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Economics and politics in submarine telegraph cables (XIX[TH] and XX[TH] centuries). A global perspective between history, heritage and preservation
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STORIOGRAFIA

IMPERIAL DREAMS AND NATIONAL AWAKENINGS: SPAIN AND THE WORLD TELEGRAPH SYSTEM, 1859-1930*

Introduction

Variously described as *hardware*, *invisible weapons* or *tentacles of empires*, infrastructures and their development present a faithful reflection of the control that metropoles exerted over their territories[1]. Britain, for example, equipped its empire with the world's largest telecommunications network, which was recently described as the «Victorian Internet», and whose size was consonant with the extent of its colonial possessions[2]. In this way, Britain established itself as the «telegraph exchange of the world».

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[1] G.B. Magee-A.S. Thompson, *Empire and globalisation: networks of people, goods and capital in the British World, 1850-1914*, New York 2010, p. 17; D.R. Headrick, *The Invisible Weapon: Telecommunications and International Politics, 1851-1945*, New York 1991; Id., *The tentacles of progress: technology transfer in the age of imperialism, 1850-1940*, Oxford 1988. More specifically, for the telegraph: D.K.L. Choudhury, *Telegraphic imperialism: crisis and panic in the Indian Empire, c. 1830-1920*, Basingstoke 2010. Telecommunications to the service of Japanese imperialism: D. Yang, *Technology of Empire: Telecommunications and Japanese Expansion in Asia, 1883-1945*, Cambridge (MA) 2010. Some authors openly assimilate technology to warfare: J.B. Dasgupta, *Science, technology, imperialism, and war*, Delhi 2007, p. 241. For China's resistance to the telegraph, and its consideration of the technology as aggressive to local culture (feng-shui), see: D.L. Anderson, *Imperialism and idealism: American diplomats in China, 1861-1898*, Bloomington (IN) 1986, pp. 54-55.

[2] T. Standage, *The Victorian Internet*, New York 1999; R. Boyce, *Imperial*

At the other end of the scale, the infrastructures produced by the remnants of Spain's world empire at the end of the nineteenth century were entirely consistent with its moribund state. In 1760, Spain's empire had accounted for 50.8% of the overseas possessions of European powers, and for 69.5% of the inhabitants; but the country's decline was so dramatic that these figures had fallen to 5.7% and 2.1%, respectively, by 1830. At the end of the century Spain was clinging on to the few far-flung possessions that remained – mainly Cuba, Puerto Rico and the Philippines[3] –, and territories in the Maghreb (primarily islands or enclaves) obtained through settlements with other European powers as these nations turned their attention to Africa.

The decline was accentuated by the increasing alignment of the territories still under colonial control with the great economic powers of the West: the US and Britain. Spain's colonies were undergoing radical change: Cuba was becoming one of the world's biggest sugar producers under the aegis of US investors, and in the Philippines sugar was also becoming an export crop thanks to the modernization of the industry, which was financed in some cases by British capital. For its part, Equatorial Guinea evolved from an enclave for the slave trade into a trading colony, and then into an economy based on cocoa farming[4].

Connecting all these lands with the mother country and with each other required the laying of telecommunication networks, a task that was beyond both from the economic resources of the ruined country and the vision of politicians and short-sighted businessmen[5]. It is this

Dreams and National Realities: Britain, Canada and the Struggle for a Pacific Telegraph Cable, 1879-1902, «The English Historical Review», 460 (2000), pp. 39-70; C. STEINWENDER, *Victorian internet: the trade impact of the transatlantic telegraph* (2014), hyyp://cep.lse.ac.uk/download/cp417.pdf.

[3] B. ETEMAD, *Possessing the world*, New York 2007, p. 135; H. CAPEL, *The Imperial Dream: Geography and the Spanish Empire in the nineteenth century*, in *Geography and Empire*, edited by A. Godlewska and N. Smith, Oxford 1994, pp. 58-73; S. BALFOUR, *The end of the Spanish Empire 1898-1923*, Oxford 1997, p. 3.

[4] J.J. DÍAZ, *De la trata de negros al cultivo del cacao*, Barcelona 2005. By 1914, there were 6,000 cocoa labourers in Fernando Po: W.G. CLARENCE-SMITH, *Cocoa Plantations and Coerced Labor in the Gulf of Guinea, 1870-1914*, in *Breaking the chains: slavery, bondage, and emancipation in modern Africa and Asia*, edited by M.A. Klein, London 1993, p. 152.

[5] A small company in Denmark used interesting tactics based on the country's nonthreatening status and understanding of the opportunities and risks inherent in joining the race for the global telegraphic network: K. JACOBSEN, *Small Nation, International Submarine Telegraphy, and International Politics, The Great Northern Telegraph Company, 1869-1940*, in *Communications under the Seas. The Evolving*

subject that we address in this essay. We also explore a number of more general questions, the most important being the effects of Spain's economic backwardness on the country's ability to transfer technology, and its technological dependence on the great powers. Another important topic examined here is the extent to which the transfer of technology to the colonies influenced the evolution of telecommunications in the postcolonial era. Thus, the focus is placed on the interplay between economic backwardness, political insignificance and low colonial ranking.

The impact of Spain's economic backwardness on technology transfer to the colonies has not been widely studied, although the few works available are extremely valuable[6]. In the wider world, most studies on technology transfer focus on the relations between highly developed metropoles and colonies that produce raw materials and foodstuffs (for instance, Britain and the 13 American colonies), on colonies with a manufacturing tradition that is repressed and stifled (for example, India under British rule), or on the ruthless colonial exploitation of labour, raw materials and markets in Africa[7].

The present study combines a geopolitical approach[8] to technology as a tool of empire with a new perspective proposed by authors such as Fernández, Pretel and Sáiz. In a nuanced version of Headrick approach, Curry-Machado argues that the introduction of steam technology in the Cuban sugar industry prompted Spain's demise, and the country's replacement by the US as the colonial power on the island. The preliminary studies by Fernández, Pretel and Sáiz suggest the establishment in the nineteenth century by Cuban Creole elites

Cable Network and Its Implications, edited by B. Finn and D. Yang, Cambridge 2009, pp. 115-157.

[6] Backwardness in textile manufacturing led to the closure of complex, elaborate workshop systems in the colonies in South America: N. ESCANDELL-TUR, *Producción y comercio de tejidos coloniales*, Cuzco 1997.

[7] For Africa: *Colonialism in Africa, 1870-1960*, edited by L.H. Gann and P. Duignan, Cambridge 1969; M. HAVINDEN-D. MEREDITH, *Colonialism and development: Britain and its tropical colonies, 1850-1960*, London 1993.

[8] For information on the geopolitical approach, in addition to works of D.R. Headrick, see P.J. HUGILL, *Global Communications since 1844: Geopolitics and Technology*, Baltimore 1999; *Media and the British Empire*, edited by C. Kaul, Basingstoke 2011; R. BOYCE, *Submarine Cables as a Factor in Britain's Ascendancy as a World Power, 1850-1914*, in *Kommunikations revolutionen*, edited by M. North, Köln 1995, pp. 81-90; P.M. KENNEDY, *Imperial cable communication and Strategy, 1870-1914*, «English Historical Review», 86 (1971), p. 731. For a mixed geopolitical-business approach, see D.R HEADRICK-P. GRISET, *Submarine Telegraph Cables: Business and Politics, 1838-1939*, «Business History Review», 75 (2001), 3, pp. 543-578.

of a «colonial innovation system» made up of «sub-imperial» institutions which were administered autonomously and staffed by foreign technicians. For his part, Adas sees Western technology as being challenged by the cultures of the colonies[9]. The findings that we present here are based on a wide range of sources, including Spanish state documents from the Ministry of Foreign Affairs (MFA), the Archivo Histórico Nacional (AHN) and Spanish Parliamentary Archives (SPA), records from international archives and libraries such as the US Library of Congress, the Foreign Office, and the French National Archives, together with other primary and secondary sources.

The article ties in strongly with the aims of some of the international programmes run by the European Science Foundation, which has already discussed a number of the questions considered here. We look at technology in general, and at the construction of technological systems as an important research field in the examination of Europe and its global context. After this introduction, section one analyzes Spain's telegraph cables as the tools of a crumbling empire in the North African war, and section two examines the laying of the first telegraph lines in Spain's colonies. The geopolitical issues, namely the implications of Spain's strategic location at the crossroads of major transatlantic routes, are explored in sections three and four. The last section discusses the country's role as a minor power, its dealings with the firms that competed for the right to moor cables, and its involvement in international agreements at a key moment in the transnationalization of Europe. The article ends with a series of concluding remarks.

In essence, the paper explores three interrelated topics: 1) the imperial and geopolitical importance of Spain's territories in the construction of an international network; 2) Spain's subordination to foreign companies and technology; and 3) the country's lack of an efficient colonial network – a product of its own economic and technological backwardness.

[9] J. CURRY-MACHADO, *Sub-imperial globalisation and the phoenix of empire: engineering and commerce in nineteenth century Cuba*, in *Empire and Globalisation. Transnational networks and the making of a global world, 1850-1925*, edited by S. Hazareesingh, Manchester 2008; ID., *'Rich flames and hired tears': sugar, sub-imperial agents and the Cuban phoenix of empire*, «Journal of Global History», 4 (2009), 1, pp. 33-56; N. FERNÁNDEZ DE PINEDO-D. PRETEL-P. SÁIZ, *Patents, Sugar Technology and Sub-Imperial Institutions in Nineteenth-Century Cuba*, «History of Technology», 30 (2011), pp. 46-62. Some authors see Spain as a spectator in the age of the imperialism: A. HELENA-J. ORDÓÑEZ, *Science, Technology and the Spanish Colonial Experience in the Nineteenth century*, «Osiris» (2001), pp. 70-82.

