Way Forward on 5G"](#) , Center for New American Security, 07/20

1. Greater diversification of vendors, able to encourage American "software companies" to take an interest in the industry, overcoming the barriers of entry that now make it unattractive;
2. Lower implementation costs. For example, Rakuten, a Japanese company that has put into practice a project based on open interface and modular architecture, claims that the cost of the network is about half that of traditional ones;
3. Interoperability, which guarantees to mitigate risks and revitalize the market;
4. The security, directly resulting from the interoperability mentioned in point 4;
5. The growth of the market and the creation of new opportunities for operators.

A last option, among those now on the table, would be instead to entrust the Pentagon with the task of setting up a national 5G network, whose management would then be transferred to the private sector for civil purposes<sup>69</sup>. The proposal was suggested directly by Trump's chief of staff, Mark Meadows, but the idea is considered also by other influential figures in the U.S. such as Eric Schmidt, former CEO of Google and now Chairman of the Defense Innovation Board, who said that the best strategy to avoid "national emergency" (= stay behind China on 5G) would involve the Pentagon as the creator of a network to share with the private sector.

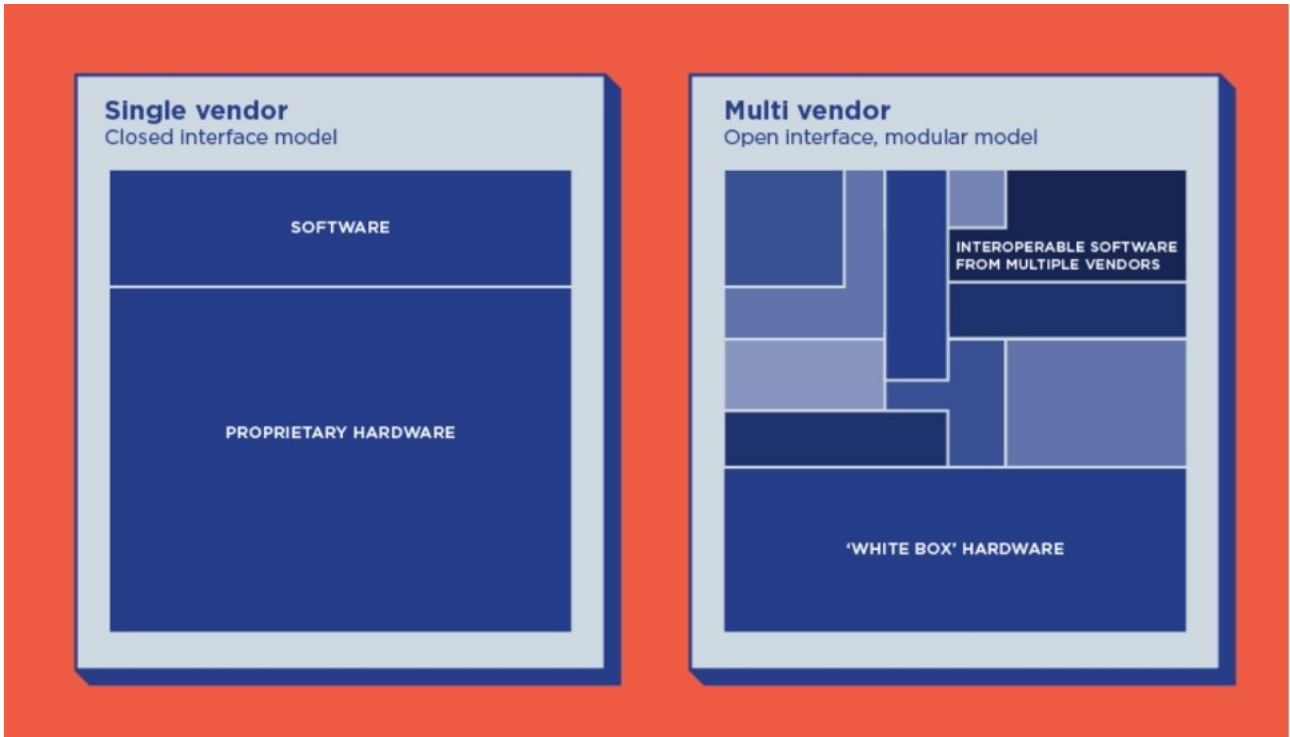
### 2.3 CREATIVE DESTRUCTION AND THE DECOUPLING OF 5G ECOSYSTEMS

Chinese and Americans are well aware that digital is physical, that data do not travel in the ether but run along tangible backbones, from submarine cables to telecommunication antennas. As Jayne Stewell, head of infrastructure for Google, effectively summarized, "people think data is in the cloud, but it's not. It's in the ocean. The physicality of digital reinforces the inseparable link between technology and national security, and between technological development and bureaucratization of the world. Ultimately, as Aresu stated, "the history of capitalism is a graveyard of the telecommunications elite"<sup>70</sup>, but it will be crucial to understand how the schumpeterian creative destruction will be governed and who will come out as a winner. In this sense, it is likely that technological decoupling will directly affect the telco sector and 5G, leading to the formation of at least two ecosystems for fifth generation networks, one Chinese and one Euro-American. However, the world is no longer classifiable in black and white as it was during the Cold War, so shades of gray will be the real object of contention. Italy could be one of them, if it has not already become one.

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<sup>69</sup> "E se il 5G americano lo facesse il Pentagono? L'idea anti-Cina dalla Casa Bianca", Formiche.net, 10/20

<sup>70</sup> Aresu A., *Le potenze del capitalismo politico*, Milano (2020), La Nave di Teseo



Fonte: Center for a New American Security

### 3. CONCLUSIONS

In conclusion, 5G represents an indispensable technology to ensure the competitiveness and attractiveness of the national economic industry, which cannot ignore the potential for digitization and connectivity that only the fifth generation networks will be able to guarantee. The digital society of the future will be based on connection speed, low latency and coverage of large geographical areas made possible by the 5G infrastructure, a fundamental driver for technologies and realities such as the Internet of things (IoT), autonomous driving, smart cities and smart manufacturing. However, the new networks risk further polarizing the market, dividing it between 5G ready and technologically immature companies. Italy in this respect risks to suffer more than other countries, in light of the chronic lack of digital skills and inadequate infrastructure, especially in rural areas: it is therefore necessary to bridge this "digital lag" to avoid starting this new and exciting game already outnumbered.

However, it will be the geopolitical aspect that will dictate the agenda of 5G, determining how to implement the network, and not the economic cost-benefit analysis. The fifth generation network is a decisive part of the clash between political capitalisms of China and the United States, and is part of a context of increasing politicization of technology. In Italy it would be first of all opportune to become aware of the pre-eminence of strategy on the economy, of the security needs on those of the market, having clear that every choice on new technologies will have an immediate reflection on the international position of the country. By virtue of this, it is appropriate that every evaluation on 5G is all-inclusive and multidisciplinary, not only sectoral and specific: it is therefore necessary to overcome the archipelago system that often characterizes our country, stimulating more connections and synergies between ministries, security agencies, business sector and academia. The establishment of a group of experts with transversal skills could be a useful solution to foster the confrontation and debate necessary to formulate realistic and conscious solutions. Only through integrated and flexible frameworks it will be possible to govern new technologies, reconciling the constraints of geopolitics with the opportunities of the economy.

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