

Networks of powers and networks of capital: evidence from a peripheral area of the first globalization. The energy sector: from gas to electricity in Naples (1862-1919)

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Abstract

At the moment of Italian political unification, the Mezzogiorno (i.e. Southern Italy) was affected by a deep institutional change and it entered the wave of financial market openness, attracting all forms of investments from international capital markets. Naples – after having lost its previous role as the Bourbon kingdom's capital city – enabled projects of large scale urban planning, beginning from basic public utilities. In this process, public and private lighting was chronologically the first area of interest – parallel to railway development planning – where international finance played a role. As an evidence of the dynamics which brought this peripheral European area into the orbit of the first globalization, this paper addresses the complex business of energy supply in Naples – between 1862 and the WW1 – both from the point of view of its financial dynamics and the parallel evolution and organizational characteristics of the business actors involved. The Social Network Analysis (SNA) will support the reconstruction of the diversified and transnational businesses which the Neapolitan energy business was integrated in, at the same time giving evidence both to the bindings linking legally independent companies and the multiple relations between the actors involved. The transition from gas to electricity, during the time, marked the transition from weak to strong corporate ties according to the evolutionary trends of international financial markets.

Key words: international capital flows; business groups; *haute finance*; public utilities; Southern Italy; Social Network Analysis.

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1. Networks of powers and networks of capitals: hints from the literature

Since the 1850s, particularly in the “capitals of capital”¹, both processes of capital concentration and export of took shape. Different fields of financial interests, such as new direct industrial investments as well as infrastructures added to the traditional investments in trade and public debt. This way, an increasingly integrated financial-economic space gradually took shape, from a local to a global space through ever more integrated rail and sea transport networks (i.e. national, transnational and intercontinental). Along these network paths, the hub cities were progressively concerned in the expanding the *networked city* model, characterized by spatial planning and utility works². The *networked city* plans triggered off a series of complementary businesses in different sectors, thus becoming one of the basic elements in the making of the capitalistic system in its first globalization distinctive features.

Evidence of this can be found from the recent (i.e. the past 30 years) growing number of historical studies on public utilities. Different literature approaches in this research field – from history of technology³, to business⁴ and financial history⁵ – give us a very complex framework concerning the organizational and funding features of these peculiar sectors generally closely bound to public authorities (i.e. railways, urban transports, telegraphy gas, water and electricity supply).

Since the 1980s, history of technology, starting from Thomas Parke Hughes’ seminal work *Networks of power*⁶, has defined network utilities as complex systems embedded in existing economic, social, political and financial networks. By using the metaphor of the “seamless web”, the studies on technological systems have highlighted how - within a system-building process – different actors interact on different levels: scientific, technological, economic, financial and socio-political⁷.

This is in line with the results of the business history studies which have defined the institutional architectures of the European *monde des affaires* during the period of the first globalization. Clusters of actors linked by various forms of relationships including ownership relations, interlocking directorships, ethnic, religious, family ties, legal and technical competencies, financial expertise generally associated with “late-industrializing” nations have been studied under the name of business groups⁸. They have been shown to have great importance in numerous countries and to have gained prominence in the global economy. Conceptually defined as social networks in which economic action is embedded in systems of actors⁹, they are seen to function as cooperatively organized business forms between markets and hierarchies¹⁰.

At the same time, in the 1980s, within the scope of the historical literature on different forms of multinational firms, Chapman’s studies of on British trading companies and their *investment groups*¹¹ as well as those by Mira Wilkins on *free standing companies*¹² have highlighted the existence of legally independent firms variously clustered around different actors (e.g. trading companies as well as: promoters, financial intermediaries, legal actors, accountants, merchant

¹ Cassis, 2008.

² Tarr and Dupuy (eds.), 1988.

³ Hughes, 1983; Tarr and Dupuy (eds.), 1988; Giuntini (ed.) 2000; Van Der Vleuten and Kaijser, 2005, pp. 21-48; Bocquet, 2006, pp. 6-16; Bijker W.E., Hughes T.P. and Pinch T., 2012.

⁴ Jones and Schröter (eds.), 1993; Wilkins and Schröter (eds.), 1998; Amatori and Colli, 1999; Jones, 2005; Smith, 2006; Colli, 2006; Khanna and Yafeh, 2007.

⁵ Cameron, 1961; Gille, 1970; Cassis, 1997; Teichova, Kurgan and Ziegler, 1997; Barron Baskin and Miranti jr, 2000; Jones, 2000; Bonin, 2006; Roth and Dinshel (eds.), 2008; Conti, Feiertag and Scatamacchia (eds.), 2009; Stoskopf, 2009.

⁶ Hughes, 1983.

⁷ Bijker, Hughes and Pinch (eds.), 2012.

⁸ Colpan, Hikino and Lincoln (eds.), 2010.

⁹ White, 1981; Granovetter, 1985; Granovetter, 1992; White, 2002; Granovetter, 2005.

¹⁰ Williamson, 1986.

¹¹ Chapman, 1985; Chapman, 1992; Jones, 2000, pp. 10-12.

¹² Wilkins and Schröter (eds.), 1998.

banks, engineers, geographical locations, etc.), set up in a financial place to do business abroad. More recently, Geoffrey Jones has defined the British trading companies structure as *business groups*. They acted as promoters/innovators: they identified business opportunities abroad, promoted them in their home country by launching new controlled separate *free standing companies* (also in the form of limited companies) at the same time not opening up the shareholding of the parent partnership. The parent partnership acted as the business groups' *core firm* and, as such, it promoted diversified investments in different firms of different sectors¹³. This research perspective has been recently deepened within the studies on network public utilities, with reference to *interest groups* in the electricity sector. The operating electric companies, at home or abroad, were typically established for a specific public utility, and were organized to enable developed countries' capital to be brought into the identified venture. Thus, the operating unit (i.e. *free standing company*) can be defined as the node surrounded by *clusters* of actors and firms, with different expertises and joined together to undertake a definite project. It was often "part of a loosely defined *business group*" whose participants were involved in numerous companies. In the specific case of public utilities, financial intermediaries were actors of critical importance due to the very large capitals required by the specific capital-intensive sector. The trend which the studies have highlighted is that of a progressive rationalization of the business forms addressed to cutting competition in a particular sector, through merging operating companies which often became part of structured groups, shaped as *holding companies*, which the clusters of actors continued to be part of¹⁴.

