

Telecommunications in Italy

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Italy

No European telecommunications system has been institutionally more complex than Italy's. Through the 1980s, it was best described as a shared monopoly of five organizations. Two of these organizations are government administrations; the other three are nominally private groups. The state directly runs the State Agency for Telephone Services (ASST), which handles long-distance and European telephony, and the Post and Telecommunications Administration (PT), which handles telegraph and telex networks. The three other groups are Società Italiana per l'Esercizio Telefonico (SIP), for local exchanges and some long-distance service; Italcable, for intercontinental service, and Telespazio, for satellite service, all of which are part of the state-dominated Società Finanziaria Telefonica (STET) holding company. In theory, the system separates segments of network control as the AT&T divestiture did in the United States, and it reduces monopoly power. In practice, however, the system in its aggregate is an inflexible bureaucracy, with service problems for small and large users. There are few performance rivalries, but frequent jurisdictional and political disputes. These revolve around financial transfers, particularly over dominance in new fields, such as data transmission and ISDN. Added to these problems are the vertical ties the STET companies maintain with sister firms in manufacturing, notably Italtel, the country's dominant telecommunications equipment maker. The protected market shares make Italy's electronics industry less dynamic than several other segments of its economy. One exception is Olivetti, which is outside this arrangement. On the positive side, the existing complex institutional system would allow for relatively easy modifications. For instance, a privatization of the STET network firms and their separation from equipment suppliers is gradually taking place, although not as part of a planned telecommunications policy. Additionally, equipment liberalization has progressed, partly because users' self-help could not be contained. As the STET firms become more entrepreneurial, the shared service monopoly could break down in the future. But this is counteracted by the government, whose chief initiative in telecommunications seeks to centralize the various institutions into one super-provider.

History

Italy's postal service originated in medieval times when the major cities and trading companies established Europe's first courier services. In Venice, a guildlike messenger organization existed and operated in a monopolistic fashion after 1305. Milan's system dates to 1385, and Naples created a runner course for southern Italy in 1444 (Dallmeyer, 1977). The Tassis family, which became a major presence in the postal system of much of Europe, also established service in Italy. The Italian PTT was established in 1870, during the unification of Italy.

Italian telephony started as a private business. The first large company, Società Generale di Telefonia, was established in 1881 (Holcombe, 1911). Limited telephone service began in Rome in 1878; the American Bell Company opened exchanges in Rome and Milan in 1881. Also in 1881, the first inter-urban service was provided between Rome and Tivoli on an experimental basis. Rival companies and competitive service emerged in some of the larger cities. Pressure to consolidate soon mounted. Within a short time, only two private telephone companies remained. In 1883, a royal decree established uniform obligations for concessionary firms, and burdensome requirements were imposed to protect the telegraph authority. Concessions were not awarded exclusively, and ran for only three years. The telegraph authority approved all public call offices as well as the private telephone rates. It levied a heavy concession fee on local exchanges and permitted municipalities to purchase the private telephone systems after twelve years. However, only one municipality wound up owning a local telephone ownership. In 1907, there were 141 local networks with 43,000 subscribers. In that year, the Italian parliament voted to purchase eighteen long-distance lines and twenty-seven local exchanges, then operated by the two major private telephone companies (Società Generale Italiana de Telefonia e Applicazione Elettriche and Società Telefonica dell'Alta Italiana, accounting for 75 percent of Italy's telephones). Under the plan, compensation to the owners of these companies was to be paid over eleven years out of future telephone profits.

Between 1907 and 1925, telecommunications were jointly provided by the state and by sixty-three regional private concessionaires. Local telephony was legally franchised to private firms, but long-distance communications remained under state control. Subsequently, under Mussolini, five telephone regions were established and assigned to different concessionaires: STIPEL, TELVE, TIMO, TETI, and SET. The PT organization ASST was established to provide long-distance interconnection between the five regions and international services with European and Mediterranean nations. This interexchange network was completed in 1928.