Weak tools for a moribund empire: the African cables

Spain lagged behind its neighbours when it came to constructing telegraph and submarine cables, the key nineteenth-century developments in communication technology. In this century, Spain faced particularly difficult internal problems, the greatest being the fall of the *ancien régime* and the task of constructing a liberal state. The country suffered great social and economic disruption from civil wars – the Carlist Wars of the 1830s and 1840s and 1872-1876, caused by the dynastic dispute that pitted the Liberals and the Queen against the Carlists, the followers of the Queen's uncle, Don Carlos – and in general was mired in long-term political instability.

At the same time, Spain's meagre colonial possessions were located thousands of miles away, making communication and control especially difficult. Correspondence from Cadiz to Havana via Fernando Po took 18 days, and 15 days to Puerto Rico via a Spanish transatlantic line[10]. Closer to home[11], after the war against the Empire of Morocco in 1859, Spain was obliged to guarantee communication with its possessions on the North African coast[12]. The Conservative government, in power under the monarchy, considered that Spain required a presence in Africa for reasons of national security, and regarded the Atlas mountains as the nation's natural frontier. An attack on the Spanish symbols of sovereignty was the pretext for declaring war, as Spain sought a place among the major powers[13].

In order to coordinate its military action, the Spanish army laid the country's first intercontinental cable across the Straits of Gibraltar, which was linked by a short land telegraph line to a telegraph office in Tetuan[14]. Laid at the same time as the electric telegraph from Galle

[10] E. ARANTAVE, *Guía telegráfica de la isla de Cuba*, Havana 1871, p. 103.

[11] CAPEL, *The Imperial Dream*, pp. 58-73.

[12] *African war (1859-1860)*, Archivo Histórico Nacional (AHN), ES.28079, 1859-1861.

[13] F. HARDMAN, *The Spanish campaign in Morocco*, Edinburgh 1860; *Marruecos y el colonialismo español (1859-1912)*, edited by E. Martín, Barcelona 2002.

[14] «The Moors, after a coffee with General Rios, visited the telegraph office in Tetuan» (HARDMAN, *The Spanish campaign*, pp. 73 and 263). The telegraph line was partially dismantled after the war. As a result of military defeats, Morocco sought to adopt Western technology and science as a means of shelter against future attacks. The powers used their agents to opt for their benefit options of the backward countries, as did France in Morocco in the case of the introduction of the telegraph, against the British and German claims: D. MAGHRAOUI, *Revisiting the Colonial Past in Morocco*, Abingdon 2013.

to Manaar in Ceylon, it was in operation for only a few days. The task was taken up again in 1864 by the firm *Siemens*, with the intervention of the French government, which was interested in communicating with Algiers. Nevertheless, it was not until six years later that concession was given for a cable[15]. While in Morocco it was military needs that led Spain to establish telegraphic communication with the war zone, in Equatorial Guinea the motivation was the defense of its growing commercial interests, as mentioned above.

By 1880, telegraphic communication with the north-African territories could no longer meet demand. Telegrams reached their destination via the Post Office from two telegraph stations on the Spanish mainland. The Spanish government decided to lay new cables, prioritizing links between the mainland and certain points on the African continent, which entailed certain stretches within Africa (for example, the line laid after a new war episode). In 1891, a cable was laid that linked Tarifa in southern Spain to Tangiers, the mooring point of the British cable to Gibraltar and a city of growing importance, with representations of most of the international diplomatic missions. It is worth noting that these north-African cables were constructed and laid by the Italian rubber producer *Pirelli*, at a time when Italian economic nationalism and technical capacity of the new nation, and the firm's own entrepreneurial policy of diversification and cost cutting, made it possible to compete with the large British companies. In fact, despite considerable pressure, the Italian government had already ignored these British firms when it constructed cables in its territories[16].

In the early twentieth century, the colonial rivalries increased. The Anglo-French Convention of 1904, which recognized France's right to assist in the administrative, economic and military reforms in Morocco, was followed by a Franco-Spanish Treaty, but opposition from Germany obliged a reassessment of the situation at the Algeciras Conference of 1906[17]. As a means of maintaining the international balance of power the Moroccan empire was divided into two, with

[15] After the failure of the direct line to Algeria, France had taken advantage of the Balearic Islands cable to secure communication with the colony in 1860 via Barcelona: E. WÜSCHENDORFF, *Traité de télégraphie sousmarine historique*, Paris 1888, pp. 29 and 35. In 1863, Spain and France began negotiations to lay the underwater line Cartagena-Oran: Ministry of Foreign Affairs, Madrid (MFA), Madrid, TR 554, 1906.

[16] Pirelli Archives; «Revista de Telégrafos», XVI, 255, March 1 (1891), pp. 87-88. «Viva Pirelli», shouted the Italian Ambassador in Madrid.

[17] MFA, TR 506, 1863.

one area controlled by France and the other by Spain. The Spanish zone comprised the Rif mountains and valley, ensuring that France did not have a connection to the sea opposite Gibraltar, and land in southern Morocco contiguous with its Rio de Oro colony. To support the political mission, new telegraph lines were laid to connect Spain's new zones of influence in North Africa[18].

However, these efforts proved to be insufficient. The lines could not cover all of Spain's colonial territories in Africa, nor could they cope with the volume of communications that the governance of these territories required. Most of the colonial telegraph traffic was dependent on the foreign companies that owned the international network cables[19]. After the disturbances in the Rif in 1909, Spain sent a large force to subjugate the tribes, and occupied a vast new area. With the Convention of Algeciras as support, a Franco-Spanish Protectorate was created in Morocco in 1912. Again, a new Moroccan war[20] strengthened the links between the metropole and the colonial territories[21]. Wireless telegraphy, advocated for years by representatives of Spain's economic interests, was now introduced to reinforce communications.

As in the case of the great majority of the cables linking Spain's continental and insular territories, these lines were built by the State and the main supplier of material and tools for the lines was *Pirelli*, which had just entered the Mediterranean market[22]. The construction of the submarine cables was very expensive because of the enormous volume of materials needed. Undoubtedly, in addition to the success of the northern route, the huge cost was one of the reasons for the failure of a Spanish Atlantic submarine line to the Americas. We study

[18] The new lines were Ceuta-Tangier (1907) and Chafarinas-Nemours in Algeria (1908).

[19] A mail steamer connected the colony of Fernando Po with the international coastal cable stations five or six times a month.

[20] A French-Spanish force was needed to conquer the Rif. The Moroccan wars have been considered «an important harbinger of the end of the European empires» (P.D. CURTIN, *The World and the West. The European challenge and the overseas response in the age of empires*, Cambridge 2002, pp. 31-32).

[21] This was possible via the cables between Spain and Africa, and via the lines to the Spanish possessions in the African continent: «Journal Télégraphique» 12 (1894); BRIGHT, *Submarine Telegraphs*, p. 119.

[22] A. GIUNTINI, *The power of cables. Submarine communication in the Mediterranean Sea*, in *Communication and its lines. Telegraphy in the 19th century among economy, politics and technology*, edited by A. Giuntini, Prato 2004, p. 62; Pirelli & Co. (1918): 37, Pirelli Historical Archives, Milan.

this aspect in section three, together with Spain's attempts to establish a route to the Far East.

Connecting the colonies. The electric telegraph

Spain had a nationwide optical telegraphy network that was connected with France across its northern border, and which proved extremely useful when the French army invaded the country in support of the Spanish monarchy in 1823[23]. Once the disruptions of the first civil war had drawn to a close in 1849, with the victory of the Liberals and the establishment of instruments to guarantee public order, the government constructed an electric land and submarine telegraphic network with international connections in order to consolidate the nation-state and strengthen its own national interests[24]. At around the same time, the railway companies and some private individuals built their own lines, which were linked to the State system in 1881[25].

However, opportunities for the introduction of the telegraph in the colonies seemed distinctly unpromising. Spain was practically the only colonial power in which the telegraph reached the colonies before the mother country: Cuba, for example, entered the modern era of telecommunications some time before Spain did. Aware of the advantages of the telegraph for trade, agriculture and war, Cuba's authorities constructed a telegraph system in 1851. Two individuals competed for the rights, and a company of local merchants associated with a US citizen offered to build it. The Royal Board of Agriculture and Commerce, a colonial institution that represented the island's material interests, provided a grant of 50,000 dollars and awarded this US-backed company the telegraph lines after auction. Eventually, 1,600 km and 41 stations were constructed, concentrated in Santiago de Cuba and the sugar districts of Matanzas, Santa Clara and Puerto Príncipe[26].

[23] Optical communication with the western frontier, Portugal, was also envisaged.

[24] *Diario de Sesiones del Congreso (DSC)*, January 15, 1855, pp. 1,387-1,392. The electric telegraph in Spain was adopted late and the rates were excessive: G. SAUER, *Statistics of European telegraphy collected and classified from official returns*, Paris 1868, p. 17.

[25] A. CALVO, *Los inicios de las telecomunicaciones en España: el telégrafo*, «Revista de Historia Económica», XX (2001), 3, pp. 613-635.

[26] AHN, Ultramar (Overseas), 99, exp. 2; L.A. PÉREZ, *On Becoming Cuban: Identity, Nationality, and Culture*, Chapel Hill (NC) 2008, p. 18. The actual density in 1888 was 0.03 km of conductor/sq. km.