In the light of the abovementioned literature, given the embeddedness of the public-utility-projects in social networks and given the centrality of financial actors in their development, the "return of actors"¹⁵ in financial history prosopographical studies, as well, is given great importance. The multiple relationships existing between many financial actors can now be better traced, thereby giving identity to financial investments patterns¹⁶ while at the same time clarifying some aspects of how economic peripheries were caught in the high finance international network.

In the light of these concisely summarized features that the literature has emphasized, the Social Network Analysis (SNA) seems to serve as an effective approach to provide a fairly clear overview of the complexity of these systems whose studies result to be transversal to different disciplines. SNA is a multidisciplinary approach, process and set of tools that reveals networks and patterns of relationships between individuals or entities¹⁷, thus allowing for the exploration of the temporality of these interactions by using a variety of models and designs. In the historical field it could be used to try to depict networks structures at several moments, interpreting patterns of continuity and change in view of the processes that had occurred. The simple task of analysing the network evolution through the comparison of subsequent states of an evolving network (i.e. the examination of nodes or links over time), aiming at enhancing the perception of structural changes at different levels (i.e. micro and macro), represents an emerging research topic in the form of the analysis of dynamic social networks¹⁸.

In the context of the abovementioned literature and approaches, the proposal of the current study is added. The highlighted transversality of historical studies on public utilities is approached here by means of the specific case of the international financial and entrepreneurial changing network, which was structured around the technological and financial crossroads between gas and electricity in Naples, which was in its turn a strategic crossroads between two important companies, the *Compagnie Napolitaine pour l'éclairage et le chauffage par le gaz* (CNG) and the *Società Meridionale di Elettricità* (SME) for the control of the local energy market. The chronological

¹³ Jones, 2000.

¹⁴ Flandreau, Holtfrerich and James (eds.), 2003; Haussmann, Hertner and Wilkins (eds.), 2008, pp. 55-57.

¹⁵ Fridenson, 2007, pp. 11-13.

¹⁶ Stoskopf, 2002; Khanna and Yafeh, 2007; Cassis Y. and Cottrell P.L. (eds.), 2009.

¹⁷ Cross, Parker and Borgatti, 2002.

¹⁸ Federico, Pfeffery, Aigner, Mikschand and Zenk, 2012.

context develops between Italian political unification (1861) – when the new political and economic context spawned many profitable opportunities to be exploited for private initiatives – and the aftermath of WW1 (1919).

The issue of the Naples energy sector has been studied within the scope of the historiography on the electric industry. New original documents of the CNG's private archive together with the rich archival records collected at the Naples Public Archives, the Enel archive, the State Central Archive of Rome, the French Public Archives (CARAN, CAEF and CAMT), the Paris Municipal Archive, the Paribas Historical Archive and the BGE of Geneva, can now give a significant interpretative enrichment to this topic going beyond the results hitherto produced by historiography. Using IFESMez – a large relational database gathering interrelated datasets on economic and socio-political individual and collective actors operating in Southern Italy and abroad between 1815-1920 – a lot of archival data has been catalogued¹⁹. With the support of the SNA, this paper reconstructs and analyzes the network of the diversified and transnational businesses which the Neapolitan energy business was integrated in, at the same time giving evidence both to the bindings linking legally independent companies and the multiple relationships between the actors involved. The SNA methodology will help to provide evidence as to how the *modus agendi* of this financial network – shaped on a long term strategy for the monopolistic control of the local energy market – developed, during the time, from weak to strong corporate ties by means of the progressive structuring of a system reminiscent of Chinese boxes, nonetheless having a constant underlying base of social interpersonal ties.

2. The CNG: a strategic node in the structuring of an international business group over Italian political Unification (1860-1866)

In the new institutional and political context of the unified Italian state, led by liberal modernizing governments, Naples finally broke free both from the restraints of Bourbon kingdom and the Rothschilds' control over the entrance of new foreign capital²⁰. At that time, Naples was the biggest Italian city in terms of inhabitants (484,026 inhabitants) and it still represented the political, economic and financial centre of the entire Southern Italy. Furthermore – thanks to its geographical position – it was considered a strategic hub in the French vision for a “Mediterranean system”²¹. Its weaknesses in infrastructure and local entrepreneurship brought international groups to make investments themselves, catching up the numerous profitable opportunities that the new context was opening up. Naples became a pole for broad-ranging investments, enabling large-scale urban planning projects²², beginning from basic public utilities. In this transition process towards the *networked city* model, public and private lighting was chronologically the first area of interest –

¹⁹ IFESMez is the acronym of **I**mprese, **F**inanza, **E**conomia e **S**ocietà (Enterprises, Finance, Economy and Society) in the **Mezzogiorno**. It has been created according to the model studied by Maria Carmela Schisani and Francesca Caiazzo and is hosted on the web server of the University of Naples “Federico II” - www.ifesmez.unina.it. The database is tailored to meet the specific needs of a wider and long-term research project (*Networks of powers, networks of capitals and economic growth: querying the history of Southern Italy from a global perspective. 1850-1914*) which requires the management of heterogeneous data and allow for network analysis. The datasets both concern economic and socio-political individual and collective actors of the Mezzogiorno system, their actions/activities and significant events, etc. with particular attention paid to those actors involved in what were the main forms of investment attracting foreign capitals: public loans and FDI (Foreign Direct Investments) in specific business sectors. Data collection and data entry – aimed at populating IFESMez.db – are currently and continuously granted by an equipe of Ph.D students and researchers (including the authors of the current paper) coordinated by Maria Carmela Schisani. The database keep track of all the sources from which data are collected (historical archives, libraries, etc.).

²⁰ Schisani, 2009; Schisani, 2010a; Schisani, 2010b.

²¹ Cameron 1961, p. 134

²² Collezione delle leggi e de' decreti reali del Regno delle Due Sicilie (Laws and Decrees of the Kingdom of the Two Sicilies), *Decree n. 676, 25 February 1860; Decree n. 809, 28 April 1860*, Stamperia Reale, Naples 1860; Collezione delle leggi e decreti emanati nelle Provincie Continentali dell'Italia meridionale (Laws and Decrees for the Southern Italy Provinces), *Decree n. 14, 1 July 1860; Decree n. 24, 6 July 1860; Decree n. 129, 24 August 1860*, Stamperia Reale, Naples 1860.

parallel to railway development plans – where international finance played a role. Hence, Naples fully entered the wave of financial market openness stemming from the *core area* of European industrialization.

