

The Origins of the Telephone in Italy, 1877–1915: Politics, Economics, Technology and Society¹

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This article aims at identifying the turning points in the early history of Italian telephone (1877–1915) considering at the same level political, economical, technical, and social dimensions and trying to reconstruct conflicts and connivances among relevant social groups. The early history of the Italian telephone can be subdivided into four periods: the urban networks building during the 1880s; the nationalization attempt, concentration process and failed building of the long-distance network during the 1890s; the nationalization process between 1903 and 1907; and the failure of public management and return to private operation between 1907 and the First World War. This analysis helps identify some characteristics of Italian telephone history that configure a kind of Italian style in telecommunications: the relevance of old media (electric telegraph in particular) for the new one, political uncertainties, foreign investments, difficulties in interconnecting different systems, a lively and overlooked demand.

Introduction

This article analyzes the early history of the telephone in Italy, and in doing so, contributes to existing academic research. The study argues that the history of Italian telecommunication is an often neglected topic of academic research. Although this article focuses on the history of Italian telecommunication, it can also appeal to an international audience, as the early history of the Italian

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telephone is a *tessera* in the mosaic of the European history of telecommunications.² The paper also highlights the recent rediscovery of the origins of telecommunication systems as a new and promising area of research in media and telecommunication.³

The primary objective of this paper is to reconstruct the early history of communication technologies using a multifocal approach (Richeri, 2006) that considers the equality among political, economic, technical, and social aspects; this approach reduces complexity and considers the instances that produce a new medium. There are two research traditions that could be combined with the multifocal approach: The Large Technical Systems / Macro Systèmes Technique is useful for analyzing the networked technologies, in particular telecommunications (Summerton, 1994, pp. 14–16), and the Social Construction of Technology provides a useful concept of relevant social groups (Pinch & Bijker, 1984, p. 414) as it allows for the analysis of relationships and conflicts among the main groups. Such analysis aids the understanding that a new medium is a co-construction and that each group tries to impose specific meanings during interaction. The result is often a negotiation among the instances of each group, a co-constructed medium made of heterogeneous pushes and pressures. Four relevant social groups were chosen for this study: politicians, private companies, technicians such as electrical and telegraphic engineers, and subscribers. Each is representative of one dimension of the four on which the research is based.

The methodology applied in this paper is a combination of research traditions, especially of economy and political economy of telecommunications. This tradition employs useful concepts such as natural monopoly, path dependence, network economy (Brock, 1982; Curien & Gensollen, 1992; Jacobsen, 2005; John, 2010; Nelson & Winter, 1982). As stated by several scholars (Balbi, 2009; Bernt & Martin, 2006; Rosenberg, 1994; Sterling, Bernt & Weiss, 2006) the intersection of these and other perspectives is an added value in studying the history of telecommunications, a complex and multifaceted field of studies.

Building the Urban Networks (1880–1890)

A new communication technology called “speaking telegraph,” later known as the telephone, was patented by Scotsman Alexander Graham Bell on February 14, 1876 (Bruce, 1973). This invention had great success in the United States where Bell lived and worked, and was rapidly exported to other countries especially in Europe. In Italy, the first experiments with the telephone began in 1877 and were regulated by the Baccarini decree and promulgated on April 1, 1881. This decree, like most of the legislative measures that would have taken between the 19th and 20th century, was dominated by a practice resembling a telegraphic paradigm: Italian politicians were keen to protect the investments made

² On the origins of Italian telegraphy see Fari, 2008. The origins of the telephone in Italy were partially reconstructed in books related to other subjects (Bottiglieri, 1987, 1990) or in anecdotal publications (Antinori, 1963; Vitali, 1980).

³ In the last decades, maybe because of the growing relevance of the telecommunication sector in the contemporary society, the origins of telecommunications have been studied with more and more attention: see for example Abbate, 1999; Douglas, 1989; Downey, 2002; Fischer, 1992; Marvin, 1988.

in the old medium, the electrical telegraph, after Italian unification in 1861, and thus penalized the new medium, the telephone. During the 1880s, protecting the telegraph and consequently penalizing the new telephone became a fairly common strategy among European governments (Calvo, 2006, p. 416). What was surprising, however, was that the telegraphic paradigm was consistently executed throughout Italy.

In Italy, the telephone was considered a public monopoly, as was the telegraph. However, politicians were uncertain about how to manage it: Who should be responsible for developing the telephone networks? Should private companies or the government manage the new medium?⁴ This natural uncertainty, as it was later called in Parliament,⁵ produced contradictory legislation and the Baccarini decree is a good example of this. Under it, the government authorized private companies to establish telephone networks, but the licences it granted were highly restrictive. Licenses covered only three years and were uneconomical because, at the end of the licensing period, the telephone networks and exchanges were to be handed over to the government free of charge. Additionally, the government tried to stimulate competition without considering private rights because it could assign several concessions in the same city. Finally, private companies were licensed for only small urban networks, so they could not develop long-distance networks.

In the 1880s many private companies invested in local telephone networks. This enthusiasm can be attributed to domestic and foreign—mostly American—investments and to the presence of many engineer-entrepreneurs who, with an economically sound industry as the telephone was at that time, accomplished their dream of managing a telecommunications industry (Segreto, 1992, p. 311). Because of the Baccarini decree, telephone companies' management invested in local networks without considering the long-term evolution of the telephone, given their uncertainty about amortizing invested capital (Società Telefonica Ligure, 1886, pp. 115–116). For example, during the 1880s, many telephone companies did not lay their networks underground because it was too expensive; they instead maintained aerial lines, which were cheaper to build and modify, but problematic as they were easily broken and susceptible to weather damage.

During the 1880s, the telephone networks were exclusively urban because of transmission losses attenuating the signal over longer distances and because each city had its own network or networks, which were not connected with others. In Milan, there were three networks managed by different companies, and their subscribers could not talk with subscribers of competitor companies (*L'illustrazione italiana*, 1882, p. 86). This was the so-called strategy of multiple concessions, assigned by the government with the aim of promoting competition, while ignoring the so-called club effect.⁶ In other

⁴ According to the available sources, during the first 10 years Italian Parliament did not discuss if the telephone should be a universal service. The concept of universal service, on the other hand, must be reconsidered in an historical perspective that could change its relevance for late 19th century (see Dordick, 1990).

⁵ This natural uncertainty (the term *esitanza naturale* was introduced by the Minister Nunzio Nasi in the Draft bill n. 189, May 2, 1899, p. 2) was a long-term feature of the Italian telephone sector.