The development of telecommunications in Cuba presents three main points of interest. First, the association between the island's authorities and US technology involved not just the construction of the lines by a US citizen, but also a commitment to install a local telegraph office in Havana with the R. E. House technology, along with a School of Telegraphy. Second, as the theoretical framework of Curry-Machado and Fernández, Pretel and Sáiz predicts, the local élite played a clear role in the launch of the telegraph, which was also done in partnership with US technology. Thus, it was a repeat of the history of the railways[27], which was ardently championed by industry and sugar growers as a means of reducing their final costs. Third, far from ending here, the connection between telegraph and rail continued, as the railways played a major role in the deployment of the new telegraph stations[28].

As early as 1846, Cuba's imports from the US accounted for more than a quarter of the total. Four years later, 39% of Cuba's total exports were destined for the US, surpassing the figures corresponding to Great Britain and Spain (34% and 27%, respectively). This shift towards the US economy increased dramatically over the years; by 1877, the US share of exports had leapt to 82%, compared with Britain's 5.7% and Spain's 4.4%. In short, the Cuban economy had expanded far beyond the limits of the empire; Spain was becoming dispensable for Cuba and, ultimately, would become superfluous. The members of the Cuban élite were convinced that the country's submission to the metropole was synonymous with economic backwardness, and were openly hostile to the reforms advocated by Spain; most of them favored annexation to the US[29].

[27] Ó. ZANETTI-A. GARCÍA, *Sugar & railroads: a Cuban history, 1837-1959*, Chapel Hill 1998. The Cuban creoles founded the Patriotic Society, a «sub-imperial» institution in defence of their sugar interests: Y. JOSEPH, *Four French travelers in nineteenth-century Cuba*, New York 2008. The biographies of the Creole élite reveal involvement in a wide range of activities: in the case of Joaquín Arrieta, railways, salt, tobacco and the postal service: AHN, Overseas, 138, N. 16 and 52, exp. 2.122, 1829; ESTADO, 17, N. 122, 1829. Between 1859 and 1866 the Spanish authorities sought consensus with the Creoles to reform their colonial policy in Cuba: J. CASANOVAS, *Bread, or bullets: urban labor and Spanish colonialism in Cuba*, Pittsburgh 1989, p. 9; B. KEEN-K. HAYNES, *A History of Latin America*, Boston 1999, p. 233.

[28] AHN, Overseas, 99, exp. 7. The first line using the North American House system dates back to 1849: G.B. PRESCOTT, *History, theory, and practice of the electric telegraph*, Boston 1860, p. 115.

[29] *Hunt's merchants' magazine and commercial review*, 21, 1849, p. 520; L.A. PÉREZ, *Cuba and the United States: ties of singular intimacy*, Athens (GE) 2003, pp.

Spain's emphasis on the development of the telegraph in Cuba, and determination to play a major role in the process, may seem surprising, but it reflects the country's keenness to maintain the support of the Cuban élite, and to respond to the needs of the powerful Cuban sugar economy as it attempted to achieve full market integration.

Table 1 – *The telegraph in Cuba, 1888*

Area	Development of wires (in km)		
	Ordinary	Railways	Total
Pinar del Río	195	94	289
Havana	54	532	586
Matanzas	68	586	654
Santa Clara	748	473	1,221
Puerto Príncipe	908	60	968
Santiago	1,620	116	1,736
Total	3,593	1,861	5,454

Source: *Estadística postal y telegráfica*, Havana 1888, p. 11.

The first attempts to introduce the telegraph in Cuba were made in 1851, in Havana. A telegraph line reached Bejucal two years later. As Table 1 shows, by 1888 the telegraph system in Cuba totaled 5,454 km of wires across the sparsely populated island. Like the telephone service, the telegraph network was government-owned, and both systems were larger than the respective services in the mother country. However, there were clear differences in the organization of the utilities because the electricity business in Cuba was controlled by US companies, in spite of the regulations imposed by Spain[30].

The situation in Puerto Rico was quite different. There, neither the metropole nor local private enterprises showed much enthusiasm for building communication and transportation infrastructures that

13-14; T. CHAFFIN, *Fatal glory: Narciso López and the first clandestine U.S. War against Cuba*, Charlottesville (VA) 1996, p. 12.

[30] C. MORRIS, *Our island empire: a hand-book of Cuba, Porto Rico, Hawaii, and the Philippine Islands*, Philadelphia 1899, p. 57; D. IZNAGA, *La burguesía esclavista cubana*, Havana 1987, p. 227. The first telephone exchange in Havana was installed in 1881, one year before the first regulation of the service in Spain, and the lines expanded rapidly: J. ALTSHULER, *Una luz que llegó para quedarse: comienzos del alumbrado eléctrico y su introducción en Cuba*, Havana 1997. Cuba played a crucial role in the transference of the telephone to Spain: the Telegraph Corps of Cuba sent two telephone sets to Spain, which were gifts from Western Union: AHN, 5,271, exp. 11, 1878-1880.

were absolutely necessary for the development of the island's economy. A first telegraph line was installed in 1858, an event attended by Samuel Morse, who was on a private visit to the island.

Though still under Spanish rule, in many ways the Philippines received less attention from the metropole than Cuba, and here the incorporation of modern telecommunication infrastructures followed a different path. The Royal Telegraph Corps (RTC) linked Manila, the economic center of the islands, and Corregidor, in 1867[31]. Five years later, the telegraph began operating in various provinces in Luzon, and in the 1880s, Luzon had four land telegraph lines totaling 2,189 km. Seventeen years later, when an extra 629 km of telegraph lines had been installed, the service was organized into 65 government telegraph offices, three quarters of which were in Luzon. While the pace of construction in the Philippines was different from that in the metropole, so was the market structure; the country had several municipal telegraph lines, which the RTC applied to take over. Three insular marine cables totaling 2,451.70 km had also been laid by international companies[32].

Geopolitics

As it expanded, the telegraph became a world system characterized by increasing global connectivity[33]. The first wave was marked by British

[31] D.J. Steinberg, *The Philippines: a singular and a plural place*, Oxford 1990, p. 20; E.L. Enriquez, *Appropriation of colonial broadcasting: a history of early radio in the Philippines, 1922-1946*, Quezon City 2008, p. 36; W.C. Forbes, *The Philippine islands*, Cambridge (MA) 1945, p. 246. Others consider the first electric line to be the one from Manila to Cavite and Punta Restinga in 1872: «Journal Télégraphique», 1878/09/25, p. 173. In 1878, Manila's water supply system was set up: *Philippines' 2 Millennium History*, 2000, p. 49. The telegraph is often forgotten: see O.C. Caoili, *A history of science and technology in the Philippines*, online. The Royal Economic Society of Friends of the Philippines was created in 1780, before the establishment of the tobacco monopoly, within a programme of economic development: S. Fish, *The Manila-Acapulco Galleons*, Bloomington (IN) 2011.

[32] Congressional Record, 1999, E18; HNA, Overseas, 5,144, exp. 56; T. Martínez, *Capitalism in colonial Puerto Rico*, Gainesville 1992, p. 36; Bureau of the Census, *Census of the Philippine islands*, 1902, p. 611. On specific aspects and pioneering efforts, see J. Martín, *Las comunicaciones en la Isla de Puerto Rico, 1850-1898*, San Juan 2005, p. 252. Differences in the chronology: A. Brown, *Telecommunications Reform in the Asia-Pacific Region*, Cheltenham 2004, p. 139.

[33] P. McMahon, *Global control: information technology and globalization since 1845*, Cheltenham 2002, pp. 26-27; K. Nier-A.J. Butrica, *Telegraphy becomes a World System*, «Essays in Economics and Business History», 6 (1988), pp. 211-226.

hegemony, Anglo-German rivalry, and the emergence of the US[34]. Wireless telegraphy was as yet unexploited[35]. From the mid-nineteenth century onwards, the process of laying underwater cables accelerated and the transmission time sped up so much that communication became practically instantaneous[36]. The impact on society and on the markets was significant, especially on speculative activities and on the trade of perishable goods[37]. The creation of the telegraph system involved large capital investment, and government subsidization of the construction of national cables (and even those of other countries if there was a strategic advantage to be gained)[38]. The operating and constructing enterprises became increasingly concentrated with the creation of the giant *Eastern Telegraph*, and the same was true of the manufacture of materials and equipment, with the emergence of *Siemens Brothers* and *Telegraph Construction and Maintenance*. An *entente cordiale* was signed

[34] C. LESAGE, *Les cables sous-marins allemands. La rivalité anglo-germanique*, Paris 1915; G.A. SCHREINER, *Cables and Wireless and their role in the Foreign Relations of the United States*, Boston (MA) 1924.

[35] K. BEAUCHAMP, *A History of Telegraphy: Its History and Technology*, London 2001. The cable companies did not consider the wireless to be a serious rival as their customers preferred the «more substantial, more tangible» underwater cables: *Memorandum on recent strategical and commercial developments of wireless telegraphy* (British Telecom Archives, London, unpublished, 1905).

[36] C. BRIGHT, *Imperial telegraphic communication*, London 1911, p. 17; P.B. ISRAEL-K. NIER, *The Transfer of Telegraph Technologies in the nineteenth century*, in *International Technology Transfer*, edited by D.J. Jeremy, Aldershot 1991, p. 118; F.C. WEBB, *Old Cable Stories Retold*, «The Electrician» (1896), p. 756: C. BRIGHT, *Submarine Telegraphs: their history, construction and working*, London 1898, p. 168.

[37] Two classical studies are: J. LEE, *The Economics of Telegraphs and Telephones*, London 1911, pp. 1, 2, 36; R.B. DU BOFF, *The Telegraph and the Structure of Markets in the United States, 1845-1890*, «Research in Economic History», 8 (1983), pp. 253-277; recent references: *A Nation Transformed by Information: How Information Has Shaped the United States from Colonial Times to the Present*, edited by A.D. Chandler and J.W. Cortada, Oxford 2000; B. LEW-B. CATER, *The telegraph, co-ordination of tramp shipping, and growth in world trade, 1870-1910*, «European Review of Economic History», 10 (2006), 2, p. 147; Á. Calvo, *Network industries and economic development. An economic-historical approach*, in *Communication and its lines*, pp. 11-23.