In this context, the CNG project took shape²³. Founded in 1862, it aimed at expanding gas lighting throughout Naples by acquiring the assets of the pre-existing Lyonnais *Compagnie Pouchaine*, which had been running the very limited gas-lighting business in Naples since 1841. Shaped like a free-standing company, the CNG was a French-directed Neapolitan-registered company²⁴: it had its legal domicile in Naples (i.e. host country), according to what the local municipality had demanded, and its head office in Paris (i.e. home country)²⁵, where the Board of Directors regularly met. Paris had indeed become the leading European financial place for underwriting and quoting public utilities financial assets within an area that was progressively being integrated with the French bimetallic system (Latin Monetary Union, 1865) as well as the shaping of the administrative system. Indeed, it was in Paris that the CNG project really developed thanks to French, Belgian and Swiss investors, clustered around the Paris-based general partnership *Parent Schaken et Cie* (P&S), led by two Belgian entrepreneurs: Basile Parent and Pierre Schaken. The former was strongly related to the Paris financial *milieu*, the latter was more related with the Brussels' financial environment thanks to his business links with the Oppenheims²⁶.

The Naples gas investment was part of a broader and coordinated line of investments which the P&S had carried out in different fields since the 1840s that – within twenty years, when it came and invested in Italy – had brought this partnership to the height of its expansion²⁷. This construction firm had indeed widened its interests to different countries into companies of different sectors, e.g. mining, the metallurgical and mechanical industry, banking, real estate, gas lighting, according to the *Crédit Mobilier* investment style. Table 1 gives an extensive (albeit incomplete) overview of the diversified businesses/firms, promoted or variously participated in by Parent and Schaken, which – starting from the 1860s – shaped a business group “consisting of legally independent firms operating in multiple [...] industries”²⁸, which the CNG became an integral part of, since its foundation. A more effective overview of this business group is here drafted in Graph 1 (Annex 2) – resulting from a comprehensive dataset processing, thanks to the specific SNA tools (UCINet) – which gives a snapshot of how this group was structured at 1862, when the CNG was created.

At that time, the P&S had become the core firm of a cluster of partly owned firms bound together by persistent formal and informal ties: not only by equity, but also by debt, management, cross-directorships and family relationships. Part of these clustered firms (Graphs 1 and 2 Annex 2 - blue nodes) – geographically scattered in France [*Vitali, Charles, Picard et Cie* and *Parent Schaken Caillet et Cie* (then *Fives-Lille*)], Spain [*Chemin de fer de Cordoue à Malaga, Chemin de fer de Ciudad Real à Badajoz, Mines de Los Santos* (then *Belmez/Pennaroya*)] and Italy (*SOGENE*²⁹ and *CNG*) – were directly promoted by the P&S and were domiciled in the host countries while the head office was in Paris, at the legal domicile of the parental partnership P&S: 12, Place Vendôme. Other

²³ Caiazzo, 2013.

²⁴ For registration matter see Haussmann, Hertner and Wilkins (eds.), 2008, pp. 12-13.

²⁵ *Compagnie napolitaine d'éclairage et de chauffage par le gaz, Statuts*, Imprimerie Centrale des Chemins de Fer de Napoléon Chaix et C.ie, Paris 1863, art. 3.

²⁶ Jacquemyin, 1960; Dumoulin, 1990.

²⁷ *Parent Schaken et C^{ie}* was the firm name of a series of general partnerships registered in Paris starting from 1850 and formed through successive renewals, changes or re-foundations by the two principal partners Basile Parent and Pierre Schaken (AP, Paris). The liquidation phase of the last *Parent Schaken et C^{ie}* started in 1866 when Parent died. Information about the activities of this firm and its links with other Italian and foreign companies are scattered in a large bibliography (above all see Gille, 1968; Dumoulin, 1990; Cameron, 1961; Crouzet, 2000, pp. 299-334; Bonin, 2006; Stoskopf, 2009).

²⁸ Khanna and Yafeh, 2007, p. 331.

²⁹ Together with the same Belgian group and the Italian bankers Vincenzo Bolmida (Turin) and Oscar Meuricoffre (Naples), in 1862 (1 September 1862), the P&S promoted the Turin-based banking company *Società Generale Immobiliare per lavori di utilità pubblica e agricola* (SOGENE) aimed at property lending. The Italian Government did not authorize the foreign head office. (ACS, Rome)

firms differently surrounding this cluster (Graphs 1 and 2 Annex 2 – green nodes) and variously bound to the core partnership had a strategic role in the structuring of those relationships which had brought Basile Parent in Italy. The most important ones were the *Paris-Lyon-Méditerranée* (PLM) (1857) and the *Crédit industriel et commercial* (CIC) (1859) of which Parent was both a founder and a member of the Board of Directors (see Table 1 Annex 1). These two companies were the fundamental links on the Paris financial place, with the *vieille banque* and the *banque nouvelle*³⁰, respectively. The CIC allowed Parent to strengthen the pre-existing ties with the financial group (Morny-Donon-)Delahante, which was in its turn the link to gain a strategic position in the Tyrrhenian longitudinal railway project (suitable for the French “Mediterranean System”) through the links with Southern Italy³¹ and Roman railways (See Table 1 Annex 1). The PLM – bound to the international *haute banque* – was the investment which allowed Parent to tighten his relationships with the Geneva financial place and the banker Auguste Dassier, who – in 1862 – was one of the founders of CNG (see Table 1 Annex 1 and Graphs 1 and 2 Annex 2).

Thus, the Naples gas investment came from far away, from know-how and relationships structured and stratified during a long time. In the current reconstruction, the CNG was the accomplishment of a pre-existing and persisting interest in Southern Italy and it represented a strategic node to strengthen the P&S position within the Italian promising opportunities. At the same time it seemed to be the arrival point of a definite pattern which had led the P&S expertise towards a financial function. It partly functioned as a venture capitalist which – keeping locked the narrow edge of the parent partnership, with few partners variously bound to each other (family ties, business ties – see Graph 3 Annex 2)³² – raised finance to spin-off separately quoted new companies on main financial markets. For the specific single project of the CNG the P&S – which had obtained the Naples gas concession – had joined two Paris-based Swiss businessmen: Vincent Dubochet and Auguste Dassier (see Table 2).