⁶ By club effect, Nicholas Curien means that the bigger and richer a network is, the more appealing it is for a new potential user because of the number of people he or she can contact. This is a self-reinforcing

words, during the 1880s, urban telephone networks in Italy developed haphazard protocols by which private companies extended their networks on the basis of the temporary needs of their subscribers.⁷

Although the weak current sector (telegraph and telephone) was scarcely considered in Italian university curricula (Stacca, 1994, pp. 82–83),⁸ a few technicians were interested in the new medium and considered it to be part of the electricity domain, and some proposed projects for local networks. For example, an engineer from Turin, Giuseppe Prina, presented a rational and all-encompassing project to “establish a far-seeing telephone network that could link *all* the houses of the town” (Prina, 1885, p. 15). He suggested that every building in Turin should potentially be able to link to the city telephone network, citing advantages including rational growth of the network and potential increase of the demand. His proposal had a fundamental problem, however: The project would have been extremely expensive for telephone companies which could not invest capital without the certainty of being able to amortize the costs over time.⁹

For many subscribers and members of the general public, the telephone was seen as unreliable because of its many malfunctions; others viewed it metaphorically as a spider’s web of wires. This metaphor expressed a concern that, from an aesthetic point of view, the telephone, both in the home and in the landscape, resembled a web. It also symbolized the diffidence, confusion, and difficulties in understanding the functioning and uses of the telephone at that time. Despite these and other worries (see Balbi, forthcoming), the demand for the telephone was high during the 1880s.

Table 1 highlights the telephone density in certain cities in the main Italian towns. As the numbers illustrate, the diffusion of the telephone was comparable to that in other European cities and sometimes even higher. The “natural” presence of a strong demand is one of the long-standing characters of Italian telephone history. Even though demand was often frustrated by legislation and sometimes by private companies’ strategies, the need for the telephone was high in Italy and it caused problems in the management of the system (see also in the next sessions of this paper).

process because every new user creates an externality, an increase in the net wealth. In English the “club effect” is often translated with network effect.

⁷ This happened in Spain too, where in the same period “[...] the Spanish telephone system developed as an aggregate of isolated local networks with an overwhelmingly urban design” (Calvo, 2002, p. 83).

⁸ On the contrary, in Italy the electrical sector immediately interested technicians and engineers and the electrotechnics was rapidly inserted in university curricula (Fox & Guagnini, 1994, p. 82; Maiocchi, 1992, pp. 156–158).

⁹ This is a typical ‘engineering viewpoint’; proposing the best possible solution without considering economic or social factors (see Ribeill, 2001, p. 142); on the concept of ‘engineering inexorability’ see Babe, 1990, p. 14.

**Table 1. Telephone Density in Cities Throughout the World (1885).
Subscribers per 1,000 inhabitants**

Atlanta	52.6	Antwerp	3.9
Honolulu	30.3	Amsterdam	3.6
Stockholm	22.2	Montevideo	3.5
Buffalo	22.2	Berlin	3.3
Providence	21.3	Melbourne	2.5
Geneva	15.4	Lisbon	2.2
Zurich	12.8	Buenos Aires	2.2
Cincinnati	10.6	Milan	2.2
Basle	10.3	Brussels	2.1
Caracas	9.6	Naples	1.7
San Francisco	8.6	Havana	1.5
New York	7.5	Venice	1.5
Chicago	7.2	Warsaw	1.5
Rome	6.8	Paris	1.4
Rio de Janeiro	5.4	Saint-Petersburg	1.3
Genoa	5.1	Sydney	1.2
Copenhagen	4.9	London	0.9
Florence	4.2	Vienna	0.8
Rotterdam	4.0	Madrid	0.6

Source: Società Anonima padovana per il telefono ed altre applicazioni della elettricità, 1887, pp. 7–8. The yellow highlighted areas pertain to Italian cities.

Just before the turn of the century, subscribers were primarily local bureaucracies (such as city halls) that used the telephone extensively because it aided in efficient management of bureaucratic affairs. A secondary use of the telephone was as an emergency tool for hospitals, fire stations, and police headquarters. Commercial uses of the new medium were relevant, too. Among them, the most important category were people working with “information.” Intermediaries, delivery men, and stockbrokers found the telephone a useful tool for facilitating communication. Many drugstore and clothing shops used the telephone either to keep contact with customers or to facilitate logistics (for example, communicating between warehouses). Finally, lawyers, engineers, journalists, just like newspapers, banks, financial institutes had often access to the telephone. In Italy, as in many other European countries during the early decades, home telephone subscribers were people from the upper class, and many subscribers were identified in telephone books as property owners. As the medium was expensive, the telephone became a status symbol.¹⁰

¹⁰ This short paragraph summarizes a long research made by the author on many Italian telephone books of this period (see Balbi, 2011).

It is not possible to talk about a single history of the telephone in Italy during the 1880s; it represented at least four things contingent on the societal group who used it. For politicians, who were not interested in how the networks should be built, it was a threat to the telegraph and so it had to be controlled by legislation. For private companies, it was a new and interesting business, but they could not invest capital without being certain that they could amortize the expenditure. For technicians, the telephone was an investment, a rational technology whose networks should be built with foresight. Finally, for subscribers it was something appealing, even if reserved to highest level of society.

The Failed Nationalization, the Long-distance Network and the Concentration Process (1890–1900)

During the second half of the 1880s and into the 1890s, most European governments decided to manage part of their telephone systems. Germany, Luxemburg, Greece, and Romania established public early on. Switzerland (1885), France (1889), Belgium (1895), and Austria (1895) nationalized the service. Sweden, Denmark, Norway, Great Britain, and the Netherlands opted for a private-public management, providing urban networks to private companies and reserving the long-distance networks to the public sector.¹¹

An attempt to nationalize the telephone networks failed in Italy in 1890. During the second ministry Crispi (Left party), Pietro Lacava, minister of the newly established Ministry of Post and Telegraphs, proposed a draft bill in which the telephone was considered a “public service of greatest relevance” (Ministry of Post and Telegraphs, 1890, p. 5). After a long and interesting debate, most Parliamentary members agreed that the telephone had to be considered a medium similar to the telegraph and that it had to be managed by the public sector. When the project was about to be approved, however, the Crispi’s ministry fell in February 1891 and the new right government rapidly approved a law (n. 184, April 7, 1892) that ratified an in-between system (Parliamentary Debates, December 9, 1891, p. 4548) that muddled the lines between private and public management.¹² This sudden change in the political orientation could be considered another example of the uncertainty Italy felt toward the management of the telephone.

¹¹ On the nationalizations of the telephone networks see Aulas, 1999 for France, De Witt, 1998 for the Netherlands, Kolbet, 1980 for Switzerland. On the discovering of the relevance of the telephone during the 1890s, see Millward, 2005. Other contemporary sources relevant to switching to national after private management are Holcombe, 1911 and Webb, 1911.