[38] Examples are the French and British governments: «The Electrician», November 1 (1895), 18; «Journal Télégraphique», November 25 (1900), 11, p. 247; P. GRISET, *L'État et les télécommunications internationales au début du XXe siècle en France: un monopole stérile*, «Histoire, Économie et Société», 2 (1987), pp. 181-207; P. BATA, *Les sociétés concessionnaires de liaisons de télégraphie sous-marine au XIXe siècle*, in *L'État et les télécommunications en France et à l'étranger 1837-1987*, sous la direction de C. Bertho-Lavenir, Genève 1991, pp. 115-146. In 1892, 89.6% of the cables were private owned: B. MODY, *Telecommunications politics: ownership and control of the information highway in developing countries*, Mahwah (NJ) 1995, p. 37.

by major companies (only to be pushed to its breaking point by the outsider *Commercial* when it reduced its tariffs)[39].

The process of concentration in the operating and constructing enterprises dictated the terms on which small, non-core countries might participate in the expansion of the system. Spain, with its long-standing shortage of technical and financial resources, was excluded from the main telegraphic communication routes. The country's hopes lay in its strategic location at the westernmost point of Europe and its islands in the Mediterranean (the Balearics) and the Atlantic (the Canaries), as a springboard to Africa and America, and as a possible crossroads to the East[40]. Nevertheless, Britain's control of Gibraltar severely limited Spain's room for manoeuvre. If we add that the major powers favored the involvement of Portugal in the creation of the African network so as to avoid potential rivalries between the two Iberian countries, we see that Spain's attempts to establish itself in the spread of telegraphy met serious obstacles. Gibraltar, together with Malta, became the British stronghold in the Mediterranean for Asian connections via Alexandria and Suez, and Carcavelos in Portugal was an important junction for the Atlantic and Mediterranean cables[41].

The challenge of long distance: the North Atlantic

In the international arena, commercial telegraphy had shown a marked preference for the North Atlantic route ever since its launch

[39] «L'Électricien», October 12 (1889), 664; «The Electrician», April 20 (1894), 683. The Telegraph Gutta Percha Co. and Glass, Elliot and Co. merged into Construction and Maintenance Co. in 1864: G.L. Lawford-R.L. Nicholson, *The Telcon Story, 1850-1950*, London 1950. The *Anglo American* granted the French state a 50% discount on telegrams, while *Commercial Cable* allowed it free use of the Le Havre-Ireland-America line: «Annuaire Statistique de la France» (1920), pp. 462-463.

[40] Previous contributions to the history of Spanish submarine cables are: M. Arcarons, *L'Espagne et ses liaisons télégraphiques transatlantiques*, in *Les réseaux européens transnationaux: quels enjeux?*, edité par A. Carreras, A. Giuntini et M. Merger, Nantes 1995; Á. Calvo, *Los cables submarinos: una rama emergente de la ingeniería civil en el siglo XIX*, «Quaderns d'Història de l'Enginyeria», 4 (2002-2003), pp. 255-270; Á. Calvo, *Business and geopolitics in the international transfer of technology: The Spanish submarine cables 1849-1930*, «History of Technology», 26 (2007), pp. 75-98. Information on the origins of the telecommunications in the Philippines is extremely scarce, as can be seen in Mody, *Telecommunications Politics*, p. 252.

[41] R. Wenzlhuemer, *The dematerialization of telecommunication: communication centres and peripheries in Europe and the world, 1850-1920*, «Journal of Global History», 2-3 (2007), pp. 365-366.

in 1845. The emphasis on a northern route seriously limited Spain's opportunities[42].

After some delay, the Spanish government laid cables to its island territories in the Mediterranean, as well as its colonial possessions, which could be considered an extension, and in some cases a substitute, of the land telegraph network[43]. At an early stage, however, the international companies dismissed the Balearic Islands as a possible relay point. For their part, the Canary Islands played a key role in the international race to control the nodes of communication to America and Africa, but in this case the government changed its traditional practice and chose to outsource the construction and operation of the cables to private companies, while upholding some national economic interests by imposing a direct cable from Cadiz. At stake was not only the modernization of the communication system with the islands (which at that time had just two mail deliveries a month) but also the chance to attract increasing traffic to and from America, as the provision of telegraphic services would increase the number of boats entering the islands' ports[44]. The government granted the license for the cable between Tenerife and St Louis in Senegal to a private operator and, since the license-holders were speculators, the rights were then transferred to a new British firm, the *Spanish National Telegraph Company* (SNTCo.), and to the French government. SNTCo. laid the Cadiz-Canary Islands cable, which connected the *West African Telegraph* cable serving the non-British colonies and the *South American Telegraph* cable to Brazil[45]. As a sign of the importance of the Canaries, in the twentieth century a new cable was planned to connect the islands with each other, and with mainland Spain[46].

In a situation dominated by the fierce international rivalry between Britain, the strongest power of the time, and emerging countries such

[42] The Atlantic cable was laid by General Atlantic Telegraph Co.: W.E. AYRTON, *Sixty years of submarine telegraphy*, «The Electrician», February 19 (1897), pp. 545-548. For more detail on the narrative and references, see CALVO, *Los cables submarinos*, pp. 255-270, and ID., *Business and geopolitics*, pp. 75-98.

[43] The cables were manufactured by British firms and laid by British steamships, usually with the help of Spanish warships.

[44] «Gaceta de Madrid» *(*MG*)*, July 17 (1879), pp. 406, 693-694.

[45] *DSC*, March 18 (1880), 2,976 and April 16 (1880), 2,975; May 3 (1882), 3,309; (1888), 2,275, 2,333, 2,360-1; *Las comunicaciones entre Europa y América 1500-1993*, edited by A. Bahamonde, Madrid 1995, pp. 151-164. *Spanish National Co.* was bought out in 1884 by the British concern *Eastern Telegraph*.

[46] Spanish Parliament Archives, Madrid (SPA), 484/27; *DSC* (1907), 6,270; 6,361; 6,392.

as Germany and the US, Spain was largely excluded, but occasionally new opportunities presented themselves. One such opportunity was provided by Germany, which was intent on strengthening its position in the modern communication routes. The earlier atmosphere of cooperation had now turned into political rivalry, and Britain denied Germany the use of the anchor points Germany needed to lay a cable to New York. In response, Germany decided to bypass the British territories. The first phase of the German project was completed in 1897 with the Emden-Borkum-Vigo cable, and the second with the grant of a cable between Emden and the Canary Islands to create a connection with South America and challenge the British and French, who were also interested in obtaining this second line[47]. The German government considered this cable vital for its relations with its west-African colonies and the territories of South America, and exerted considerable pressure on the Spanish authorities to grant the concession. Later, in 1924, *Deutsche Atlantische* obtained a grant for a cable from Vigo to Germany[48].

Italy, headquarters of the multinational *Pirelli*, which built up other interests in Spain from 1902 onwards, also applied for spaces in the Mediterranean and Atlantic. In 1922, the *Compagnia Italiana dei Cavi Telegrafici Sottomarini* won a license for a fastening point near Malaga for a cable between Rome and South America via the Canary Islands, as well as two grants for new sections of a line to the North American coast via the Azores in 1924, and between Malaga and Lisbon three years later[49].

The unattainable dream: links to the West and the East

The main challenge facing Spain, and more specifically its cash-strapped treasury, was the cost of the transoceanic cables. These cables were three times more expensive than the overland telegraph lines, and had to cover a very long distance[50]. Just one year after the laying

[47] HEADRICK-GRISET, *Submarine Telegraph*, p. 558; J. AHVENAINEN, *The European cable companies in South America before the First World War*, Helsinki 2004, pp. 291-293.

[48] A. MOUSSET, *La política exterior de España 1873-1918*, Madrid 1918, p. 173. The Germans rejected the Portuguese government's suggestion to substitute Lisbon for Vigo in the line.

[49] MFA, R. 34, 13; SPA, 484/27; *MG*, April 13, 1924, 278 and December 1, 1927, 1,311.

[50] BRIGHT, *Submarine Telegraphs*, p. 65.

of the first cable in the English Channel, moves were afoot to establish a telegraph link with Cuba, which was seen as a complementary way of strengthening colonial ties[51].

A plan was designed to set up inter-American connections in support of Spain's commercial interests in the Caribbean, which were closely linked to the US economy. Early in 1856, and well before any action on the part of the government, the private enterprise *Sociedad Catalana General de Crédito* (SCGC), which specialized in the financing of railways, planned to link Cuba and the North American coast in Florida via a submarine line. Interestingly, the project was undertaken at the same time as the design and construction of the Atlantic cable by Brett and Whitehouse, which in fact was the inspiration of the SCGC's plans. The government's silence, and the unfavorable business prospects, forced the Spanish firm to abandon the idea[52]; in general, Spanish companies lacked the kind of state support that the British government gave to its private firms, and which played such an important role in the construction of the empire[53]. As the Spanish authorities stalled, international companies leapt at the chance to occupy the routes. Ultimately, successive Spanish governments felt unable to compete with the projects planned by other countries, and decided not to build their own transoceanic lines.

Any attempt to connect Europe and America needed mooring points at the two ends of the line, together with relay stations. This is why companies fought so hard for the European and American end points. Four main telegraph routes across the Atlantic Ocean were proposed, the three first being the Norway-Labrador, the Ireland-Newfoundland, and the Europe-Azores-America routes. The last one was the southernmost route connecting Europe with South America, the Caribbean and North America, and involving two competing countries: Spain and Portugal, which both had a southern-Atlantic seaboard and islands that could serve as relay stations[54].