Forces for further centralization were strong. In October 1933, three of the concessionary firms were absorbed into the government holding company STET, which in turn was part of the government's industrial reconstruction institute, IRI. In 1958, the two remaining regional companies, TETI and SET, became

part of STET. In 1965, these five concessionaires were among nine firms merged into the Società Italiana per l'Esercizio Telefonica (SIP), a company that had started as a northern Italian electrical utility. About 70,000 shareholders owned approximately 45 percent of SIP's capital; STET controlled the remainder. In turn, about 50,000 shareholders controlled 42.3 percent of STET, with the remaining 57.7 percent held by IRI.

In the meantime, international communications also consolidated. International telegraph service was initially divided between the radio provider, Italia Radio, and the submarine cable provider, Italcable, and was centralized in 1941 when Italcable acquired its rival. It was further consolidated in 1965, when Italcable became a subsidiary of STET. Telespazio, Italy's satellite communications provider, was established as part of STET in 1963.

Structure

The complexity of the Italian system of telecommunications is largely hidden from the user's view. Virtually all user transactions except telegraph and telex are through SIP, which provides customers with a single telephone bill. The complexity of the system is upstream in the transmission path, where various organizations carved out segments of control. Despite the multiplicity of actors, at no point could users choose a provider, and they faced a monopoly, or more accurately, a shared monopoly. By tradition, politics, or influence, five organizations were able to control geographical or service areas within the monopoly. Virtually all these organizations were in one way or another government controlled, but by different parts of the state bureaucracy. In theory, this system could permit a comparison of performance and diffuse otherwise considerable power. In practice, the organizations were political rivals and not market competitors. Italy's telecommunications structure reflects the more general pervasiveness of politicization. By law, all telecommunications services are the province of the state. The complexity starts because the government operated telecommunications directly, through two of its own administrations, and it also granted operational authority to three outside concessionaires, notably SIP. These concessionaires were controlled by parts of the government other than the PTT ministry. These entities divided domestic and international long-distance service among themselves in no obvious pattern. The lead agency responsible for telecommunications is the Ministry of Post and Telecommunications (MPT). The MPT provides mail service and the vast postal bank transfer system. Two bodies, the Administrative Council and the High Technical Council for Telecommunications, assisted the ministry in its overall control of telecommunications. The Administrative Council included a wide array of governmental interests and is consulted on tariffs, proposed regulations, and concessionaires. The High Technical Council for Telecommunications consisted of experts from government, universities, and the concessionaires. It advised the ministry on technical and economic matters, development plans, and operations.

Subordinate to the MPT through the 1980s were two autonomous administra-

tions: the Post and Telecommunications Administration (PT) and the State Agency for Telephone Services (ASST). The PT conducted postal telegraph, telex, telex, and radio electric services. ASST, an autonomous public corporation, operated the primary long-distance transmission network that connected the twenty-one telecommunication "compartments" of the country. ASST also operated international telephony within Europe and the Mediterranean basin. Through the PT, the MPT provided a coastal station network (DCR) for communication with ships, minor islands, and Albania. It also provided broadcasting transmission for government operations such as embassies abroad. Two other companies, Sirm and Telemar, operated radio equipment aboard Italian ships, and potentially other services where no private concessionaries can be secured. The national network's layout consisted of twenty-one regional compartments, subdivided into 231 districts, each with its own area code. These were, in turn, divided into about 1400 sectors and 10,000 local exchanges, of which more than half have less than 500 subscribers.

Perhaps the best way to conceptualize the allocation of services in Italy is to imagine four concentric rings, in which the responsibilities alternated between the government-controlled STET holding company and direct government provision. At the core, STET's subsidiary company SIP operated local distribution. SIP also provided domestic packet-switched service. The next ring around it, corresponding to a greater distance of communication, was domestic long-distance transmission, operated by ASST. (For a long time, SIP also ran long-distance service in many rural districts.) The next ring, international service within Europe and many countries in North Africa, was also in the domain of ASST. The third ring was international transmission outside of Europe and North Africa, which was operated by the STET companies Italcable (for terrestrial and submarine transmission) and Telespazio (for satellites). Both also provided the PT administration with international record traffic.