¹² According to contemporary observers (Rava, 1900, p. 67), the change was surprising but could be explained by a major shift in the Italian political economy: The nationalization project was influenced by Belgian and French economic patterns (and good relationships with Italy’s Left party), while the Branca’s law was influenced by the liberal ideas of the most popular Italian economists: Antonio De Viti De Marco (see De Viti, 1890).

Toward the end of the century, a complementary phenomenon, a great concentration process,¹³ affected Italy's telephone history. One company, the *Società Generale dei telefoni e applicazioni elettriche* (from now SG), began to absorb others in a three-step process. SG was controlled by two main groups, the first of which was the Bell Company. It was interested in selling telephones and in managing telephone systems in Italy and elsewhere in Europe, and a key figure in Italy was Louis De Groof, manager of the Belgian Bell Telephone Manufacturing Company. The second group was linked to a French-Greek family, politically and socially well integrated in Italy, which established a bank in Paris (M & A Tossizza); this group was ruled by Michele Tossizza, a so omnipresent man on the boards of directors of telephone companies, that in Parliament, he was later labeled "triune."¹⁴ SG bought increasing shares in the other companies, placed trustworthy men on their boards of directors, and finally liquidated the companies. This three-step strategy worried the government during the discussion of nationalization because politicians feared that SG would establish a private monopoly in Italy (Parliamentary debates, 1890, July 9, p. 5088). Perhaps for this reason, SG favored the birth of another company, the *Società telefonica per l'Alta Italia* (from now SAI). In principle this new company had to mirror the practices and policies of SG, but in practice, SG owned most of its stock (SG, 1897, pp. 8–9; *Telefono, Poste e Telegrafi*, p. 8). In 1899, there were 13,840 Italian telephone subscribers; 6,679 were customers of SG (48.3%), 3,296 of Alta Italia (23.8%), and 3,865 of the remaining smaller private companies (27.9%) [Draft bill n. 3 (189), 1899, cit.: 19]. Considering SG and Alta Italia together, three-quarters of the Italian telephone subscribers were controlled by the same interest group at that time.

Maybe the most pernicious consequence of the failed nationalization of the telephone and of the general indifference of the public toward the new medium was the under-development of the Italian long-distance telephone network. During the 1890s, the great majority of other European countries built inter-urban networks, and in many nations, the control and development of these networks were the main reasons for nationalization. Other countries did not nationalize the urban networks, but the governments decided to invest large sums of money and managed to directly monitor the long-distance networks. In Italy, the government invested in neither the urban telephone nor the *telefonia interurbana* (long-distance network). In the 1880s, apart from a few experiments, the government did not invest in these networks and did not allow private companies to manage them. In the 1890s, politicians did not consider the long-distance network a strategic asset, so it did not invest public money in its development, although it did begin to assign a few lines to the private companies. Italian politicians understood the strategic nature of the long-distance network only at the beginning of the new century and passed a law (n. 32, February 15, 1903 presented by the Ministry of Post and Telegraphs Tancredi Galimberti) that promoted its extension.

¹³ This phenomenon is quite similar to what happened in Great Britain, where the National Telephone Company absorbed the other companies between 1889 and 1894 and where telephone policy was unstable. The government protected the revenue from the telephone's competition with the telegraph, and as discussed in the third and fourth parts of this article, the English Post Office nationalized the telephone two years before the Italians did (Foreman-Peck & Millward, 1994; Hazlewood, 1953).

¹⁴ This reconstruction of the history of Italian telephone companies was done thanks to the "Bollettino Ufficiale delle Società per Azioni," an official document of Ministry of Industry in which are conserved many minutes of the board of directors of the main Italian private companies .

Table 2 presents the situation in the second half of the 1890s, giving a picture of long-distance telephone density in Europe indicating that development of the long-distance telephone mainly occurred in countries where long-distance networks were managed by the government or by a combination of public and private companies. This was not the case in Italy, however, the only country in Europe to leave the development of inter-urban networks to private companies. Furthermore, licences for long-distance networks were generally given to private companies after a lengthy wait and with many second thoughts. One possible reason for this is politics, namely that the Italian government feared the long-distance network could fall into foreign investors' hands and be used by them in case of war. Uncertainty and lack of investment were the main causes of the underdevelopment of the new medium in Italy.

Table 2. Kilometers of Long Distance Telephone Wires per 10,000 Inhabitants (1897)

Public Management	
Luxemburg	106
Switzerland	39.76
England (1898)	21.2
Belgium	18
France	14.43
Germany	12.38
Hungary	7.6
Austria	6.33
Rumania	4.4
Bulgaria	3.66
Russia	0.08
Private-Public	
Norway	125.9
Sweden	96.1
Denmark	35.62
Netherlands	8.84
Only Private	
Italy	0.05

Source. *Draft bill n. 3 (189)*, November 16, 1899, attachment D, p. 20.

Technicians believed that the long-distance network was different from the local one, both technologically (wires, exchanges, etc.) and in terms of its main uses. Electrical engineers were worried about the limited development and malfunctions of this network. From 1891 and 1892, experts began to compare the long-distance networks in Italy to those in other countries in technical journals and expressed what was later recognized as “a really mortifying condition of inferiority” [*Draft bill n. 3 (189)*, November 16, 1899, p. 1].

Unlike politicians and technicians, people running private companies believed that local and long-distance networks were closely related and they wanted to manage them in a parallel way. Telephone companies sometimes asked for urban concessions only because they hoped to be assigned long-distance networks connecting to the local ones at a later date. For example, the SG requested and obtained local concessions for small towns around Florence and Rome because it wanted to link up these large cities. However, the Italian government did not assign these long-distance networks to SG, and the telephone company decided to abandon the local concessions (SG, 1899, p. 9).

SG and SAI obtained a few concessions for long-distance networks with great difficulty and invested in only the profitable areas of Italy. In 1899, the two companies owned eight inter-urban networks: five around Milan (Milan-Monza, Milan-Legnano, Milan-Como, Milan-Novara and Milan-Lecco), two around Venice (Venice-Mestre and Venice-Treviso), and one in Piedmont (Turin-Pinerolo). The Ministry of Post and Telecommunications managed only four additional networks, all in the north of the country (Turin-Novara, Novara-Milan, Milano-Bergamo and Bergamo-Cazzaniga) [Draft bill n. 3 (189), November 16, 1899, attachment E, p. 21]. It was obvious that private companies invested in the wealthiest and most dynamic areas for commerce and tourism (mainly in the north) as they had to make profits, and that the scarce public investments in long-distance networks were also concentrated in the north. The government did not equally distribute the service and so evaded a fundamental responsibility of the public sector, which is granting every citizen equal access to sources.