Table 2 – Initial capital from the CNG Statute³³

“1) M. B. Parent en sa qualité d’un des gérants de la maison <i>Parent Schaken et C.ie</i> , actions	2.845
2) M. Auguste Dassier	600
3) M. Vincent Dubochet	600
4) MM. <i>Parent Schaken et C.ie</i> au termes de l’article 6 des présents statuts, pour paiement de la somme de 250.000 francs, entièrement libérées	500
5) les autres actions sont réservées à l’ancienne Compagnie Lyonnaise du Gaz de Naples, en paiement de la concession particulière de ses usines, terrains, canalisations, édifices, matériel, appareils, mobilier etc., aussitôt qu’elle en aura fait à la Compagnie anonyme le régulier abandon et cession et ces actions seront aussi entièrement libérées	455
TOTAL	5.000”

Source: Compagnie napolitaine d’éclairage et de chauffage par le gaz, Statuts, Paris, Imprimerie Centrale des Chemins de Fer de Napoléon Chaix et C.ie, 1863, art. 6 and 7

Vincent Dubochet, native of the Swiss Canton of Vaud, had been a pioneer in French gas industry: in 1837, he had been the founder of one of the six Paris gas companies, later merged into the *Parisienne du gaz* (1855)³⁴, closely bound to the Pereires’s *Crédit Mobilier*. Auguste Dassier, native

³⁰ Landes, 1956.

³¹ Collezione delle leggi e de' decreti reali del Regno delle Due Sicilie, *Decree n. 809, 28 aprile 1860*. The contractors were: Gustave Delahante; Raffaele De Ferrari Duca di Galliera, José de Slamanka, Paulin Talabot, Antoine Chatelus, Edward Blount, Basile Parent, Thomas Brassey e William Buddicom (Archivio Notarile di Napoli (Naples Notary Archive), Notary Pascarella, year 1860, v. 2, p. 889, 24 August 1860, n. rep. 649).

³² The partners of the Parent, Schaken et C.^{ie} (1859) were: Parent Basile (Belgian constructor); Schaken Pierre (Belgian Constructor); Blin Eugène (French landowner) – who was Parent’s brother-in-law and Schaken’s son-in-law; Lavaurs François Louis (French constructor); Borguet Henri (Belgian constructor) since the 40s Parent and Schaken’s business partner. (CARAN, Paris, Minutier Central; AP, Paris).

³³ The CNG’s initial capital was 2.5 million francs, in 5,000 shares, single nominal value 500 francs.

³⁴ Williot, 1999.

of Geneva, was one of the bankers of that particular branch of the Genevan Protestant *haute banque* that had turned from *fabrique* to *banque*. Particularly active in supporting industrial investments, partner of the Rothschilds' *Réunion financière* (1856), he was member of the Board of Directors of the *Parisienne du gaz* and was the President of the PLM, of which Basile Parent and Pierre Schaken were members as well³⁵. P&S, Dubochet and Dassier were therefore the three central nodes of the CNG management structure, in which three different groups were defined, generally articulated on family or business links (see Table 3 Annex 1 and Graph 3 Annex 2). The governance model mirrored the leading role of the Paris head office, strongly limiting the position of the host country actors who had a subordinate weight in the decision-making processes³⁶. Nevertheless, the local actors represented long-standing contacts to be established, suitable for the company activity. The small Neapolitan committee generally gathered strategic actors who were in turn nodes of other wide networks of relationships which enriched the cluster of participants that surrounded the CNG (see Graph 1 Annex 2). As an example, one refers to Giacomo de Martino, who had been the diplomatic link for the P&S to join the business of Southern Italy railways, in 1860; to Oscar Meuricoffre, a Swiss-Neapolitan banker who participated to the SOGENE's foundation and had important international links, among which Cahen d'Anvers; Luigi Balsamo who was bound to the Banca Nazionale (then, in 1894 the Banca d'Italia), the most important of the Italian issuing banks (see Graph 1 Annex 2).

This way, the CNG decision-making core was represented by the three major foreign groups who cooperated on different basic functions, by integrating their expertise for the exploitation of the gas business. The P&S group centralized the political function, aimed at forging relationships with local authorities and the financial function as well; while the group Dubochet/*Parisienne du gaz* principally managed the technical function cooperating with the Swiss engineer Daniel Colladon, member of the Dassier group (he had family ties with Dassier), who planned and supervised both the construction and the widening of the CNG plants. Up to 1866 this situation remained unchanged, as did the central role of the P&S. The monopolistic control of the local energy market – which the CNG wielded thanks to the 1862 concession contractual clauses³⁷ – was strengthened as the demand for modernization became greater and other cities needed to be illuminated. Between 1863 and 1865, the CNG – thanks to the P&S – obtained two other concessions for gas lighting in Salerno and Castellamare and this meant to enlarge its financial relationships³⁸. According to its role, the P&S – which normally functioned as the CNG treasury (i.e. dividend distribution, coupon payment and short-term loans) – exploited its important financial links with the *Banque de Bruxelles* (Brussels), the new-born *Crédit Lyonnais* (Lyon) and *Bonna et Cie* (Geneva) for the subscription and treasury service of the new CNG's bond issues (1863 and 1864).

³⁵ Paquier, forthcoming.

³⁶ According to the articles of the CNG's Statutes, only four (as a maximum number) local members (Neapolitan committee) could be part of the Board of Directors out of a maximum total of twelve members and the valid decisions were taken with only 5 positive votes. The day to day management in the host country was carried out by a general manager who was responsible for implementing the Board's decisions, ensuring the circulation of information between the head office and the Neapolitan committee.

³⁷ The concession contract for gas lighting, granted to the P&S in 1862 by the Naples local authorities, ensured a monopoly on the energy sector to the CNG. This was thanks to two specific clauses: 1) the exclusive right of laying underground pipes and 2) the pre-emption right on an eventual change towards a different lighting system in consequence of technological innovation. The monopoly was part of the guarantees which could accompany concession contracts in order to grant fixed capital, including interest, to be recovered through cash flows. Indeed, according to the concession system "à la française" (Bezançon, 2005; Wollmann H. and Marcou G. (eds.), 2010), the infrastructures property was maintained by the local authority, while the infrastructure construction and exploitation was granted to the contractors for a lapse of time which could allow capital recovery according to the tariffs established by the contract itself (by the tariffs levied on users).

³⁸ On this occasion, the CNG's capital was increased (1000 shares reserved to the existing shareholders) and new bonds – subsequent to the first issue in 1863 – were issued. In 1866 the stock capital amounted to 3 million francs and the debt capital to 3,465 million francs.