SIP is by far the largest Italian service operator, with a turnover of 14,900 billion lire and 77,000 employees in 1989; the next largest, ASST, had revenues of 2,400 billion lire and under 13,000 employees.

An interesting side-effect of this system was that the separation of firms by different functions makes internal cross-subsidization more difficult (Benedetti, 1983). The creation of a cross-subsidization fund in 1980, the *Cassa Conquaglio per Il Services Telefonico*, did not clarify this complex accounting process. SIP's local service was separate from ASST's long-distance service. Thus, where contributions existed, they were by payment to another entity or by contributions to a parent company, and were thus more transparent than internal subsidies would be within a unified PTT system.

In 1985, the PTT ministry (MPT) initiated a study of the feasibility of separating postal and telecommunications activities. The study proposed separate agencies within the ministry to administer each of these activities throughout the country. The recommendations, however, were not instituted. In 1987, a bill was introduced that would change the PTT role from operating services to planning and coordination and that would divide service provision so that Ital-

cable would provide the entire international service and SIP would provide the domestic one. Additionally, the bill proposed that Telespazio operate independently, providing satellite service for SIP, Italcable, and RAI. ASST's operations would be assumed by SIP, Italcable, and the ministry. The bill's opponents focused on job relocation and preserving the state control.

Subsequently, the Christian Democrats offered a plan in 1988 to consolidate the telecommunications agencies into a "Super-STET"—including SIP, ASST, Italcable, and Telespazio—aggregated as "Italia Telecom." It would have relegated the ministry to a watchdog role (Rosenbaum, 1988). But this project was blocked by the PTT minister, trade unions, and southern Italian Christian Democrats, who traditionally were influential in MPT matters and were concerned with loss of telecommunications and postal patronage. An example for the politicization of the decision process: ASST was headed by the leader of the Christian Democratic Italian Union Workers' Confederation. After the proposal failed, an alternate plan to create a "Super-SIP" was introduced by Socialists, but this was also blocked by the Christian Democrats as well as by top management. In 1990, two bills were introduced to break the logjam. One bill proposed a change in the union contract for ASST, to protect those members opposed a move to the private-sector IRI-STET group where they would lose the right to retire after twenty years and receive a smaller pension. The other bill proposed separation of post and telecommunications activities of the PTT.

In 1990, the telecommunications ministry recommended a "Super-STET" under which the government's ASST would be transferred to STET. But the push for structural reform lost some of its steam when a government crisis led to the replacement of Minister Oscar Mammi, a member of the economically liberal Republican Party.

Italy was slow to focus on the role of telecommunications in the development of its economy. Although it was advanced in completing a universal subscriber trunk dialing, the system stagnated in the late 1970s, when, for political reasons, rate increases lagged behind rapid inflation. The major problem in upgrading Italian telecommunications has been reconciling the cost of modernizing the network and of trade union demands for high wages and flexible working conditions with political pressures to keep telephone rates from rising. This dilemma became particularly acute in the late 1970s, when local rates were frozen even with inflation raging at 20 percent. In consequence, no funds remained for investment. The ratio of SIP's self-financing (the contribution of a company's own earnings to capital formation) plummeted to 10 percent in 1980, when the firm reported losses of 538 million lire (Benedetti, 1983). SIP had to resort to indirect ways to increase rates, such as requiring subscribers to increase their deposits. It also had to borrow at the prevailing high interest rates. Subsequently, interest payments at times ate up 30 percent of its total income. The investment slowdown, in turn, adversely affected equipment suppliers and penetration. Italy's telephone density was about half of West Germany's; there were only half as many telex subscribers as in France and one-third as many as in the United Kingdom. Telephone switches were largely electromechanical

rather than electronic, and the system was chronically congested. Italy was also late in introducing national data networks, which were implemented eleven years after Germany and seven years behind France's Transpac (Pozzi, 1987).