Subscribers were reluctant to use the long-distance networks and the so-called *telefonìa interubana* became a scarce commodity for two main reasons. First, telephone lines connecting the cities were insufficient for the demand; subscribers had to wait, sometimes for hours, before being connected. Second, a long-distance call could last only two periods of three minutes, so a long-distance phone call could last only six minutes. If a subscriber wanted to make another call, s/he had to get into queue again. Long-distance telephone service in Italy before the First World War was therefore used mainly by politicians and the most important businessmen. This allocation of privilege to a small minority could be interpreted either as a result of political short-sightedness or as a deliberate strategy to contain, and above all, control private communications.

At the end of the 1890s, the main political fear materialized. One company owned the majority of the urban and inter-urban networks, and this group was controlled by foreign capital: The telephone was in the hand of foreigners.

Setting the Stage for Nationalization (1903–1907)

At the beginning of the 1900s in Italy, the telephone service was paralyzed as the number of subscribers did not increase during the 1890s, malfunctions became ordinary and, contrary to their behavior in the 1880s, private companies had stopped improving the system. This crisis originated with bad management practices but was affected by factors exogenous to the telephone sector. An economic depression that hit Italy between 1889 and 1894 caused the fall of the two most important banks of that time, Credito Immobiliare and Banca Generale. Other factors were a commercial war against France for colonial pretensions that Crispi fought in these years and political and financial scandals, including the

scandalo della Banca romana (scandal of Roman bank) in 1892. In 1903, the Italian Parliament ordered a two-year investigation into the responsibilities for the telephone crisis. The results, presented to the Italian Parliament in December 1905, confirmed that the crisis could be attributed to poor management by SG and SAI, which the report said tried to cheat the government and the subscribers in many ways. The companies also treated employees poorly, especially the young women who operated the telephones (Ministry of Post and Telegraphs, 1905). For these reasons and several others, the government proposed to nationalize the telephone.

Initially, and before the investigation's results were presented, private companies defended themselves against the findings of the investigation and claimed that the investigation was ordered with the sole aim of justifying nationalization. According to the companies, the telephone investigation had the following aims:

First, creating a large telegraphic, telephonic and radio department with autonomous functions. Second, firing three or four top officers of the telephone sector and replacing them with new young officers . . . Third, impressing public opinion with astonishing news in order to set the stage for the nationalization of the telephone networks managed by private companies. Fourth, finding a way, after the nationalization, to employ 190 inspectors of post and telegraphy without work at the moment. (*Telefono, Poste e Telegrafi*, 1904 p. 5)

While the investigation was underway, many politicians denounced a "coalition of sinister interests" (Parliamentary debates, February 13, 1905, p. 988) or a conflict of interest between politics and private companies. The SG "surrounded itself with influential members of Parliament who were either on its board of directors or legal consultants," (ibid., p. 992) and these politicians tried to minimize the damage caused by the investigation. Additionally, in 1904 and in 1905, one of the most influential Italian banks, Banca Commerciale, purchased all the telephone networks of the SG and SAI, which encompassed a great majority of the Italian telephone system. The Banca Commerciale entered this business venture for three main reasons. First, French, Greek and American capitalists who owned the majority of these companies wanted to get rid of their shares; second, the telephone really seemed to be a promising business, and third, the bank wanted to analyze this business to see if it was really promising or to prepare a fair deal on nationalization with the government (BCI, 1904, pp. 91–92).

According to some technicians, the pressure of "the great bank" in political circles was instrumental in convincing the government and public opinion that the telephone had to be nationalized (*L'elettricista*, 1905, p. 219; 1907, pp. 141–142). The Banca Commerciale was satisfied when handing over its telephone networks to the state that the business was "convenient" for the bank (BCI, 1907, pp. 224–225). Bank Director Otto Joel said at a board meeting that the Bank sold its shareholding for at least "twice the price" of the real sales value (*Telegrafia e Telefonia*, 1910a, pp. 17–18). Other technicians, in particular, a group of telegraph operators who believed that in public hands, the telephone could be integrated with the telegraph with positive results in terms of technological rationality and working equity (Fumero, 1905), favored nationalization. One of the most well-known engineer-entrepreneurs of that time, Giacinto Motta, supported the nationalization of the telephone because, since 1880, this service had been

controlled by foreign capital. Motto believed that the Italian government should manage this public service on its own (Motta, 1905).

Subscribers and public opinion, in general, supported nationalization for two main reasons. First, they were affected by the results of the telephone investigation, especially by the malfunctions and inappropriate treatment of the exchange operators. Second, sentiments regarding telephone privacy exploded when a case of fraud garnered attention in Bergamo, Italy, in 1903. In this Lombard city, the Banca Bergamasca was caught intercepting calls made by another bank, the Banca Ceresa, with its customers and representative in Milan (*Telefono, Poste e Telegrafi*, 1903). Although the bank manager and the two switchboard operators involved were exonerated, the Bergamo case worried Italian society at the time and had repercussions on public opinion. As a result, private telephone companies were considered incapable or protecting privacy (a crucial concern) and so Italian society convinced itself that the telephone service had to be managed by the government.

Between 1903 and 1907, the four relevant social groups agreed, for many reasons, that the telephone should be nationalized. Politicians had to respond to the results of the telephone investigation, and private companies appeared to be interested in selling the networks to the State. Many technicians wanted to integrate telegraphy and telephony and subscribers wanted to protect their telephone privacy by assigning the service to the government. The first nationalization of the Italian telephone service was implemented with law No. 506 on July 15, 1907. It was presented by Carlo Schanzer, the Minister of Post and Telegraphs of the third Giolitti government.

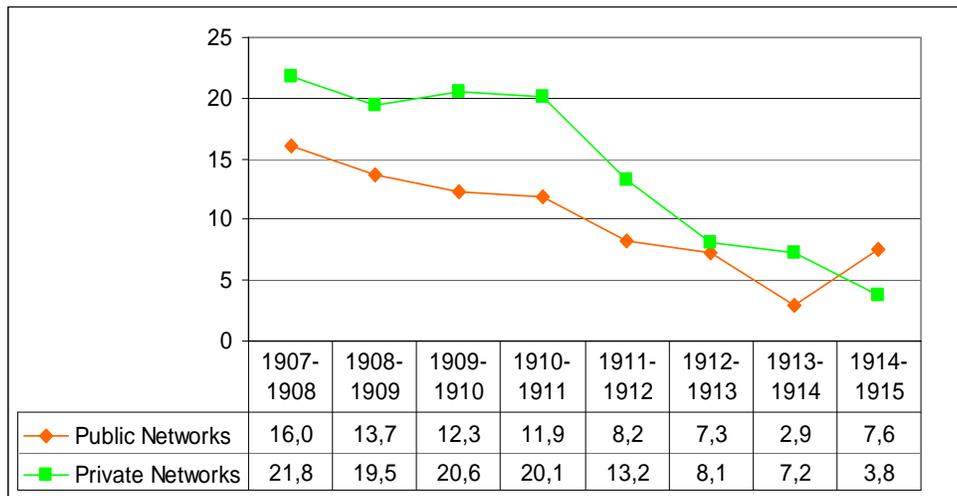
Back to the Future: The Failure of Nationalization (1907–1915)

Nationalization, however, proved to be only a partial solution because the state had nationalized only the networks owned by the two most important companies, SG and SAI. This meant that the government controlled two-thirds of Italian subscribers and about 70% of long-distance networks. It also meant that 67% of the local networks and a third of the subscribers remained in the hands of some 70 private and small companies, as did 30% of the long-distance networks (Draft Bill n. 757, May 22, 1907, pp. 73–83). These data show that placing a portion of the Italian telephone system under state control neither unified nor rationalized the system despite the fact that, according to the government, such unification and rationalization were two of the main goals of the nationalization.