[51] «El Correo de Barcelona», December 13 (1852), p. 1.

[52] SCGC, *Yearbook* (*s*) (1857), pp. 10-11; (1858), p. 13; (1859), p. 11; (1860), p. 8. The US exported equipment for the Cuban railways and machinery for the sugar mills: B. RAUCH, *American interest in Cuba*, New York 1974.

[53] A. DE MARCOARTÚ, *Universal Telegraphic Enterprise, Telegraphic Submarine Lines between Europe and America, and the Atlantic and Pacific*, New York 1863. In 1869, a Central American system with a landline and a submarine cable between Jamaica and Aspinwall was planned: AHN (Madrid), 254, exp. 10.

[54] T.P. SHAFFNER, *The Telegraph manual, a complete history and description of*

In 1858, Europe and the Americas were connected for the first time by an intercontinental cable, but the link was short-lived and its failure raised doubts among scientists about the practicability of underwater communication from Europe to America[55]. However in the years between the failure of the first transatlantic cable and the success of 1866, an alternative route was traced out, known as the southern transatlantic route. Entrepreneurs were attracted by the prospect of bringing together two growing markets capable of moving thousands of pounds a day in trade. A new French company was formed with a line from France to the Saint Pierre and Miquelon colony off Canada, across Spain, Portugal and the Azores, together with an extension to New York and the Antilles[56].

Along this southern route, Cuba was a point of vital importance in the link-up with the US, as were the Canary Islands as the point of departure across the Atlantic. Both Cuba and the Canaries were under the aegis of the Spanish government, which was to receive a number of applications from representatives of the main transatlantic companies. Perhaps the most serious came in 1857 from Horatio J. Perry, who had excellent contacts in both Spain and the US, thanks to his ties with the diplomatic world – he had been secretary of legation in Madrid, as well as *chargé d'affaires*; this was also thanks to the very close proximity of his wife, the poetess Carolina Coronado[57], to the Queen. Perry proposed a project with transnational capital and participants, led by *Submarine Telegraph Company* of New York, created by Morse together with some of the pioneers in submarine telegraphy, and owner of the mooring rights for a cable between Cadiz and America[58]. Nevertheless, as the Ministry for Overseas Affairs had

the semaphoric, electric and magnetic telegraphs of Europe, Asia, Africa, and America, New York 1859, pp. 655-656; AHVENAINEN, *The European*, p. 11.

[55] SHAFFNER, *The Telegraph*, p. 622.

[56] *Télégraphie transatlantique*, Paris 1860, pp. 1-5. A curious and unrealistic plan was presented to Napoleon III in 1857 by Siégris to connect Le Havre and New York: Archives Nationales, Paris, F12, 2,213.

[57] On the North American Horatio J. Perry influence in the Spanish court circles: C. BROWN JR., *The International Ocean telegraph*, «The Florida Historical Quarterly», 68 (1989), 2, pp. 135-159. Coronado interceded with the Queen of Spain, as she did with the US President to obtain a post for her husband in Spain: AHN, Overseas; 254, exp. 8, 1866 and 253, exp. 8, 1870/1892; The Abraham Lincoln Papers at the Library of Congress, Series 1, General Correspondence, 1833-1916, March 25, 1861; M. ARCARONS, *La Spagna e i collegamenti telegrafici transatlantici (1858-1898)*, «Memoria e Ricerca», 5 (2000), pp. 45-66.

[58] C. BRIGHT, *Los cables submarinos de Cádiz a las Américas*, Madrid 1864, pp.

authorized anchorage of a cable that would link up with the US coastline, the promoters stopped all work on the project and the license eventually expired. After his confrontation with the *International Ocean Telegraph*, which would bankrupt him, Perry worked as an agent of *Eastern Telegraph*, first in Spain and then in Portugal, where he died in 1891[59].

A similar fate befell the project of Arturo de Marcoartú, Chief Engineer of Roads, Channels and Ports in Spain, member of the London Institute, businessman of international standing, and advocate of free trade and Iberian Federalism, a movement favoring union between Portugal and Spain. Again, the plan involved the whole of the Iberian Peninsula, which de Marcoartú conceived as the center of a world transport and communication network[60]. For his part, P.A. Balestrini devised a project for the same route under the auspices of a treaty with Brazil, Haiti, Italy, and Portugal, under the leadership of France, that granted him the right to construct a transatlantic cable. However, Balestrini was unable to meet his commitments; the concession was revoked and given first to Charles Bright in 1870, and two years later to the banker Viscount Mauá, who teamed up with British investors and succeeded in laying a cable between Portugal and Brazil[61].

23-27. In the Perry project of 1857 melted these of Peter Cooper from New York and Horace B. Tebbets, the last associated with several capitalists in Havana, Sama among other; a half of the shares would remain in the hand of Spanish: «The Journal of Education for Upper Canada», 11-12, 1858, p. 136; *Telegrafía submarina*, Madrid 1867, p. 217.

[59] Perry invited to Duke of Riánsares, a businessman with interests in Cuba and husband of Queen Regent María Cristina de Borbón, to join the project of the telegraph to the Antilles: ES. 28079. AHN/4.2.8/, 3442, LEG.232, exp. 1, 1859. Perry, proud of his role in the construction of the great North American submarine arteries, received «no subsidy, no aid, no emolument» from the Spanish government, but a grant for a cable: Reply of Hon. Horatio J. Perry to the Letter of Minister Hale, «New York Times», March 27, 1869.

[60] AHN, 78, exp. 28, 1868/1869; 79, exp. 28, 1863-1868. De Marcoartú attempted to create a bank in Puerto Rico, and he also acted on behalf of British railway enterprises: D.H. Carlisle, *Venezuelan foreign policy: its organization and beginning"*, Washington 1979, p. 75; AHN, 322, exp. 2 and 3; Diputació de Barcelona Archives, 1,389, 8. He was also a peace commissioner in the Cuban War: «The Saint Paul Globe», August 30, 1898.

[61] P.A. Balestrini, *Note à Son Excellence le Ministre plénipotentiaire de Sa Majesté l'Empereur du Brésil à Paris, concernant la ligne télégraphique sud-transatlantique et les stipulations particulières avec le Gouvernement brésilien qui s'y réfèrent*, Paris 1864; A. Marchant, *Viscount Maua and the Empire of Brazil*, Berkeley 1965, p. 227; J.

The success of the transatlantic cable of 1866[62] hurried events along. Cubans and Spaniards alike had long aspired to acquire the rights to lay a cable between the US and Cuba, but without success. For its part, the US feared that the US-owned sugar plantations would lose the control of world markets if Spain were to construct its own underwater cable. In 1866, the US government awarded the right to build and exploit the Florida-Cuba telegraph line to the *International Ocean Telegraph*. for a period of 14 years[63]. The Spanish government also granted licenses to the *Cuban Submarine Telegraph* to build and exploit telegraph cables between Havana and Santiago de Cuba, and to *International Ocean Telegraph* to build cables between Puerto Rico and the Bahamas, Haiti, and Santo Domingo[64].

In the last third of the nineteenth century, three more applications were received to build the southern route: from the engineer L. Brookman, from J. de Lasarte, which was transferred to Adolfo Clavé in 1873, and again from de Marcoartú[65]. On this occasion, de Marcoartú stressed that his line would link Spain with its colony without having to depend on the British or the Americans. Perry, then working in Portugal, advised against a direct line between the Canary Islands and Puerto Rico[66]. This was the last chance for Marcoartú, who was now better placed than before to defend the undertaking; but he was overtaken by events as Cuban independence became imminent. Another potential relay point

HILLS, *The struggle for control of global communication: the formative century*, Chicago 2002, p. 157.

[62] G.P. ROSLIN, *The Story of Telecommunications*, Macon (GE) 1992; W.E. RUSSELL, *The Atlantic Telegraph*, Annapolis 1865 (reissue 1971).

[63] *Acts and resolutions adopted by the Legislature of Florida*, Tallahassee 1866, p. 72; AHN, Overseas, 254, exp. 7; G.A. SCHREINER, *Cables and Wireless and their role in the Foreign Relations of the United States*, Boston (MA) 1924, p. 40. The company had received the Spanish concession from *Horatio J. Perry:* HILLS, *The struggle*, p. 51.

[64] *MG*, April 13 (1873), 103. The main users of cables were private businesses, which accounted for 98.66% of the total telegrams transmitted by the cables in Cuba.

[65] Although shorter than the cable proposed some years before by Perry, Brookman's cable was 0.4% more expensive: microfilm, Spanish National Library, Madrid.

[66] Perry Correspondence, 1890 (courtesy of Isabel Pérez). An inter-Caribbean system had been in existence since 1870-78, and several Cuban underwater lines were laid in 1895. In 1898, an optical telegraph line combined with the electric telegraph was planned: Engineering District of Puerto Rico, *Memoria descriptiva* (1898). Optical telegraphy was still used in the military to «strengthen defence»: AHN, Overseas, 1,218, exp. 14.

for international communications in the East, the Philippines, would also become independent before the century was over[67].

At this point, a comparison with the results of other European colonial powers is in order. Non-European countries and colonies generally lagged behind the most developed countries in Europe in the spread of the telegraph. With some important exceptions, colonial powers did little to improve communications inside the colonies themselves; when they did so, it was usually to serve their own interests, or to connect the ports with the main areas of economic activity. Britain had the highest density of telegraphic bureaus per inhabitant and surface area, followed by France and then by the Netherlands. The construction of Britain's dense networks in its colonies began in 1850, with a short experimental electric telegraph line in India; three years later, a vast new plan was implemented, and the system was definitively established in 1854. The telegraph was also introduced in Victoria (Australia) in that year, and it spread throughout the country in the 1860s. Between September 21 and 28, 1868, chess matches were played between Melbourne and Adelaide via electric telegraph[68]. The public telegraph lines were concentrated around capital cities, market towns, goldmines, and large farming settlements. However, with the exception of Natal, New Zealand and Victoria, none of the British, French or Dutch colonies had a higher density of lines per area than Cuba, the jewel in Spain's crown[69].