Tariffs were often set by politics, resulting in a complex split of local, long-distance, and international revenues. A parliamentary committee finally recommended streamlining the cumbersome and restrictive rate-setting process and permitting rates to reflect inflation. The government responded in 1986 by increasing rates, giving SIP more pricing flexibility and fine-tuning the rate structure with time-measured local calls and peak load pricing. It also used a compensation fund, the Cassa Conquaglio, to transfer carrier profits from ASST and Italcable to SIP. It even temporarily reduced SIP's concession fee from 4.5 percent to 0.5 percent of its revenues, invested in its shares, and guaranteed purchase of the remainder. SIP's self-financing ratio increased to almost 50 percent by 1983 as a result of these actions—still low by comparison. France's DGT had a ratio of approximately 65 percent, that of British Telecom was 60 percent, and the Bundespost's was 100 percent (Benedetti, 1983). By 1988, SIP's self-financing had reached 90 percent of its capital expenditures.

In 1982, the PTT ministry also formulated a ten-year plan for the telecommunications sector. The targets for 1990 were a density of thirty-eight subscribers and fifty-seven telephones per 100 population (up from twenty-four and thirty-eight in 1981), and a digitalization, by the year 2000, of 50 percent local and 80 percent long-distance switching. In 1989, digitalization predictions were revised upward for 55 percent of all switches by 1993 and 100 percent by 2000. Trunk lines would be 85 percent digital by 1993 (Benzoni, 1990).

Even after streamlining, the rate-setting process was extremely complex. Users making fewer than forty calls per month paid 40 lire per billing unit, and others paid 127 lire. Italy's 3.9 million business users paid rates well above the OECD average, and telex service was Europe's most expensive. International rates were also the highest in Europe in 1988, with a three-minute call from Milan to London costing 33 percent more than a call in the other direction (OECD, 1990, p. 30; Schenker, 1990). Perhaps because of its high rates, Italy's international traffic was half that of France's and one-third of Germany's, accounting for less than 1 percent of network usage. Even Switzerland generated more total minutes of international calling. Those three nations accounted for 50 percent of Italy's traffic, with an additional 20 percent going to the United States and the United Kingdom (Staple, 1990; Smau, 1990).

SIP greatly reduced the waiting list for basic service, from 750,000 in 1981 to 118,900 in 1988, though penetration rates were relatively low (34.9 main lines and fifty-one telephones per 100 persons). A great disparity persisted between telephone penetration in the industrial north/central region (fifty-seven per 100 persons) and the rural south (thirty-seven per 100) (ITU, 1990).

In 1989, SIP launched a four-year investment and expansion plan called Piano Europa to invest \$8 billion above the already budgeted \$18 billion to connect 4 million new basic subscribers by the end of 1992, 43 percent of which reside in southern Italy.

The Equipment Industry

Most equipment procurement is from Italian companies, or Italian operations of foreign companies. Italtel, known originally as SIT-Siemens, is Italy's major telecommunications equipment manufacturer, with 1986 sales of around \$1 billion and 17,745 employees. It supplies more than half of SIP's switching equipment needs and 40 percent of its transmission equipment. Under Marisa Bellisario, Italy's only woman CEO of a major firm, Italtel emerged from near bankruptcy in 1981 to financial solvency, mostly by cutting employment from 30,000 in 1981 to 19,000 three years later.

In 1985, SIP bought 75 percent of Italtel's production. Italtel's exports are relatively anemic. In 1985, they totaled about \$30 million, or 5 percent of total sales, which consisted primarily of government-subsidized aid to developing countries, including Zambia and Guatemala.