In the years immediately following nationalization, many problems emerged. The first problem was the so-called “telephone thirst” as a Royal Commission formed in 1910 (Ministry of Post and Telegraphs, 1911, p. 189) to study the telephone question called the popular demand for the telephone. This demand was persistent and the government could not meet it as it lacked sufficient funds to build new networks or exchanges (even with the co-participation of local entities), so aspiring subscribers had to wait for months, sometimes even more than one year, to be connected to the network. Another problem was the inheritance of the private companies. In the years before nationalization, the two main private companies refused to invest in the system and waited to be bought by the government. By then, the telephone exchanges were obsolete and overloaded, so no new local numbers could be activated (Statistical report of telephone administration, 1909, pp. 20–23) and telephone networks were insufficient

for the demand, and the government had to spend an exorbitant amount of money modernizing the telephone system. A third problem was the unexpected dynamism of the small companies excluded from the nationalization. As previously mentioned, the Italian government had decided to nationalize only the two main private companies, but many other companies continued to manage small local and long-distance networks. Unexpectedly, between 1907 and the First World War, these companies grew much more than the networks owned by the state (see Table 3). As they invested more in the system, they organized themselves into associations (see Federation of Italian telephone concessionaires, 1911) and were ultimately managed by people with longstanding experience in the telephone sector and with beneficial political connections.

Table 3. Percentage Increase of Local Subscribers in Public and Private Networks 1907–1915.



Source. Processing of data from statistic report of telephone administration 1909–1916.

Disappointed by the way the public sector was managing the telephone system, technicians were the first group to launch a campaign against the public telephone. At the beginning of 1908, a popular technical journal, *Telegrafia e Telefonía*, claimed that the Italian telephone system would face a crisis mainly due to the imbalance “between the needs of demand and the available capital” and the inability of the government to manage this service (*Telegrafia e Telefonía*, 1908, p. 116). A few years later, the technicians said that the main reason for nationalization had been political and had, above all, the sole aim of increasing the number of people employed by the Ministry of Post and Telegraphs, “in order to satisfy ministers, senators, members of Parliament and everyone who has found in the telephone a new source . . . for paying debts of gratitude” (*Telegrafia e Telefonía*, 1910b, pp. 5–8). It is not easy to

demonstrate if recruitment in the telephone department was guided by political favoritism and nepotism, but one figure is indicative of an exaggerated growth: One year after nationalization, the number of people working in the telephone sector increased from 1,307 to 2,988 (ibid.).

Politicians began to realize that the telephone industry was entering a crisis in 1910 and began to ask themselves if they had been fools (Parliamentary debates, June 22, 1910, p. 8852) when nationalizing the service. Between 1910 and 1913, Parliament stigmatized the way the telephone was managed by the state, but in this phase the main aim of the politicians was to convince Parliament to allocate more money to the development of the telephone networks. From 1913 to 1914, the new Minister of Posts and Telegraphs, Teobaldo Calissano, took a reformist stand and tried to solve the problem, presenting and making Parliament approve two laws that assigned 70 million lire to the urban networks and about 55 million lire to long-distance ones (Law n. 253 and n. 254, March 20, 1913). However, in the latter half of 1914, the situation changed again; a new government, which supported the principles of free trade (again the natural uncertainty), took power, and public expense grew because of war in Libya. This international crisis began to be felt in Italy, as did the start of World War I, which caused an increase in the price of raw materials and a reduction in telephone traffic. In this complex national and international economic situation, the Italian Parliament changed its position again:

[...] we have to avoid a situation in which the State manages useless functions, we have to renounce nationalizations that have demonstrated that the government is a bad industrialist; take the example of telephone; while private industry is looking for customers, the State rejects them. For years thousands of citizens in Milan, Rome, Naples have asked in vain to be served by the telephone. (Parliamentary debates, June 12, 1914, p. 4080)

This was the prevailing opinion of the Italian Parliament at the time and is significant in that, of all the unsuccessful nationalization projects, the telephone was cited as the main example of failure and ineffectiveness. The only solution was to "look again for the help of private companies" (Parliamentary debates, February 20, 1915, p. 6210). So, before Italy joined the WWI in June 1915, politicians changed their minds and decided that the best way to manage the telephone sector was to relinquish power and authority to private companies.

The failure of nationalization is depicted in Table 4. Between 1908 and 1913, the public administration increased the percentage of subscribers by only 1% and Italy had one of the lowest telephone densities in Europe.

Table 4. Subscribers per 1,000 Inhabitants Between 1908 and 1913.

	1908	1909	1910	1911	1912	1913
USA					63,96	63,96
Denmark	30.2	33	36.5	38.1	41.91	47.08
Sweden	29.9	31.2	33.6	23.8	35.6	39.81
Norway	23.3		26.8	29.2	29.2	33.29
Switzerland	22.8	20.9	22.3	22	23.7	25.87
Germany	14.1	15.2	16.9	17.5	17.56	21.98
UK	13	13.3		15.1	15.8	16.16
The Netherlands	8.5	9	10	10.6	12	13.62
Belgium	5.3	5.6	6.2	6.7	7.66	7.74
France	5		3.5	6.2	6.97	7.66
Austria		3.1	3.6	4.3	5	5.73
Hungary				3	3.37	3.98
Italy	1.6	1.7	2	2.5	2.5	2.61
Spain	0.9	1.1		1.2	1.17	1.74
Russia	0.8	0.9	1		1.29	1.56
Greece	0.5	0.3	0.5	0.6	0.74	0.74

Source. Processing of data from Statistic report of telephone administration 1909–1916.