The example of Portugal, another economically deficient country, highlights three points that are relevant to our study. The first is the delay in the construction of telegraph lines in the colonial territories. The second is the practice of transferring mooring rights to international companies in order to secure connections with the colonies: for example, the mooring rights for a cable from Great Britain to Brazil in Madeira and Cape Verde, and for a second cable between Cape Verde and the west coast of Africa in the 1890s, which meant that Portugal was now connected with all of its colonies except Timor. The third is the

[67] M.E. PAGE, *Colonialism: an international social, cultural, and political Encyclopaedia*, Santa Barbara (CA) 2003, p. 136. In the 1920s, a very ambitious project was presented by *Cable Hispano-Americano*: MFA, 1925.

[68] *The games of the intercolonial chess match*, Melbourne 1868.

[69] Great Britain, Colonial Office, 1860, *The reports made for the year*, 2, p. 9; E. MCLEOD, *The impact of technology on communications*, online; WENZLHUEMER, *The dematerialization of telecommunication*, p. 365. India was the nexus of the integrated rice wheat market: W.L. BERNSTEIN, *A Splendid Exchange: How Trade Shaped the World*, London 2013.

commercial rivalry between foreign companies to obtain concessions, as occurred in Mozambique with the British firms *Chartered Company* and *Companhia da Zambézia*; the latter won the concession for telegraph lines, and opposed the entry of its competitor[70].

In the case of the Netherlands, a leading export economy in territories similar to the ones studied here, by 1859 the telegraph network in its colony Java already had 28 offices with a total of 2,700 km of lines. Seven years later, the government extended the service by constructing a line in the south of Sumatra. In the 1860s, telegraph lines were operating all over the island of Java – a large sugar and coffee producer and exporter – and the colonial government attempted to connect the different parts of the Dutch East Indies and to set up communication with Singapore. The electromagnetic telegraph had been introduced, and a line of wires had been completed between Batavia and Buitenzorg. In addition, a submarine cable had been successfully laid between Singapore and Batavia, and an agreement was made in 1859 between Great Britain and the Netherlands to lay a cable from Singapore to Batavia. In early 1874, the Dutch Indies telegraph system had 5,181 km of lines and 60 telegraph offices. For its part, Germany, a latecomer to the colonial feast, offers an example of the successful construction of a colonial system of telegraphs, based on public funding[71].

Weak powers and great powers: the position of Spain

Intensification of the rivalry between the major powers bent on maintaining control over their possessions and domains created a new scenario. In 1879, the *Compagnie Française des Cables Télégraphiques* (CFCT), a French Company, had completed a transatlantic cable

[70] W.G. CLARENCE-SMITH, *The third Portuguese empire, 1825-1975: a study in economic imperialism*, Manchester 1985, p. 97; R.J. HAMMOND, *Portugal and Africa, 1815-1910: a study in uneconomic imperialism*, Stanford 1966, p. 169. Telegraph lines in Angola in the early twentieth century: D. BIRMINGHAM, *Empire in Africa: Angola and its neighbours*, Athens (OH) 2006, pp. 54, 56 and 89; A.P. SILVA-M.P. DIOGO, *From host to hostage. Portugal, Britain, and the Atlantic Telegraph Networks*, in *Networking Europe. Transnational infrastructures and the shaping of Europe, 1850-2000*, edited by E. van der Vleuten and A. Kaijser, Sagamore Beach 2006, pp. 53 and 57.

[71] Great Britain, Parliament, *House of Commons papers*, vol. 9, p. 44; *Limited liability chronicle and joint stock times*, 105, 1857, p. 139; *NYT*, January 30, 1860; J.W.B. MONEY, *How to manage a colony*, London 1861, p. 240; *Proceedings of the fourth Pacific Science Congress*, vol. 4, 1930; «Journal Télégraphique», 1876/3/25, 15, p. 277; *Colonialism in Africa*, p. 239.

originating in Brest, France, through the tiny French-owned islands to Eastham. The CFCT had obtained a grant from the French government to build a second line between France and the American coast, which would link up with the West Indies network. In 1895, the CFCT presented a set of proposals to the Spanish government for the establishment, provision and operation of several submarine lines on the north coast of Cuba, ending at Cap-Haïtien in Haiti – a distance of 292 km. The proposal was attractive to Spain, because at the time the country was dependent on the US cable system for telegraph communications between Madrid and Havana. The second argument presented by the company was the slowness, unreliability, and lack of security in the transmission of messages due to the large number of relay points on the current route. It offered an independent link, outside the US network, faster communications, and greater security against the Cuban insurgents. Although it was the licensee of the Haiti-Caimanera line, the company did not attempt to call in the favors it had rendered to the Spanish government in compelling circumstances – for example, the opening of the new station of Caimanera, which allowed communication between Santiago de Cuba and Havana. Surprisingly, the CFCT did not seem to object to the various concessions that affected the route chosen, which was granted to W.G. Smith in December 1861. The company expected to see the issue addressed in the Council of Ministers and hoped to obtain the concession, remaining open to modifications in the project[72].

Spain's official agency in Cuba was aware of the desirability of the CFCT plan, but at the same time called for further study of the project and timely completion of the tender. It did this because a previous application from Cuban Submarine had been received, and also because the project was an international matter. However, the urgency of the project argued against holding the tender and also, with the precedent of Cuban Submarine, against giving the applicants a choice between the construction of the line or its exploitation. Finally, the agency advised the governor general not to accept the proposal[73].

The East was another geopolitical area that was coveted by states and enterprises as an alternative route to America[74]. Situated on a

[72] AHN, Overseas, 252, exp. 15; P. GRISET, *Entreprise, technologie et souveraineté: les télécommunications transatlantiques de la France (XIXe-XXe siècles)*, Paris 1996.

[73] AHN, Overseas, 252, exp. 15.

[74] J.B. DWYER, *To Wire the World*, Westport 2001; V. DE ST. ANNE, *Télégraphe électrique. Ligne d'Europe, d'Asie, d'Afrique, d'Océanie, d'Amérique*, Paris 1862.

normal, direct route, Spain was ideally placed for the construction of landlines and coastal relay points, and the country also controlled one of the possible end points in the Philippines.

The first British plans to reach India involved Spain. De Marcoartú drew up projects for the route, initially alone and then in association with the engineers Bright and Clark. Finally, Bright and Clark changed the plans and formed their own company, choosing a cable through Gibraltar[75]. As this decision increased the importance of the western coastline, in 1872 a concession for a cable between Britain and La Coruña came into the hands of *Construction Maintenance* after several transfers of the rights[76]. The line from Britain to Gibraltar found an expeditious way when Falmouth Gibraltar and Malta Telegraph Co. was licensed to fasten a cable on the north-west coast of Spain before continuing to Portugal[77].

Land in northern Spain was crossed by the England-Bilbao and Barcelona-Marseille lines (the latter cities being link-up points in the cable from England to Bombay), which were constructed by the *Indian Rubber, Gutta-Percha, and Telegraph Works* (IRGTW) on obtaining a concession in 1872-73[78]. Lines were also built between Barcelona and Italy, a sort of Anglo-Spanish connection to the eastern system. At the same time, the British ensured their link with Africa through the license for a Barcelona to Egypt cable that bypassed the Balearic Islands[79].

The Spanish government reacted slowly to the changing situation in the colonies, as well as in the wider world. The delay in the construction of cables led to angry exchanges in the Spanish parliament, and to criticism from many financiers. At the time of the restoration of the monarchy in 1874, the building of telegraph lines to the Philippines had not even been considered. Connecting the Philippines to the world cable system was made possible by subsidizing private companies, a common practice in other countries. The British firm *Eastern Extension Australasia and China Telegraph Co.* (EEAChT) received a grant from the Spanish government, as well as a sum of

[75] *Correspondence, A. de Marcoartú to V. Balaguer*, London 1869.

[76] It was granted first to the *Ocean Telegraph*, and the next year to *Spuit*.

[77] «Journal Télégraphique», II (1872-1874), 251, 318 and 382.

[78] Marcoartú, promoter of the line, failed to obtain public financial backing: Diputació de Barcelona Archives, 1,389, 8.

[79] BRIGHT, *Submarine telegraphs*, p. 130. The Barcelona-Genoa line opened up traffic with Italy and the central European countries: *MG*, April 13 (1873), p. 103.

4,000 pesos each month over ten years for the construction of the cable between Bolinao in Luzon, and Hong Kong. The opening of the service in 1880, and a new line linking Manila in Luzon to the anchor point allowed communication between the Philippines and Europe. Finally, eight years later, EEAChT Co. again received an annual grant of £ 4,500 to link Manila, later considered by the US to be the best-placed trading port in the Far East, to the Visayas islands in the archipelago[80].

By awarding the construction of the international connections in the area to foreign companies, the Spanish government ceded not just resources but also important tools for maintaining effective control over the system. Concession holders also tried to change previously agreed conditions in an attempt to adapt the construction to their own interests, causing conflict with the government[81]. The government's short-sightedness and a severe lack of economic resources favored the British companies, which did not hesitate in imposing high tariff levels on international connections.