Notwithstanding, the strengthening of the CNG's position of control in the gas business in the local area did not correspond to a strengthening of the relationships with the Naples municipality. Some problems of opportunistic behaviour both of the CNG and some local political actors related to a problem of bound rationality of the public administration occurred, which were linked to the complex transaction of the 1862 long-term concession agreement (60 years). The CNG underwent a legal procedure in the charge of having extracted monopoly rents thanks to the "leonine pacts" included within the contract³⁹. The specific defendant was the General Manager Emile Hemery, bound to the P&S by family links, whose opportunistic behavior had been already blamed by some shareholders of the Dassier group who thought that he was "trop de l'école de Parent et Schaken". Furthermore they were persuaded that Basile Parent himself "connait bien un peu les défauts [d'Hemery] [...], mais [...], comme tous les grands spéculateurs n'est pas taché d'avoir un homme qu'il considère comme à lui et qu'il peut charger de beaucoup de millions"⁴⁰. This situation had to change in 1866 when Basile Parent suddenly died and the P&S was simultaneously put into a members' voluntary liquidation.

3. Investment slowdown and changing ties on the threshold of the electric power breakthrough (1866-1891)

Eighteen sixty-six ushered in a period of instability and a time of transformation arrived at several levels. The international situation was rapidly changing due to the 1866 financial crisis. As a consequence, a *flight-to-quality* effect occurred involving the Italian financial assets and the introduction of the regime of fiat money further struck at the heart of the Italian economy. Then, the 1870 French-Prussian War suddenly changed the international political references (the fall of Napoleon III and the German Unification). This changing international and national context, together with the deaths of Basile Parent in 1866 and Pierre Schaken in 1870, greatly affected the organizational dynamics of the business group clustered around the P&S, whose central node was definitely dissolved. New patterns and changing ties – passing through pre-existing ties – had now to be drawn, hence deeply transforming the network structure.

Graph 4 (Annex 2) gives a clear vision, as compared with Graph 1, of how this transformation took shape in the course of about 10 years. The dissolution of the core partnership meant that new funding to support those firms which were variously bound to it, including the CNG, had to be raised. The P&S functions shifted towards different financial institutions linked through pre-existing ties, and new big banks joined the network. The remaining partners of the P&S kept joined in the *Fives-Lille* which found the financial support of the *Société générale* – where Basile Parent had entered as of 1864. The *Société générale* got involved in the P&S integrated Spanish businesses of the *Chemin de Fer Ciudad Real Badajoz* and the *Mines de Belmez* (ex *Mines de Los Santos*), to which also the international banking houses *Mirabaud*, *Paccard et Cie* and *Cahen d'Anvers*⁴¹ were bound through credit ties. Parent's heirs, legally represented by Lebeuf de Montgermont (Parent's son-in-law), went on to support Philippe Vitali (the husband of Marie Orthense Finet who was a Parent's niece) in the reorganization of the railway construction business through the *Entreprise générale de chemins de fer et de travaux publics* which was supported and participated by the *Banque de Crédit et de Dépôt des Pays-Bas* and by the *Banque de Paris*, then Paribas (1872). On the Italian side, it was the financial reference for the former CIC-P&S' firms: the SOGENE and the *Banca di Credito Italiano* (this latter set up in 1863 for funding the Roman railways that appears as an isolate node⁴² – see Graph 4 Annex 2)⁴³. These latter two, were in turn participated by the *Credito Mobiliare Italiano*, which had been founded (1863) by Domenico Balduino to fund the Bastogi's

³⁹ Atti del Consiglio Comunale di Napoli, 1867, *Relazione sul contratto del 12 maggio 1862 per la illuminazione a gas*.

⁴⁰ BGE, Geneva, Colladon's private correspondence, Letter of Colladon to Raoul-Duval, 21 June 1863.

⁴¹ López Morell, 2005.

⁴² Negri, 1967.

⁴³ PARIBAS Historical Archive, Paris; ACS, Rome.

Società per le Strade Ferrate Meridionali (Southern Italy railways)⁴⁴. Finally, on the Naples place, the new-born investment bank *Banca Napoletana*, bound to the CNG through directorship ties (Antonio Cilento and Jean Auverny - see Graph 4 Annex 2) – had among its founders some Paribas' strategic actors (see Graph 4 Annex 2) thus reshaping the pre-existing ties on Paris financial place. Hence Paribas was going to become a strategic node for the future reshaping of the CNG's financial network.

The dissolution of the parental partnership, as above described, resulted in an internal reorganization of the CNG Board of Directors, in 1871. The Naples Committee was reduced from four to three members while a member was added to the Paris Board in order to allow the entrance of a member from Geneva “vu l'importance des intérêts représentés dans cette Ville”⁴⁵. Really, the link with the Genevan financial place had strengthened since 1865, when the *Compagnie genevoise de l'industrie du gaz* (IDG) – the holding company born in 1861 for international gas businesses and already operating on the Italian gas market in Lodi, Ravenna and Bologna – had got an equity stake of 10% in the CNG⁴⁶. The IDG had been created thanks to the cooperation of the major Genevan bankers, among whom the Hentschs – core actors of Paribas as well – in turn bound to the so-called “Ador pole”⁴⁷ who had family ties with August Dasser.

The reorganization of the CNG Board of Directors marked a change in the composition of the major groups: both the Dasser group and the group Dubochet/*Parisienne du gaz* increased to the detriment of the P&S group. This way, the CNG *governance* and the basic functions progressively moved towards the Swiss component of the firm, and Fernand Raoul-Duval, son-in-law of Auguste Dasser, and core node of the Swiss group after the Dasser's death (1862), became a central actor in this changing situation. He took over the political function marking an interruption in the P&S style, by trying to re-establish good relationships with the Naples local authorities, and had a strategic role with regard to the financial function, which had to become newly strategic when a business recovery phase occurred.

After about a ten-year period of investments slowdown, the need for raising finance for the CNG suddenly appeared as urgent when Naples' new neighbourhoods needed to be illuminated (1885) and much more when the monopoly on the local energy market was under the threat of the electricity competition. Actually, up to the return to convertibility (1881-83) after the LMU adjustment (1878), the CNG had managed its business not by increasing its capital but rather by resorting to strategic choices aimed at lowering costs, through more efficient industrial processes; reducing expenses, by blocking new investments if not strictly required by the concession contract; and making financial investments/operations. Only in 1886, after the CNG had obtained a new concession for new Naples neighbourhoods gas-lighting, thereby preserving its monopoly power, it resorted to capital markets by issuing new capital⁴⁸ which was immediately invested in new works.