As previously mentioned, after nationalization the government attempted to meet an uncontrolled demand for the telephone. The key users who needed the telephone for work, such as banks, shops and newspapers, were unhappy with the service offered by the government (Perotti, 1909, p. 208). In particular telephone users complained about the delays in long-distance calls because the lines were often busy and they had to wait, sometimes more than one year, to be connected to the local networks. Because of its inefficiencies, public management began rejecting potential customers and the “subscribers’ army” turned into a “discontented army” (ibid., p. 214) that had hoped for the return to private companies.

Finally, private companies also acquired a role in this reorientation toward private management. When the government nationalized the two main telephone companies it assumed that, in a few years, the smaller companies would gradually be absorbed or would collapse. On the contrary, these companies were more dynamic than the public sector, and their better administration contributed to questions about the ability of the public administration to manage the telephone service.

Before Italy’s entrance into the First World War, Italian society, which before 1907 agreed on the idea of nationalizing the telephone, returned to the idea of assigning networks to private companies. This

was a sudden change and was caused by public inefficiency in managing the telephone, the unexpected growth in demand, the skills of small companies, and the war, which interrupted the plan to return to private management. However, the current political unease might have helped the Fascist Party to easily privatize the telephone sector in the 1920s (Bottiglieri, 1987).

Conclusion. Original Characters of the Italian Telephone: A Style?

The history of the early Italian telephone has some distinctive characteristics. Some are shared with other countries, while other more specific characteristics are summarized as follows.

As often happened in European countries at that time, the new medium, the telephone, was evaluated using the logic, structures, and operating procedures of the old medium, the telegraph. This telegraphic paradigm especially characterizes the political approach to the telephone. The most prevalent attitude of Italian politicians during the time was the "natural uncertainty," the fundamental inability of the political class to make long-term consistent decisions about the telephone sector. The main cause of the changes in the political approach can be found within the legislative instability of the 19th and 20th centuries, which prevented the formation of shared and long-term thinking regarding telecommunications.

On the economic-industrial level, the ambiguity of legislation influenced the management of the telephone service by private companies. During some stage, the legislation restricted investment in the development of networks because companies were not sure to amortize the invested capitals.

The ambivalent relationship between politics and private companies is another characteristic unique to the origins of the telephone in Italy. For example, the two groups opposed each other during the parliamentary investigation launched in 1903, but they were linked by forms of complicity and conflicts of interests. For instance: During the early years, men linked to political power were regularly in the telephone companies' boards of directors.

A fourth characteristic of the telephone's early history is the enthusiasm exhibited by private companies. Despite the legislation, either during 1890s or after the nationalization of 1907, private companies invested in the telephone sector. Most of the capital of these companies came from foreign investors, confirming that the Italian telecommunications industry was able to attract shareholders beyond national borders.

From a technical perspective, many problems characterized the origins of the Italian telephone, including poor sound quality and the delays in making calls. However, the most relevant problem in a macro-systemic perspective was the fragmentation of the networks caused by the lack of a single authority responsible for coordinating and planning the service. These problems emerged in the first decade, when urban concessions were assigned to various private companies. During the 1890s, the telephone system was divided broadly into two sectors, urban and long-distance telephony. Finally, partial nationalization in 1907, intended to unify the telephone system, only made it less efficient.

As the government's tendency was always to divide and assign the telephone networks to many companies, those companies tried instead to merge with competitors in order to create a virtual monopoly in a single region.

Finally, another striking characteristic of the early telephone in Italy was the lively demand expressed by the society, so great that caused crisis in the service managers, who often failed to meet these needs.

This analysis of the origins of the telephone service in Italy may provide a new perspective at the history of Italian telecommunications. First, the foundations of the Italian point-to-point communications were built around the turn of the century. The telephone followed the electrical telegraph and preceded radio-telegraphy in the creation of a system of communications in the country. The origins of the telephone also offer a few relevant elements for interpreting the contemporary Italian telecommunications system. Indeed it could be argued that a few characteristics and logistics that emerged in the first years of development have configured a kind of Italian style in telecommunications (Hughes, 1983; Stourdzé, 1987; see Ortoleva, 2000 on an Italian style in telecommunications). These include political uncertainties (Foreman-Peck & Manning, 1988, p. 181; Richeri, 1985, p. 55), a market controlled by foreign companies (Bottiglieri, 1987; Lizzeri & De Brabant, 1979), difficulties of interconnections among different systems (Giuntini, 2005), and the presence of a demand often ignored (Abeille, 1999). These were four long-lived characteristics in the Italian telecommunications history of the 20th century.

References

- Abbate, J. (1999). *Inventing the Internet, inside technology*. Cambridge MA: MIT Press.
- Abeille, R. (1999). *Storia delle telecomunicazioni italiane e della Sip 1964–1994* [The History of Italian telecommunications and SIP 1964-1994]. Milan: Franco Angeli.
- Antinori, A. (1963). *Le telecomunicazioni italiane 1861–1961* [Italian telecommunications 1861–1961]. Rome: Edizioni dell'Ateneo.
- Aulas, P. (1999). *Les origines du téléphone en France, 1876–1914* [The Origins of the telephone in France, 1876–1914]. Paris: ADHE.
- Babe, R. E. (1990). *Telecommunications in Canada: Technology, industry, and government*. Toronto, Buffalo and London: University of Toronto Press.
- Balbi, G. (2009). Studying the social history of telecommunications. Between Anglophone and continental traditions. *Media History*, 15 (1), 85–101.
- Balbi, G. (2011). *Le origini del telefono in Italia. Politica, economia, tecnologia e società* [The Origins of the telephone in Italy. Politics, Economics, Technology and Society]. Milan: Bruno Mondadori.
- Balbi, G. (in press). *The scary house: When Italy's old telephones gave rise to new fears*. In S. Nicholas & T. O'Malley (Eds.). *The Media, Social Fears and Moral Panics: Historical Perspectives*. London and New York: Routledge.
- BCI. (1904). *Board of directors, May 28, Minutes of Central Committee*, vol. 2, papers, 91–92, 94.
- BCI. (1907). *Board of directors on Soc. Generale It. dei Telefoni e Applicazioni Elettriche*. vol. 2, papers, 224–225.
- Bottiglieri, B. (1987). *STET: Strategie e struttura delle telecomunicazioni* [STET: Strategies and structures of telecommunications]. Milan: Franco Angeli.
- Bottiglieri, B. (1990). *SIP: Impresa, tecnologia e stato nelle telecomunicazioni Italian* [SIP: business, technology and State in telecommunications]. Milan: Franco Angeli.

International Journal of Communication 5 (2011) The Origins of the Telephone in Italy, 1877–1915 1075

Brock, G. W. (1982). *The Telecommunications industry: The dynamics of market structure*. Cambridge, MA: Harvard University Press.

Bruce, R. V. (1973). *Bell: Alexander Graham Bell and the conquest of solitude*. Boston: Little, Brown & Co.