In 1986, STET and Fiat attempted to merge Italtel and Telettra against increasing international competition. The Italtel/Telettra merger would have joined the leading public switch manufacturer with the top transmission and radio communications supplier. Plans for the new company, to be known as Telit, were approved by parliament, but later suspended because of bickering. The fundamental logic behind the Italtel/Telettra merger was not enough to overcome the struggles for managerial control. Fiat's chairman, Giovanni Agnelli, disapproved of allowing Bellesario to run Telit, fearing the influence of bureaucrats at IRT/STET, Italtel's parent firm. Tragically, Bellisario died at a relatively young age in 1988.

Another manufacturer is Ericsson's subsidiary, FATME, which employs 4500 workers in nine factories around the country. FATME had about 20 percent of the market. Alcatel, controlled by the French CGE with minority participation by ITT, employs about 10,000 at its Italian subsidiary, FACE. GTE had a substantial presence in Italy for many years. In 1986, as part of a global agreement with Siemens, it sold its manufacturing facilities and contracts to the German firm. Hewlett-Packard joined forces with Telettra, the telecommunications arm of the Fiat group, for advanced private communications and data-processing systems and equipment.

Conversion to digital switches in Italy was launched in the early 1970s, when SIP began a program for the introduction of PCM systems. Following the example of Alcatel in France, Italtel bypassed the semielectronic stage of switching and installed digital switches, except in some smaller exchanges. In 1980, the first digital exchanges were introduced, Italtel Proteo's TN-16, and AXE of Ericsson's Italian company FATME.

In 1982, the governmental interdepartmental committee for economic planning decided that telecommunications modernization was to be based on electronic switching equipment provided by a competition between two systems, one of which had to be Italian. The primary system, known as the first "pole," was awarded to the Italian joint venture based on the Proteo technology.

SIP planned to procure the majority of its exchanges from the National Pole and the remainder from either FACE, then an ITT subsidiary, or FATME, Ericsson's subsidiary, both of which were domiciled in Italy. However, since the employees of the loser among FACE and FATME would likely have to lay off employees, both companies were chosen as suppliers with the vague expectation that their systems would be modified into a uniform switch. In 1985, the National Pole (Italtel, GTE, Telettra) received two-thirds of the \$900 million contract, FACE had 14.2 percent, and FATME had 20.4 percent. This was a continuation of their already existing and quasi-established market shares. Those steady market shares for switching equipment had been Italtel, 52 percent; Telettra, 1 percent; FATME, 18 percent; FACE, 17 percent; GTE (later Siemens), 12 percent (R. Lauro, 1987, communication).

In developing the Proteo system, Italtel first entered into a joint venture cooperation agreement with the American-owned GTE Telecomunicazioni and Telettra, the Fiat subsidiary. It soon required another major partner. This led to a major joint venture between AT&T and Italtel, which won a large portion of the \$28 billion that Italy planned to spend on network equipment by 1992 (Colby and Hudson, 1989, p. 27). The Italtel-AT&T deal followed some heavy-handed lobbying for the partnership position, including personal intervention by François Mitterrand for Alcatel and Ronald Reagan for AT&T. Alcatel chairman Pierre Suard played the European card, stating that the "goal of European telecommunications policy must be to maintain and improve the leadership of European industry" (Roussel, 1990). Germany, on behalf of Siemens, threatened to block \$4 billion in subsidies for Italy's steel industry. Former Prime Minister Bettino Craxi, a socialist, supported AT&T (Hayes, 1988). Ultimately, AT&T paid the government \$130 million, the difference in value of the stock swap of its 20 percent share of Italtel and Italtel's 20 percent stake in AT&T's Network Systems International.

In response to the AT&T-Italtel partnership, Alcatel acquired Telettra in 1990, thereby gaining Telettra's thirty-three percent market share in transmission equipment in Italy and forty-five percent in Spain. But the European Commission first required Spain's Telefonica telephone monopoly to divest itself of its shares in Alcatel (21 percent in the Spanish subsidiary) and Telettra (10 percent), as well as to open its purchasing policy.