But an effective sharp acceleration of the financial function was spurred on only by the advent of the electricity which could really jeopardize the CNG monopoly power on the local market. In this light, the links with the Swiss finance proved to be of critical importance for the company in choosing to enter the electricity sector, in 1891. The information advantage of Genevan high

⁴⁴ The *Società per le Strade Ferrate Meridionali*, already bound to the CNG since 1862 (see Graph 1 Annex 2), had been closely related to the P&S which had become, at the same time, its building contractor, bondholder and its legal agent at the Paris stock exchange (1864-70). This last function as a representative at the Paris stock-exchange, in 1870, went to the Banque de Paris during the P&S winding-up process (CAEF, Savigny-le-Temple).

⁴⁵ CNG Archive, Board meetings reports, 21 September 1868, 25 July, 10 October and 16 December 1871.

⁴⁶ Paquier, 1996. The IDG shareholding in the CNG can be traced in: *Rapport, assemblée générale de la Compagnie de l'industrie du gaz*, Genève, years 1865-93 (1865, 500 shares out of a total of 6000, 500 francs each; 1867, 715 shares out of a total of 6,000 shares, of 500 francs each; 1893, 2,944 shares out of a total of 24,000 shares of 250 lire).

⁴⁷ Perroux, 2003, pp. 171-173; Stoskopf, 2002.

⁴⁸ It was decided to double the CNG's capital up to 6 million lire by issuing 24,000 shares of 250 lire each. 12,000 shares (out of the total of 24,000) were issued to replace 6,000 early shares of 500 francs each (CNG Archive, Reports of general meetings, 22 September 1885).

finance on the future of energy sources, deriving from its international calibre, was fundamental in choosing to diversify investment in the field of electricity.

Indeed, within ten years, the technological development of electricity had brought⁴⁹ the competition within the energy sources to challenge gas lighting future, thus opening a period of strategy adaptation of the gas industry according to two possible options⁵⁰:

- the development of short-medium term commercial strategies aiming at exploiting plants till the concession contracts expired, paying attention both to lower costs and develop gas uses different from lighting and heating;
- the development of long-term strategies by entering the electricity sector for the integrated exploitation of the two sectors plants, in which the gas uses different from lighting could be combined with coke exploitation (the main by-product of the gas industry) in thermal plants for electricity production.

The CNG chose the latter one also thanks to the IDG, which had very early begun to invest in electricity since the 80s by participating the *Edison Suisse* and the Italian *Società piemontese di elettricità*. This choice entailed the realization of growing capital-intensive investments by operating through proper financial operations and tools in order to face the gradually increasing needs and the long-term strategic objectives. In this framework, the further strengthening of the Genevan bankers role within the CNG is explained.

On one hand, the Genevan financial place had emerged as an operative hub of the international *haute banque* since the French-Prussian war and – on the other hand – the financial expertise of the Genevan bankers progressively moved the financial function for access to capital markets ever more towards the Genevan bankers role within the CNG. This role was also consolidated thanks to their distinctive tradition of cooperation⁵¹ that gave rise to the *Union financière* (UF, 1890)⁵², founded by some of the most important Genevan banking houses such as Bonna et C^{ie}, Darier et C^{ie}, Hentsch et C^{ie}, Bordier et C^{ie}, which then would have been directly involved in the CNG financial operations.

4. Competition between energy sources and growing capital needs: towards stronger corporate ties (1891-1902)

It was on the monopoly of lighting supply, hold by the CNG, that the competition between energy sources took shape. The 1862 CNG's concession contract for Naples gas lighting provided for its monopoly power thanks to two clauses: the exclusive right of laying underground pipes and the pre-emption right on an eventual municipal choice of a different lighting system in consequence of technological innovation. The monopoly was part of the guarantees which could accompany infrastructures construction concession contracts, in order to grant immobilized capital recovery, including interests, through cash flows. Indeed, since infrastructure property was maintained by the grantor, the infrastructure management was granted to the contractor for a long lapse of time which could allow capital recovery before the contract expired, according to the tariffs established by the contract itself⁵³. This explains the central role of financial actors within the dynamics of a public-utility-project funding based on concession contracts (*à la française*). Therefore, on the basis of its concession contract, the CNG exercised its pre-emption rights when electricity competition became evident, in order to maintain the energy market control within the area where it acted.

The push to move towards the electricity sector was exogenous: it came from the competition within the private lighting sector after the contract that the Naples municipality had granted to the

⁴⁹ Giannetti, 1992.

⁵⁰ Paquier and Williot, 2005.

⁵¹ Cassis, 2008.

⁵² Cassis, 2008, pp. 83-85 and 142-146.

⁵³ Debande, 1997; Hautcœur and Romey, 2006.

Rome-based *Società generale per l'illuminazione* (SGI) (27 December 1890) for the electric lighting of some specific public buildings⁵⁴.

The CNG's strategy to defeat the competition was that of a hostile takeover of the SGI⁵⁵, a process which was slowed down, due to the 1893 Italian banking crisis, thereby entailing higher costs for the acquisition of the target company and a consequent strong financial effort for the CNG. The capital increase of 1891 (from 6 to 7.5 ml) was not sufficient to hurdle the problems for entering the new sector and new debt exposure to the Geneva financial place was necessary through:

1. a credit opening by Bonna et C^{ie}, which was the CNG agent in Geneva since its foundation and member of the *Union Financière*;
2. loans made by the IDG;
3. the new bonds issue in 1893;
4. a credit opening by the *Banque Genevoise de Prêts et Dépôts* (BGDP), which was a direct expression of the Genevan private bankers and cooperated with the *Union Financière*.

This entailed the further strengthening of the Swiss finance position within the CNG's Board. In 1892, Daniel Colladon gave up his post as a director to his nephew Gustave Ador, who was President of the Swiss State Council, the CEO (Chief Executive Officer) of the *Genevoise du gaz* and also one of the directors of the IDG. He immediately took over the political role of Raoul-Duval who died in the same year. At the same time, the composition of the Board of Directors was increased from 13 to 14 members in order to “augmenter la représentation des actionnaires genevois dans le Conseil” so allowing the entry of Edmond Aubert, a Swiss engineer with a strong expertise in electricity, already member of the Board of Directors of the IDG⁵⁶. This was “en raison des intérêts importants de la Place de Genève dans [les] affaires et du concours qu'elle [...] a constamment donné, particulièrement lors des derniers accroissements [du] capital social”⁵⁷. At the end of 1894, after having acquired the SGI majority stake (6.386 shares to 6.747 total shares), the CNG entrusted the controlled company to carry out the contract for the partial electric lighting of Naples that had been stipulated with the municipality on 27 November 1894⁵⁸.