Calvo, A. (2002). The Spanish telephone sector (1876–1924): A case of technological backwardness. *History and Technology*, 18(2), 77–102.

Calvo, A. (2006). The shaping of urban telephone networks in Europe, 1877–1926. *Urban History*, 33(3), 411–433.

Curien, N., & M. Gensollen. (1992). *Economie des télécommunications: ouverture et réglementation* [Economy of Telecommunications: opening and regulation]. Paris: Economica.

De Viti de Marco, A. (1890, September). L'industria dei telefoni e l'esercizio di Stato [The telephone business and the State management]. *Giornale degli economisti*, 279–306.

De Witt, O. (1998). *Telefonie in Nederland, 1877–1940. Telefonie in Nederland 1877–1940* [The telephone in the Netherlands 1877–1940]. Den Haag: Cramwinckel.

Dordick, H. S. (1990, June). The origins of the universal services. *Telecommunications Policy*, 223–231.

Douglas, S. J. (1989). *Inventing American broadcasting, 1899–1922*. Baltimore: Johns Hopkins University Press.

Downey, G. J. (2002). *Telegraph messenger boys: Labor, technology, and geography, 1850–1950*. New York: Routledge.

Draft bill n. 189. (1899, May 2). *Disegno di Legge presentato dal Ministro delle Poste e dei Telegrafi (Nasi) di concerto col Presidente del Consiglio Ministro dell'interno (Pelloux) e col Ministro del Tesoro (Vacchelli), Sul servizio telefonico*. Camera dei Deputati, Legislatura XX, 2° sessione 1898–1899.

Draft bill n. 3 (189). (1899, November 16). *Disegno di Legge n. 3 (189) presentato dal Ministro delle Poste e dei Telegrafi (Di San Giuliano) di concerto col Presidente del Consiglio, Ministro dell'interno (Pelloux) e col Ministro del Tesoro (Boselli). Sul servizio telefonico*. Camera dei Deputati, Legislatura XX, 3° sessione 1899.

- Draft Bill n. 757. (1907, May 22). *Disegno di legge presentato dal Ministro delle Poste e dei Telegrafi (Schanzer) di concerto col Presidente del Consiglio, Ministro dell'Interno (Giolitti) col Ministro del Tesoro (Carcano) col Ministro delle Finanze (Lacava) e col Ministro di Agricoltura, Industria e Commercio (Cocco-Ortu). Riscatto di linee e reti telefoniche esercitate dall'industria privata e ordinamento dell'azienda dei telefoni dello Stato*. Camera dei Deputati, Legislatura XXII, sessione 1904–1907.
- Fari, S. (2008). *Una penisola in comunicazione. Il servizio telegrafico italiano dall'Unità alla Grande Guerra* [A Communicating peninsula. The Italian telegraph service from Unity to the Great War]. Bari: Cacucci.
- Federation of Italian telephone concessionaires. (1911). *Atti del VI° Congresso dei Concessionari Telefonici Italiani tenutosi nei giorni 19 e 20 Novembre 1911 nel Padiglione dei Congressi a Castel S. Angelo in Roma* [Minutes of concessionaires meeting in 1911]. Bergamo: Stabilimento Tipografico S. Alessandro.
- Fischer, C. S. (1992). *America calling: A social history of the telephone to 1940*. Berkeley: University of California Press.
- Foreman-Peck, J., & Millward, R. (1994). *Public and private ownership of British industry 1820–1990*. Oxford: Oxford University Press.
- Foreman-Peck, J., & Manning, D. (1988). Telecommunications in Italy. In J. Foreman-Peck & J. Mueller (Eds.) *European telecommunication organisations*. Baden-Baden: Nomos Verlagsgesellschaft.
- Fox, R., & Guagnini A. (1994). Starry eyes and harsh realities: Education, research, and the electrical engineer in Europe, 1880–1914. *The Journal of European Economic History* 23(1), 69–92.
- Fumero, E. F. (1905). Il servizio telefonico in Italia e la legge che lo regola [The telephone service in Italy and Reference Law]. *Telegrafia e Telefonia* V(2), 9–13.
- Giuntini, A. (2005). Nascita, sviluppo e tracollo della rete infrastrutturale [Birth, development, and collapse of the infrastructural network]. In *Storia d'Italia. L'industria. I problemi e lo sviluppo economico*. Milan: Einaudi-II Sole 24 ore.
- Hazlewood, A. (1953, March). The origin of the state telephone service in Britain. *Oxford Economic Papers*, new series, 5(1), 13–25.

Holcombe, A. N. (1911). *Public ownership of telephones on the continent of Europe*. Cambridge, MA: Harvard University Press.

Hughes, T. P. (1983). *Networks of power: Electrification in western society, 1880–1930*. Baltimore: John Hopkins University Press.

Jacobsen, K. (2005). *Institutional change and path dependence in Danish telecom development*. Conference "Cross-Connections: Communications, Society and change." Science Museum, London, November 11–13.

John, R. (2010). *Network nation: Inventing American telecommunications*. Cambridge, MA: Belknap Press of Harvard University Press.

Kolbet, C. (1980). 100 years of telephone service in Switzerland. *Bullettin Technique PTT*, 10, 344–363.

Law n. 253 and n. 254. (1913, March 20).

L'elettricista. (1905). "Informazioni — Riscatto telefonico," [Information — Nationalization of the telephone]. 219.

L'elettricista. (1907). "Informazioni — Manovre affaristiche nel riscatto dei telefoni. Il carrozzone telefonico e la crisi ministeriale," [Information — Commercial tactics for nationalizing the telephone]. 141–142.

L'Illustrazione Italiana. (1882, January 29). "Dappertutto telefoni" [Telephones everywhere]. 86.

Lizzeri, G., & De Brabant, F. (1979). *L'industria delle telecomunicazioni in Italia* [Telecommunications industry in Italy]. Milan: Franco Angeli.

Maiocchi, R. (1992). La ricerca in campo elettrotecnico [Electrotechnical Research]. In G. Mori (Ed.) *Storia dell'industria elettrica in Italia. 1. Le origini. 1882–1914*. Roma-Bari: Laterza.

Marvin, C. (1988). *When old technologies were new. Thinking about electric communication in the late nineteenth century*. New York: Oxford University Press.

Millward, R. (2005). *Private and public enterprise in Europe. Energy, telecommunications and transport, 1830–1990*. Cambridge: Cambridge University Press.