The STET Group

Società Finanziaria Telefonica (STET) is the mainstay of Italian telecommunications. With its array of local, domestic long-distance, and international telephone services, as well as manufacturing, it is a formidable presence in Italian communications. In 1990, STET's revenues were 17,200 billion lire, including exports of \$1 billion; investments were 5000 billion lire; employment numbered 130,000 people, almost 6000 in R&D (ITU, 1990). STET is controlled in turn by the Institute for Industrial Reconstruction (IRI), the major national holding company for all government-controlled economic enterprises. IRI, a vast company, was created in the 1930s by Mussolini to control the government's op-

erations in telecommunications, transportation, utilities, and several other fields. STET was formed by IRI in the same year as the umbrella organization for its telecommunications activities. In 1986, IRI controlled 84.6 percent of STET, with the rest widely held, and there was a continuing discussion of permitting greater participation by outsiders. In 1985 STET began to sell 30 percent of its subsidiary SIP to the general public as part of a quiet trend toward privatization. Whereas in 1984, private ownership in SIP had been 8.17 percent, two years later, it had grown to 35.69 percent and was expected to reach 46 percent in 1989, almost half of a privatization and not much less than that for British Telecom (*La Repubblica*, 1987). The move was inspired more by IRI's efforts to reduce its substantial losses than by telecommunications policy.

Customer premises equipment (CPE) markets were severely restricted, largely because services were vertically integrated through STET, which favored its equipment subsidiary, Italtel. In 1984, SIP provided 97.6 percent of all additional telephone sets and 45.4 percent of PBXs (R. Lauro, 1987, communication). SIP held an 88 percent market share in key telephone systems and a 60 percent share in facsimile markets. Maintenance of CPE, even that purchased elsewhere, was a SIP or PTT responsibility; this situation changed after 1988, except for first sets. Applicazioni Elettro Telefoniche (AET), an outside plant installer whose core business was cable installation, was acquired by STET in 1989 (G. Pozzi, 1990, communication).

Liberalization began when it became clear that existing regulations were being circumvented and were ultimately counterproductive. Equipment can be purchased from outside vendors, but it has to meet Ministry specifications for type approval, and SIP had to provide the interconnections. The 1987 national ten-year plan liberalized modems and provided for the liberalization of the remaining telephone and telex. Modem liberalization was carried out in 1989 only after the European Commission filed an Article 90 complaint against the Italian government.

SIP is the largest of the STET firms, with about 77,000 employees, 10,000 exchanges, and \$4.8 billion in revenues. It had 20 million main lines and 29.2 million telephones at the end of 1988. For a long time, SIP was perceived as an organization barely keeping pace with demand, and not as an innovator in service development.

To improve this situation, SIP initiated a 500 billion-lire (\$350 million) program in 1987. As network modernization became a priority, SIP allocated 36,000 billion lire (\$26 billion) over four years (1989-1992), 33 percent of which would go to southern Italy (Benzoni, 1990).

Italcable, created in 1921 as an operator of submarine cables, has been part of STET since 1965 and provides transoceanic services outside of Europe. Its 1989 turnover was 659 billion lire, and it employed 3500. From 1968 to 1985, Italcable's telephone traffic grew from 3.7 to 226 million minutes, and telex traffic grew from 3.0 to 71 million minutes. Italcable operates the message and data packet switching network IRICON and provides access services to international databases.

Telespazio is Italy's satellite carrier and its signatory in Intelsat, Inmarsat,

and Eutelsat. Like the American Comsat, it is a carriers' carrier. It also provides remote sensing services. Its revenues in 1985 were \$43 million, and it employed about 640. One-third of Telespazio is held by the broadcast authority RAI, which uses its services.

The Selenia-Elsag group was another major STET subsidiary. It is extensively involved in manufacturing civilian and military electronic systems and industrial automation and employs 13,000. Elsag won a major contract award from the U.S. Postal Service to automate its system, an export achievement that received much attention because of its size and because of the implicit affirmation of Italy's high-technology capability. In 1989, STET sold its control in Selenia and Elsag.