With the outbreak of the Cuban revolt at the end of the century, Spain would soon suffer the consequences of its inability to build an independent communications system. By the time the government decided to fight to ensure the direct cable to the West Indies mentioned above, it was too late; in 1898 Cuba was in the throes of a major crisis[82]. In the Spanish-American war, the United States used the cables for its own benefit by imposing censorship and isolating Spain from its colonies. In the case of Cuba this proved impossible, because of the existence of other cables joining the island with the rest of the world, but in the Philippines, where the only link was the Hong Kong-Manila line, the US put pressure on the EEAChT to seal off the Hong Kong end of the cable. After the Spanish-American war, Spain sold Yap, one of the Caroline Islands, to Germany; these islands would become an important point in cable communication in the Pacific[83].

[80] «New York Times», December 3, 1899, p. 23; BROWN, *Telecommunications Reform*, p. 139.

[81] AHN, 103, 2. Three island-to-island cables were granted again in 1896: *MG*, April 25 (1897).

[82] L.A. PÉREZ, *The war of 1898: the United States and Cuba in history and historiography*, Chapel Hill (NC) 1998.

[83] *DSC*, May 21 (1897), April 24 and May 13 (1898); HEADRICK, *The invisible weapon*, pp. 82-84; K. CLARK, *International communications. The American attitude*, New York 1931, pp. 161, 165.

After this description of the construction of infrastructures, we now turn to the role of minor countries like Spain in the construction of a global system of communications, and to their relations with the powerful international companies with relay points in their territories.

The unbearable lightness of decline: cooperation and international agreements

As noted above, it was Spain's geographical location that made it attractive to firms interested in laying cables for the international network and in gaining hegemony in the construction of subsidiary cables in Western Europe[84]. British companies took the initiative, and Spain granted them the right to construct and exploit the lines that linked up its colonial territories.

The granting of a license to construct and exploit underwater cables carried with it the obligation to establish a service point in one of Spain's existing stations, with the additional costs being met by the license-holder. However, the choice of technology was left to the license-holder who, via the licenses themselves, enjoyed access to materials and equipment belonging to the public works commissions. For example, it was the license-holder who decided whether to link up points on the African coast, and which points to choose. Under the license, the holder was able to choose the telegraph workers, who were subject at all times to the statutory provisions established by the workers' official body. The government reserved the right to intervene when it felt that the circumstances required it[85].

Let us very briefly explore the role of a minor state such as Spain in the operation of lines granted to foreign companies, by examining the example of the Florida-Cuba cable mentioned above. Spain awarded the right to build this cable to the *International Ocean Telegraph Company* (IOTC) in 1866, believing that the new connection would provide significant benefits for trade relations between the US and Spain, and would accelerate communication between Cuba and the

[84] F.J. BROWN, *The cable and wireless communications of the world*, London 1930, p. 120.

[85] In 1856, the government set up the new Royal Telegraph Corps and Service, which merged with the Post Office thirteen years later. In the Cadiz station of the *Eastern Telegraph*, for instance, all the staff, with the exception of the head, were Spanish.

mother country. The Spanish naval authorities in Havana had to oversee access to the coast in order to enable the US technicians to complete their studies. The civil governor of the island was responsible for the link between the mooring cable and the telegraph station in Havana, which would be operated by Cuban telegraph officers in accordance with the regulations of the island's authorities, under supervision by the Spanish government. The Spanish government reserved the right to suspend telegraphic communications between Cuba and the US, without compensation. In addition, the costs of the construction of the section would be borne by the company. The rates for the transmission of private and official correspondence via the submarine cable would be fixed by the company and the Spanish government[86].

As required, the construction of the cable by the IOTC was completed with the laying of a line (underground on this occasion), but under the direction of the Telegraph Corps. In practice, the telegraph employees had to transmit messages in three languages, keep records of the operations, and ensure the secrecy of the correspondence. For its part, the company had sole responsibility for the accounts and revenue collection. Thus, Spain provided scientific and technical capability in the form of highly skilled professionals belonging to specialized bodies, many of whom had trained at the School of Telegraphy and on the railways in Cuba itself. The Havana Telegraph office saw the cable as a vital instrument for promoting trade and strengthening the government, and raised hopes of huge benefits. The Spanish agency, charged with inspecting the service, considered the operation of the landline to be good[87].

Cables might be subsidized by foreign countries and later became State-owned. In the case of the cable between Tenerife and St. Louis in Senegal, for instance, France and Spain came to an agreement regarding the working of the line[88]. Restrictions such as the use of codes or ciphers were imposed on companies for the international traffic circulating through the landlines in Cuba and other Spanish colonies[89].

In the case of underwater cables beginning on Spanish land, the

[86] AHN, Overseas, 254, exp. 7.

[87] AHN, Overseas, 254, exp. 10.

[88] *Agreement between Spain and France*, Paris 1884, pp. 1-6.

[89] There were no agreements with *Western Union*, *Anglo-American Transatlantic Cables* and *Anglo-French from New York to Brest* companies regarding the service and the security of the telegrams.

companies and the State had a reciprocal interest in connecting the capital of the country with these large international routes. The Spanish government contracted IRGTW and *Anglo-Spanish Telegraph* to construct direct overland lines to serve the respective cables, fixing their starting point in Madrid. Thus, IRGTW's Bilbao-Madrid and Barcelona-Madrid lines linked Madrid and Barcelona to the British cable system to Malta via Lisbon. A direct line was also established between the capital Madrid and the cities of Barcelona, Bilbao and Valencia, the country's main industrial nuclei and export centers for iron and fruit. At the same time, the Spanish government allowed the *Eastern Telegraph* to use its station in Vigo, the mooring point for the cable to Gibraltar and Malta[90]. In 1873, the award of the England-Bilbao underwater cable with its overland extension to Madrid was transferred to the *The Direct Spanish Telegraph* (TDST)[91]. The *Eastern Telegraph*, the major shareholder in TDST, believed that Spain occupied an important place in Europe and guaranteed continuity in communication lines with Spain in the case of a breakdown on the Falmouth-Bilbao cable. It also carried out the maintenance and repair work on the cable as needed[92].

Naturally, the government sought some sort of compensation in return, as well as an additional source of income. It reserved the right to use the moorings to hang its own lines, and at the same time it put the overland line at the service of the Telegraph Corps. If the line fell into total disuse, it was agreed that it would be ceded to the State following payment in accordance with its valuation; if the break in the line was only temporary, the State could use it for its internal service[93].

While the State-State and State-companies agreements were of great importance for the construction of a world communications system, another big step was the rise of international organizations to regulate the traffic. The European nation states were keen to communicate beyond their borders. The German states led the movement for inter-state cooperation, a true step towards the creation of an European

[90] «The Electrician», May 29 (1903), 268; «Journal Télégraphique», 1, January 25 (1900), p. 16.

[91] *MG*, June 1 (1873), 579; BRIGHT, *Submarine Telegraphs*, p. 119. The volume of traffic of *The Direct Spanish Telegraph* represented 2% of that of the *Eastern Telegraph* («The Telegraphic Journal», January 15 (1878), p. 33). The *Eastern Telegraph* representatives were the same as those of IRGTW.

[92] «The Electrician», March 23 (1894), p. 630, and August 18 (1893), p. 431.

[93] *MG*, January 9 (1873), 88; January 22 (1873) and January 17 (1873), 183.

telecommunications area, and from 1848 onwards European telegraph frontiers began to fall. Spain attended the second international telegraphic convention of 1855 in Paris, together with France, Belgium, Sardinia and Switzerland, where agreement on a price system was reached. The Austro-Germanic Morse alphabet was created in 1854, and an European Morse alphabet was adopted five years later[94]. The widening of international cooperation led to the creation of the first International Telegraph Union in Paris, with the presence of twenty countries[95]. There were also moves to promote bilateral cooperation, such as the Spanish agreements with France in the 1860s and with Portugal in 1872, to regulate telegraph relations.

Spain also joined the international campaign led by the French Third Republic to guarantee the protection of the submarine cables. The country signed a protocol in 1882, an agreement in 1884 (before the country had passed legislation to protect the cables), and then the final agreement in 1887.

With its new overland and submarine connections, Spain's international communications increased rapidly, especially with France, its neighbour to the north. In fact, the empirical evidence indicates a gradual opening up of the country as its economic and social relationships took on a more international dimension.

There remains one final issue to be examined, albeit briefly: to what extent did the transfer of telecommunication technologies to the colonies affect their evolution in the postcolonial era? Although the ex-colonies often maintained lasting ties – «new solidarities» – with the metropole, Spain's influence naturally became far weaker after it had lost political control[96]. Overall, there was a strong penetration of foreign capital in Latin America, which became a magnet for multinationals, including in the telecommunications field[97].

[94] Telegraphic Union of four German-speaking States (Austria, Bavaria, Prussia and Saxony) in 1850; Austria-Prussia and France-Baden in 1849-52; Telegraphic convention France-Belgium-Prussia in 1852; Franco-Swiss treaty in 1853: CLARK, *International*, pp. 91-93; SHAFFNER, *The telegraph*, pp. 784 ff and 472 ff.

[95] In 1865, an international organization, the Universal Postal Union, was formed within a much older means of communication, transforming the world into a «single territory»: CLARK, *International*, p. 33.

[96] W.G. CLARENCE-SMITH, *The impact of 1898 on Spanish trade and investment in the Philippines*, in *Old ties and new solidarities, studies on Philippine communities*, edited by C.H. Macdonald and G.M. Pesigan, Manila 2000, pp. 234-268.

[97] R. LEDBETTER, *ITT: A Multinational Corporation in Latin America during World War II*, «Historian», 47 (1985), 4, pp. 524-537.