At the same time, the SGI Board of Directors was completely reshaped by the CNG. Three members of the CNG's Board entered that of SGI – Victor Krafft, the CNG's General Director, Edmond Aubert, who represented Genevan interests and Robert Cabarrus who represented French interests – while the Neapolitan lawyer Maurizio Capuano was appointed as the CEO of the company⁵⁹. This way, all the strategic decisions for the SGI were taken within the Board of Directors of the CNG and then only formally confirmed by the SGI Board via Maurizio Capuano.

In March 1896, a new increase of capital was necessary in order to discharge the CNG short-term debts and thus preserve its reputation for repayment and its credit access on international capital markets. The 63% of the capital increase was placed on Geneva financial market⁶⁰ and resulted in a reshaping of the CNG's Board. Gustave Ador was appointed vice-President and Ernest Hentsch⁶¹ entered the Board⁶² thus meeting the “désirs très légitimes de nos actionnaires de Genève de voir

⁵⁴ CNG Archive, Board meetings reports, 10 September 1890. The Naples municipal administration had shown some interest in entering the electricity sector from the mid-1880s, but this interest was strongly hampered by the CNG (Bruno, 1987; de Majo, 1992).

⁵⁵ CNG Archive, Board's meetings reports, 24 May 1894. The SGI was a Rome-based company which, since 1888, had entered Neapolitan market, by incorporating the pre-existing *Società anonima cooperativa napoletana*. By acquiring the SGI's majority stake from the *Banca industriale e commerciale di Roma* (the most important shareholder of the SGI itself). Enel Archive, SGI, Reports of general meetings, 10 December 1888; Bruno, 1987.

⁵⁶ Paquier, 1996, pp. 163-64.

⁵⁷ CNG Archive, Reports of general meetings, 28 September 1892.

⁵⁸ CNG Archive, Board meetings reports 26 September 1894. The contract preserved the pre-emption right of the CNG on new contracts.

⁵⁹ CNG Archive, Board meetings reports, 25 April 1894; Segreto, 1992.

⁶⁰ CNG Archive, Board meetings reports, 29 April 1896.

⁶¹ Ernest Hentsch (1853-1921), son of Charles Hentsch, had become partner of the maison Hentsch et C^{ie} in 1878 and succeeded his father since 1902.

⁶² CNG Archive, Reports of general meetings, 23 September 1896.

augmenter dans le Conseil la représentation de leurs intérêts ” in the belief that “Hentsch par sa connaissance approfondie des affaires financières et industrielles et par la situation qu’occupe sa Maison sur la place de Geneva, nous apportera le concours le plus précieux”⁶³. Hentsch took the role of financial node and access point to the Geneva financial place in a duo with Paribas which, from 1897, unified its financial service of the CNG on Paris and Geneva.

During this first period of the approach to the electricity sector (1891-96), the cooperation between gas and electricity had allowed an integrated use of the profits thus ensuring the CNG would bear the high starting costs of the electricity business.

A new phase of sharper competition suddenly ignited in the new fields of tramway electric traction and hydroelectricity, also encouraged by the intent of the local authorities to undermine the CNG’s monopoly power, in order to realize lower prices in the energy supply. The Swiss group of the CNG prevented negotiations with outside groups: in regard to the electric traction sector, it hampered the possibility of a Belgian group (bound to the *Banque de Bruxelles*) from gaining access to the CNG shareholding and, at the same time, it rejected the German offers for hydroelectricity production and transport⁶⁴.

On 11 July 1898, the holding company *Franco-Suisse pour l’industrie électrique (Franco-Suisse)* was founded in Geneva thanks to the cooperation between the *Union Financière*, the *Bankverein Suisse*, the *Crédit Suisse*, *Paribas* and the *Banca Commerciale Italiana (Comit)*⁶⁵. It had directorship relations with the IDG and the CNG through the Swiss engineer Edmond Aubert and with the CNG and the *Union Financière* through the Swiss banker Ernest Hentsch. Since its very beginnings, the *Franco-Suisse* had to become one of the financial key nodes for the new CNG’s strategies. At the moment of the *Franco-Suisse* foundation, indeed, the CNG launched a wide range investment project, aimed at acquiring the monopoly both of electricity production and use, and beating any business competitor in that market. The CNG’s project provided for initially putting all the efforts into maintaining the control over the local area (Naples, Salerno and Castellamare) and for successively undertaking other business initiatives in Southern Italy, which was vice versa the specific interest of its financial partners. To realize its plan the CNG’s General Manager (Victor Krafft) was authorized to research and develop all forms of cooperation in whatever direction: agreements with tram and funicular companies, local railways, with German producers of electric equipment. For this purpose, a long-term financial plan was launched for 8.9 million lire, to be realized in two steps (1899-1901 and 1901-09), the first one of which, provided for issuing 10.000 new shares to be paid in gold coins. The shares were issued in 1899 and transferred to a selling syndicate represented by Hentsch et C^{ie}. This way, the Swiss bankers had definitely taken over the financial function within the CNG’s Board of Directors⁶⁶.

At the same time, the CNG together with the *Franco-Suisse*, the *Comit* and a Neapolitan group, founded the *Società Meridionale di Elettricità (SME)* (15 March 1899) for hydroelectric production. The CNG General Manager, Victor Krafft, and Maurizio Capuano, immediately entered the SME’s Board of Directors and the CNG underwrote 1/5 of the SME’s issued capital while demanding some clauses aimed at granting its pre-emption right on the use of the energy produced within the controlled local area⁶⁷. Once the abovementioned agreements with the CNG’s financial

⁶³ CAMT, Roubaix, CNG’s general meetings reports, 23 September 1896.

⁶⁴ CNG Archive, Board meetings reports, 29 May 1895, 27 November 1895, 28 April 1897, 9 March 1898.

⁶⁵ In 1898 the Comit - which had between its founders the Union Financière and the other Swiss banks which had formed the Franco-Suisse - opened a Naples branch; in 1899, in order to manage future important businesses, *Paribas* entered as a shareholder COMIT, and then – in 1900 – with the COMIT’s capital increase, became the COMIT’s major foreign partner (Confalonieri, 1980, pp. 213-16), after the end of the tariff war between France and Italy, when the trade agreement of 21 November 1898 was signed, re-establishing the trade relationships between the two countries. (Journal des Chemins de Fer, v. 58, Paribas General Meeting, 9 May 1899, pp. 361-62).

⁶⁶ The negotiations led by Lavaurs with a French financial group in Paris had no positive result (CNG Archive, Board meetings reports, from 29 March to 26 April 1899).