SGS, until 1989, was a STET company in the microelectronics field and is the major Italian manufacturer of integrated circuits. In 1985, its revenues were \$300 million and it employed almost 10,000. In 1987, it entered into a joint venture for component manufacture with the French electronic giant Thomson. But the venture did not flourish and STET sold its share in 1989. Other major STET subsidiaries include Seat, a publishing company for telephone directories and electronic yellow page directory service, and Consultel, a telecommunications consulting firm active in the developing world. STET's research & development organization is CSELT, established in 1984.

Olivetti

Olivetti (formally Ing. C. Olivetti & Co.), headquartered in the northern city of Ivrea, is perhaps Italy's most noted entrepreneurial firm in advanced electronics. For a time it was renowned for its equipment's design rather than its marketplace success. This changed when Carlo De Benedetti assumed its leadership. De Benedetti is to Italy's electronic sector what Silvio Berlusconi is to its broadcasting: an empire builder of the first order. He managed the automobile firm Fiat for a short while, until he had a falling-out with the Agnelli family, which controls it. In 1978, De Benedetti acquired 15 percent of the financially ailing Olivetti.

Within a few years Olivetti became Europe's largest office equipment maker and the world's second largest producer of personal computers. In 1982, AT&T acquired 25 percent of the company for \$230 million, with an option to raise its share to 40 percent in 1987. With its AT&T connection in the United States, Olivetti aimed to become the world's number 2 company in professional desktop computers. But in 1988, AT&T, frustrated at its absence of control, declined to increase its financial involvement and cut its computer order by 75 percent (Guyon and Colloy, 1988).

In 1988, the West German firm Volkswagen acquired a 5 percent stake in Olivetti, for which Olivetti received the large German office equipment maker, Adler-Triumph. Olivetti also bought interests in dozens of international high-tech firms, many of them in the United States. In the United Kingdom, Olivetti bought most of the small computer maker Acom. It also joined with GeDa, a computer services company, to form Olinet, providing database management,

data processing, and so forth. Thus, Olivetti had a highly international set of owners, subsidiaries, and markets, all part of De Benedetti's strategy of making it a global electronics company.

In the process, De Benedetti's own shares multiplied in value. He had acquired 15 percent of Olivetti for \$17 million. By 1986, this was worth half a billion dollars. He also embarked on building a personal business empire distinct from Olivetti. He acquired for a time Italy's largest food company, Buitoni, and several smaller food companies, an automobile component maker, a tobacco equipment manufacturer, a share in the publishing house Mondadori (where he fought with Silvio Berlusconi for control), and an investment bank. He also established close relations and an ownership share with Pirelli, the large tire manufacturer. In 1987, he embarked on a take-over bid for Belgium's huge but stodgy conglomerate Société Générale de Belgique (SGB). Though established Belgian and French interests succeeded in beating him back, the effort proved profitable for De Benedetti. In the early 1990s, Olivetti experienced serious deficits again, raising questions about its long-term prospects as an independent company.

Services

In data transmission, the structure of the system reflects the complexity of the underlying carriers. The PT administration (not to be confused with the State Administration for Telephone Services, ASST) provides slow-speed data transmission services. Italcable provides intercontinental data transmission lines. SIP supplies slow data transmission over the switched network, and higher rates over leased circuits.

Telex emerged under restrictive regulation. A message could only be sent by its originator; only PTT-supplied devices could be attached to the equipment; and a deposit of \$2,000 to \$3000 plus annual fees of \$2000 made use expensive. Poor service and installation waits that exceeded two years compounded the problems. Users circumvented some of these restrictions by forming associations enabling members to use a community-owned telex.