Most British investment in Latin America was in public utilities, compared with only 26% of the total US investment in the subcontinent in 1930[98]. More specifically, in Argentina, the British-owned *Western Railway* of Buenos Aires built a short experimental land telegraph line in 1866 – this was the country's first. Three years later, a project for a State-owned national telegraph system was set in motion by President Sarmiento. As for international connections, a land and submarine cable concession between Buenos Aires and Montevideo was granted first in 1864 to two London associates – J. Proudfoot and M. Grew – and then in 1890 to D. S. Buratovich[99].

The telegraph did not reach the whole of Latin America until the 1880s. Three out of the four countries with the poorest telegraph facilities in the world were South American (Peru, Paraguay and Uruguay)[100]. In Peru, the telegraph was first installed between Lima and Callao in 1864 using the French Bréguet system, and two new lines were constructed in the next two years. In 1867, a *National Telegraph Company* was formed to connect Lima with the capitals of the departments. By 1896, Peru had 1,120 km of telegraph wire and in the following 24 years 11,830 km of new lines were added. For international communications, in 1869 M.F.P. Soldan obtained the concession for the Peru-Panama cable, after negotiations with the IRGTW. The West Coast of America Telegraph Company laid the inland cables from Chorrillos to Mollendo in 1875, and continued to operate until 1897. An overland line connected the Republics of Peru and Ecuador for the first time[101].

[98] J.F. Rippy, *British Investments in Latin America*, «The Journal of Political Economy», 56 (1948), 1, pp. 63-68; Id., *Investments of Citizens of the United States in Latin America*, «The Journal of Business of the University of Chicago», 22 (1949), pp. 17-29. Railroads and communications were in US hands in Mexico: J.A. Combs, *The History of American Foreign Policy: To 1920*, New York 2008, p. 188.

[99] V.M. Berthold, *History of the telephone and telegraph in the Argentine Republic 1857-1921*, New York 1921, pp. 3-4. In Venezuela, a North American citizen obtained the exploitation of the telegraph lines with the guarantee of tax exemption for imported materials.

[100] Diplomatic and Consular Reports. Annual Series, 3,075-3,090, Great Britain, Foreign Office, 1903; V.M. Berthold, *History of the telephone and telegraph in Chile, 1851-1922*, New York 1924. Peru: 36 telegraphic bureaus and 2,575 km of wire; Paraguay: 821 km and a service of only 28 officials: «Journal Télégraphique», 1893/7/25, p. 171.

[101] J.F. Rippy, *Latin America and the industrial age*, New York 1947; C.R. Markham, *Peru of the twentieth century*, New York 1947, p. 104; *Exporters' Encyclopaedia*, Dun and Bradstreet Publications Corp., 1921, p. 1,275; P.F. Martin, *Peru of the twentieth century*, London 1911, p. 59; *Reports of the United States*

It is no surprise to find Peru and Paraguay in this group of underdeveloped countries, but the presence of Uruguay is unexpected. Known as the «Switzerland of Latin America», this small state had strong commercial links with Europe and North America. Curiously, the need for communication with markets elsewhere in the continent (especially Argentina) prevailed over the need for a national system. The British-owned *River Plate Telegraph Company* built the first telegraph line, spanning 393 km, between Montevideo and Buenos Aires in 1866, but Uruguay did not build its own telegraph system until twenty one years later, and even then the system remained in the possession of the firm that had built it until 1892. The West India and American Telegraph Co., created in 1866 in London by de Marcoartú, obtained an exclusive concession from the Uruguayan government for a mooring point in Montevideo in order to reach Europe via Brazil and the Antilles[102].

The Cuban telegraph system constructed under Spanish rule was considered incomplete, obsolete, and unreliable in the extreme by the US administration. However, in the pacification of Cuba and Puerto Rico, and the suppression of the Philippines uprising, the military telegraph proved to be a particularly potent agent. The US estimated the cost of an entire telegraph system connecting all of its possessions to be $ 25-30 million. One of the best examples of the incursion of private capital in telecommunications is the *United Fruit Company* which, immediately after its foundation in 1899, began to build up a wide-ranging transport and communications network in Central America and the Caribbean[103].

The Philippine islands came under US dominance in 1898, and the rights over cables were also transferred to the new superpower. Initially, the telegraph system was handled by a special division, and in 1907 the US government transferred all the lines, including the cables, to the island government, which from 1909 onwards had total control over the service. The Signal Corps constructed a state-of-the-art telegraph system for military purposes, which was soon made available

commissioners to the Paris universal exhibition, 4, United States, 1867, p. 140. There are discrepancies regarding the date of the first line; in our view, the date proposed by Martin is more likely.

[102] V.M. BERTHOLD, *History of the telephone and telegraph in Uruguay, 1886-1925*, New York 1925; K.G. BEAUCHAMP, *History of telegraphy*, Herts 2001, p. 156. Additional landlines to communicate with Uruguay and Brazil were planned: AHVENAINEN, *The European cable*, p. 28.

[103] Library of Congress, http://hdl.loc.gov/loc.wdl/dlc.62.

to the public. Meanwhile, the telecommunications service was split up, and in 1905 the *Philippine* Islands Telephone and *Telegraph* Company (PT&T), a recently-founded private US firm, was granted a franchise to operate the telephone service, which began with 400 subscribers[104].

Conclusions

Combining a techno-economic history approach and a national/geopolitical perspective, this essay stresses three important aspects of Spain's attempts to enter the new world of telecommunications in the mid-and late nineteenth century. The first relates to the geopolitical importance of Spanish territories in the construction of an international network, and the country's subordination to British companies and dependence on foreign technology for the laying of telegraphic cables. The second is the lack of an efficient colonial network able to link the mother country with Central America and the Philippines (ceded by Spain to the US in 1898). The third is the construction of a small system of telegraph cables linking Spain with its African colonies and territories in the Atlantic and the Mediterranean, namely the Canaries and the Balearics.

Spain was late in joining the race to control international communications. A more serious error was its failure to establish adequate links with its own dependent territories. Moreover, a lack of foresight and severe budgetary problems posed obstacles that eventually proved too great for the construction of lines planned to link up with the last remnants of the empire.

[104] *Telephones and telegraphs: 1902*, United States, Bureau of the Census, Govt. Print. Off., 1906, p. 106; H.B. JACOBINI, *Governmental services in the Philippines*, Manila 1956, p. 552; A.V.H. HARTENDORP, *History of industry and trade of the Philippines*, 2, Manila 1961; C.B. ELLIOTT, *The Philippines: To the End of the Commission Government*, New York 1968; C.E. TORRES, *Americanization of Manila*, Quezon City 2010, p. 87. Some telegraph lines were reconstructed and converted into the telephone lines: War Department, *Annual reports*, 3, Washington, Government Printing Office, 1908, p. 263. «Western Electrician», September 22, 1900; «New York Times», July 7, 1905; «National Geographic Magazine», XII, 1901, pp. 1-22. For Spanish postcolonial ties with the Philippines, see: W.G. CLARENCE-SMITH, *The impact of 1898 on Spanish trade and investment in the Philippines*, in *Old ties*, pp. 234-268. Filipino resisted the North American acquisition and the «benevolent assimilation» of the islands: S.C. MILLER, *Benevolent Assimilation: The American Conquest of the Philippines, 1899-1903*, New Haven-London 1984.

Because of Spain's strategic location at the crossroads of major international telecommunications routes dominated by Great Britain, Spain attracted the interest of leading foreign companies that were keen to use its territory to land cables for the international network. In spite of this geographical advantage, Spain played only a secondary role in the world system of submarine telegraphs. The shift of the worldwide economy towards the Atlantic reduced the importance of the old southern route of discovery and, with it, Spain's chances of becoming a key player. Now a declining colonial power, the country could construct only a small cable system at home and in the colonies. At the same time, it was compelled to allow cable mooring.

Spain permitted other powers to use its territory in order to shorten the paths of the major international routes. It provided connecting lines, and offered subsidies to large companies to enable them to build branches. Eventually, the country became a part of the international system of cooperation. However, Spain's system of underwater cables was unable to capitalize on the country's geographical position, and the country was slow to extend the overland network of telegraphs to its island territories, the Balearics and the Canaries.

As a bit player in the West's great imperial conquests of the nineteenth century, Spain was unable to provide the means to maintain or expand its dwindling possessions. The inability to build an underwater cable network to strengthen its links with the colonies made the country dependent on the systems of the great powers – some of which were its enemies – during times of colonial crisis, such as 1898. An explosive mixture of incompetence, inefficiency and favoritism gave rise to a bewildering array of concessions and entitlements, which often led the representatives of international companies involved in the construction projects of new transcontinental lines of communication to seek other solutions that did not involve Spain.

Ultimately, worldwide market conditions, the location of the colonies in economic areas controlled by Britain or the US, and the technological predominance of these two great powers prevailed over the purely administrative ties that bound the colonies to the metropole.

After decolonization, this process continued apace, and at the same time Britain and the US increased their financial penetration into Latin American telecommunications. Spain was unlikely to invest in the utilities in its colonies when it was handing over its own utilities to foreign capital. In fact, the colonies sometimes led the way: Cuba introduced Spain to some of the most advanced technologies in the production of sugar and tobacco, in many cases originating in the US,

and provided expertise and scientific knowledge by training Spanish workers, or through translations of scientific works.

In summary, even though, to some extent, Spanish policy followed that of the great powers in terms of the subsidization of lines, and that of small countries in terms of exploiting geo-strategical advantages, the country's endeavors can hardly be described as a success. The aspirations of Spain's industrial lobbies with interests in Latin America failed, as did those of successive governments. Spain even squandered some of its geo-strategical advantages because of the incompetence of its bureaucrats and the short-sightedness of its politicians. Ultimately, the unstoppable process of globalization punished Spain for its inability to acquire the means to compete with countries of smaller dimensions, but with closer ties to the world's major economies. As a result, Spain was marginalized from the new global connectivity.

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