- Ministry of Post and Telegraphs. (1890). *Report of Commission on Draft Bill n. 117 Sul servizio telefonico*, Camera dei Deputati, Legislatura XVI, February 10, 4° sessione 1889–1890.
- Ministry of Post and Telegraphs. (1905). *Report of the telephone investigation n. XXIV*. Rome: Tipografia della Camera dei Deputati. In Legislatura XXII, December 4, Sessione 1904–1905.
- Ministry of Post and Telegraphs. (1909–1916). *Statistic report of telephone administration*.
- Ministry of Post and Telegraphs. (1911). *Report of Royal Commission named with decree July 10, 1910. Per lo studio tecnico, amministrativo e finanziario del servizio telefonico in Italia*. Rome: Tipografia dell'Unione editrice.
- Motta, G. (1905, March 6). L'inchiesta telefonica [The telephone investigation]. *Il tempo*.
- Nelson R. R., & Winter, S. G. (1982). *An evolutionary theory of economic change*. Cambridge, MA: Harvard University Press.
- Ortoleva, P. (2000). Telecomunicazioni: Un modello italiano? [Telecommunications: An Italian style?]. *Memoria e ricerca* 5, 107–118.
- Parliamentary debates. (1890, July 9). Camera dei deputati [Chamber of Deputies, i.e. the lower house of the Italian Parliament, corresponding to the British House of Commons], Legislatura XVI, 4° sessione, 1° tornata.
- Parliamentary debates. (1891, December 9). Camera dei deputati [Chamber of Deputies, i.e. the lower house of the Italian Parliament, corresponding to the British House of Commons], Legislatura XVII, 1° sessione, tornata unica.
- Parliamentary debates. (1905, February 13). Camera dei Deputati [[Chamber of Deputies, i.e. the lower house of the Italian Parliament, corresponding to the British House of Commons], Legislatura XXII, 1° sessione, tornata unica.
- Parliamentary debates. (1910, June 22). Camera dei Deputati [[Chamber of Deputies, i.e. the lower house of the Italian Parliament, corresponding to the British House of Commons], Legislatura XXIII, 1° sessione, 2° tornata.

Parliamentary debates. (1914, June 12.) Camera dei Deputati [Chamber of Deputies, i.e. the lower house of the Italian Parliament, corresponding to the British House of Commons], Legislatura XXIV, 1° sessione, 2 tornata.

Parliamentary debates. (1915, February 20). Camera dei Deputati [Chamber of Deputies, i.e. the lower house of the Italian Parliament, corresponding to the British House of Commons], Legislatura XXIV, 1° sessione, tornata unica.

Perotti, G. (Ed.). (1909). *Atti del VII. Congresso nazionale dei commercianti, esercenti ed industriali. Piacenza 1908* [Minutes of the eight national congress of traders, dealers and manufacturers]. Piacenza: Stab. Arti Grafiche D. Foroni.

Pinch, T., & Bijker, W. E. (1984). The social construction of facts and artefacts: Or how the sociology of science and the sociology of technology might benefit each other. *Social Studies of Science*, 14(3), 419–424.

Prina, G. (1885). *Descrizione del nuovo sistema (privilegiato) per facilitare l'esercizio telefonico ad uso pubblico* [Description of a new (and privileged) system to make easier the public use of the telephone]. Turin: Tip. subalpina.

Rava, L. (1900). *Il telefono nella legislazione italiana* [The Telephone in the Italian law]. Bologna: Zanichelli.

Ribeill, G. (2001). De l'objet technique a l'utopie sociale. Les ressorts de l'imaginaire technologique des ingénieurs au XIXe siècle [From technical tool to social utopia. The impulse of engineers' technological imaginary in the XIX century]. *Réseaux* 5(109), 114–144.

Richeri, G. (1985). The difficulties involved in the control and organization of telecommunication in Italy. *Media, Culture and Society*, 7(3), 49–70.

Richeri, G. (2006). The media amidst the enterprises, the public and the State. *Studies in Communication Sciences* 6(2), 131–143.

Rosenberg, N. (1994). *Exploring the black box. Technology, economics, and history*. Cambridge MA: Cambridge University Press.

Segreto, L. (1992). Imprenditori e finanzieri [Entrepreneur and moneymen]. In G. Mori (Ed.), *Storia dell'industria elettrica in Italia. 1. Le origini. 1882–1914*. Roma-Bari: Laterza.

- SG [Società Generale Italiana di Telefoni ed Applicazioni Elettriche]. (1897). *Board of directors meeting, March 29*. Rome: Tip. F.lli Centenari.
- SG [Società Generale Italiana di Telefoni ed Applicazioni Elettriche]. (1899). *Board of directors meeting, March 24*. Rome: Sede della Società.
- Società Anonima padovana per il telefono ed altre applicazioni della elettricità. (1887). *Board of directors, February 27*. Padova: Stabilimento Prosperino.
- Società Telefonica Ligure. (1886). 'Board of directors, March 29' *Bollettino ufficiale delle società per azioni (BUSA) 18*, 115–119.
- Stacca, G. B. (1994). L'ingegnere delle telecomunicazioni nell'evoluzione della sua formazione professionale [Telecommunications engineer in the evolution of his training]. *AEI 81*(1), 80–91.
- Sterling, C., Bernt, P., & Weiss, M. B. H. (2006). *Shaping American telecommunications: A history of technology, policy and economics*. Mahwah, New York: Lawrence Erlbaum Associates.
- Stourdzé, Y. (1987). *Pour une poignée d'électrons. Pouvoir et communication* [For a handful of electrons. Power and communication]. Paris: Fayard.
- Summerton, J. (1994). Introductory essay: The system approach to technological change. In J. Summerton (Ed.), *Changing Large Technical Systems*. Boulder, San Francisco and Oxford: Westview Press.
- Telefono, Poste e Telegrafi*. (1903). "Il... 'segreto' telefonico e il caso di Bergamo" [Telephone privacy and the case of Bergamo]. *I*(4), 4–5.
- Telefono, Poste e Telegrafi*. (1903). Società Generale Italiana dei telefoni ed applicazioni elettriche [Italian General Telephone Company]. *I*(5), 8.
- Telefono, Poste e Telegrafi*. (1904). "Ancora l'inchiesta sui telefoni," [Again on the telephone investigation]. *II*(1), 3–5.
- Telegrafia e Telefonia*. (1908). "Crisi telefonica italiana," [Italian telephone crisis]. *VIII* (8), 116–117.

International Journal of Communication 5 (2011) The Origins of the Telephone in Italy, 1877–1915 1081

Telegrafia e Telefonia. (1910a). "A Quoi bon?" [Why?]. *X*(2), 17–18.

Telegrafia e Telefonia. (1910b). "La crisi telefonica" [Telephone crisis]. *X*(4), 57–58.

Vitali, E. (1980). Centenario del servizio telefonico pubblico in Italia (1881–1981) [Centenary of the public telephone service in Italy (1881–1981)]. *Informazioni di marketing*, XI.

Webb, H. L. (1911). *The development of the telephone in Europe*. London: Electrical Press.