Since 1983, SIP has operated a circuit-switched data network, Rete Fonia-Dati (RFD), using a technology by Telettra. In 1986, a new digital circuit-switched network, CDN, went on line. Itapac, the packet-switched network operated jointly by SIP and MPT, opened in 1986 for general use. In the first year of full operation, it expected 5000 subscribers but only had 2700. Itapac's main problem was operational, since each of the two partners controls separate parts of the network. In addition, high tariffs and low-speed connections presented problems. Switches were Italtel-modified Siemens equipment. After 1989, Itapac was run by SIP alone.

Dedicated private network facilities are permitted only for services not provided by the public network and exist in a gray zone of tacit agreement among large corporations. Resale is technically prohibited, but appears to exist.

Because of the administrative complexity of the Italian telephone system,

moves toward ISDN required more coordination than in most countries. In 1984, the PTT Ministry announced a national plan for telecommunications for the next decade, addressing in particular network digitalization (MPT, 1984). After 1989, only digital equipment was cut over. SIP also introduced the CCITT Common Channel Signalling System 7 into the national network. In Milan, a fiber local loop trial project capable of videotex data, TV, and teleconferencing transmission was started in 1987.

Videotex began experimentally in 1980 under the name Videotel and has operated on a regular basis since 1986. Users can access the system center in Milan from anywhere in Italy with a local call. Videotel is based on the Italtel and CEPT standards, and is concentrated on business subscribers.¹ In 1991, SIP had an installed base of 100,000 terminals and planned to become the second largest videotex system after France.

SIP controlled cellular telephony as the only service provider of its kind in Italy. SIP introduced a 900-MHz system and aimed at a digital system. But increased demand brought pressures to end SIP's monopoly in mobile service. To apply for licenses for digital mobile services, Media czar Berlusconi's Fininvest joined Fiat and the U.K.'s Racal; Olivetti formed the Omnitel consortium with Bell Atlantic and Sweden's Televerket; and Pacific Telesis was part of a third applicant group.

Telecommunications in Malta

Telephone service in Malta, an island nation between Italy and Tunisia, dates back to 1882. Service is operated by the private Malta Telephone Company, which was taken over by the government in 1933. The telephone network was largely destroyed during World War II. In 1957, the manual system was upgraded by STC to a stronger automated system. Later, Siemens exchanges were added. Overseas telephone service to London was established in 1947, and service to Rome began in 1952. A submarine cable to Italy soon became the main connection.

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Spain

Spain's telecommunications system is unusual. It is dominated by one semiprivate firm, Telefónica de España, which is strongly integrated vertically into equipment manufacturing and horizontally into Latin American telecommunications. Telefónica has been assigned the role of a locomotive in Spain's rapid industrialization, and its powerful and entrepreneurial presence is likely to increase still further, as long as its primary mission of providing basic service does not lag.

History

In 1884, a royal decree established a government monopoly over telephony. Two years later, service concessions were awarded to private firms through an auction of monopoly franchises for each city. Contracts were awarded to applicants who promised to provide the state with the highest percentage of gross receipts of at least 10 percent; bids for some cities far exceeded that percentage. Thirty-five local exchanges were established under the system, but problems soon became apparent; rate reductions could not be instituted, and the private companies were unwilling to extend service to rural and isolated areas. As a result, the government decided in 1890 to drop the monopoly system and to allow any interested parties to establish exchanges, while absolving the existing licensees of their revenue-sharing obligations. Commercial long-distance lines were also left to private firms. No competition emerged, however, since companies were unwilling or unable financially to enter into each others' territories. Thus, de facto unrestricted monopolies remained in existence and were institutionalized in 1903. However, service remained unsatisfactory, and in 1924, the government granted a major concession to operate all of Spanish telephony to the *Compañía Telefónica Nacional de España S.A.* (CTNE), a firm that had only recently been formed by the American firm International Telephone and Telegraph (ITT) and private Spanish investors. Later that year, ITT acquired all the company's shares. This purchase was the first major step taken by ITT in its efforts to become a major international presence in telecommunications. ITT's founders, the Behn brothers, had little capital and no manufacturing support behind them. Despite its grandiose name, the company was a midjet in