⁶⁷ CNG Archive, Board meetings reports, from August 1898 to March 1899. The SME had taken over a concession for exploiting of the water power of the Tusciano river (Salerno).

partners had been established, on November 1900, Ernst Hentsch could be replaced by the Swiss banker Barthélemy Bouvier. The last one belonged to the banking house Darier et C^{ie} - in turn associated to the *Union Financière* - and, starting from this moment, would have been the central actor for all the financial agreements on the Geneva financial place.

From 1900 on, the realization of the CNG's monopolistic plan was undermined by the creation of the *Società napoletana per le imprese elettriche* (SNIE) (11 November 1899), a Naples-based company through which a group of Piedmontese and Neapolitan bankers and businessmen, among whom Gaetano Pavoncelli, had entered the local electricity market thanks to a Prefect's authorization⁶⁸. This was thanks to a central preceding government measure (7 June 1894) aimed at fostering free competition in the energy sector, by giving Prefects the power to authorize the laying of electric distribution lines. The CNG's attempt to cooperate with the SNIE's Piedmontese shareholders at the moment of its creation, was unsuccessful due to the opposition exerted by the SNIE's Neapolitan shareholders⁶⁹. The SNIE's competition made the CNG's incomes to lower, so making very difficult to realize the second step of its monopolistic plan. The CNG growing financial commitments had to be faced by increasing short term debts: credit openings by the *Banque Genevoise de Prêts et Dépôts* and short-term loans by the IDG, *Comptoir d'escompte de Genève*, the *Banque fédérale de Genève* and by the French links with the *Società di Pennaroya, Cahen d'Anvers et C^{ie}* and *Mirabaud, Puerari et C^{ie}*. These loans were guaranteed through the deposit of the SGI shares and 3/4 monthly drafts. In 1902, the CNG's budgets were heavily burdened with a debt exposure for 3.8 million lire against credits for 5 million granted to the SGI.

The situation had to be recovered through a financial agreement which was elaborated in Geneva, on 9 July 1902, by the delegates both of the CNG and the *Franco-Suisse*. The agreement resulted in the creation of a new Geneva-based holding company: the *Société financière Italo-Suisse* (Italo-Suisse)⁷⁰, whose capital of 12.5 million francs was almost completely formed through a stock swap: the Italo-Suisse shares were exchanged for the SGI and SME's shares belonging to the CNG and for the SME's shares belonging to the *Franco-Suisse*. This was in view of the intended future merger of the SGI and the SME. This way the Italo-Suisse almost wholly owned both the SGI and the SME while the CNG had taken over the control of the *Italo-Suisse* (30,299 shares to a total of 50,000 shares) whose seven-member Board counted on four CNG's Directors: Denis Pérouse, Edmond Aubert, Raymond Lavours and Gustave Ador (see Graph 5 Annex 2 – which represents the CNG's network in 1903). Gustave Ador was also appointed as the *Italo-Suisse*'s President while Maurizio Capuano as the General Director in Naples. The *Italo-Suisse* creation allowed to immediately issue new loan capital for 12.5 million francs (equal to its initial capital)⁷¹. This complex financial operation resulted in a more effective organization model of the Naples energy business. The pyramidal ownership structure – which had been introduced thanks to the acquisition of the SGI – was now reshaped with the separation of the electricity business from that of gas⁷² (see Graph 6 Annex 2). The CNG – which kept the vertex position – managed to maintain the control of the new structure until 1914, by not opening the Italo-Suisse's shareholding.

⁶⁸ The SNIE was founded in 1899 thanks to investors from Turin and Naples.

⁶⁹ CNG Archive, Board meetings reports, 29 May 1901 and 26 June 1901.

⁷⁰ Paquier, 2001.

⁷¹ CNG Archive, Board meetings reports, 30 July 1902, 29 October 1902. The Italo-Suisse was founded on 29 September 1902.

⁷² This complex financial operation led the CNG to strongly lower its debt exposure (from 4.8 million to about 836,000 lire) in 1903, so making it possible for the CNG to comply with the requirements deriving from a new contract which had been negotiated with the Naples municipality on 5 April 1900. The new concession provided for widening electric lighting to the whole city of Naples and entailed that the CNG should expand its plants to meet demand for new calorific use of the gas. The validity of this contract, which had involved both the CNG and the SGI, was questioned, in 1900, by the parliamentary inquiry led by the senator Saredo which investigated malpractice in the Naples municipal administration. As a consequence, Krafft e Pérouse were questioned for monopolistic behaviour and bribery, and Krafft went away from its post as the CNG's General Manager and entered the Fives Lille and appointed as General Manager.

5. Separation between energy sources and inter-corporate shareholding strategy: the breaking of the CNG leadership (1903-20)

The creation of the *Italo-Suisse* made the control of financial decisions to move outside of the CNG's Board, as it results from the Board's meeting which only report votes on financial proposals developed elsewhere and regarding only gas businesses. From now on, the link between gas and electricity businesses for the CNG only survived in the yearly high dividend accruing from its controlling interest in the *Italo-Suisse*.

Nonetheless, even though the financial situation had been recovered, the problem of the increasing competition had to become ever more urgent in the following years. Both the public utilities municipalization law, in 1903, and the special law for Naples' industrialization in 1904 – which entrusted the municipality of the exploitation of the hydraulic power of the Volturno river – mounted a serious challenge to the CNG monopoly, while the increasing competition on electricity prices exerted by the SNIE, made the system incomes to lower. This serious threats led the CNG to reopening the negotiations with the SNIE, through the *Italo-Suisse*, in order to reach a cooperation agreement and take the “complete control of Naples electric lighting market”⁷³. The negotiations began in 1903 but an agreement was reached only six years later, in 1909, when – with the participation of COMIT – the SNIE was acquired through a stock swap acquisition by the SGI. The acquiring company increased its capital in order to replace the SNIE's retired shares⁷⁴. This way, the system was taking a progressively hierarchical-type structure: the *Italo-Suisse* maintained the control on the SGI and, through this last, took over the SNIE control. In the meantime, after the electric business had been transferred to the *Italo-Suisse*, the CNG focused its activities on the gas business and, in order to expand its plants to meet rising demand, it had to rapidly increase its short-term debts (more than 2 million lire on October 1906), which were consolidated, via a new bond issue (completely managed by Swiss financiers)⁷⁵ in 1909, after the 1907-crisis slowdown. This operation opened a new difficult period for the CNG due to the incertitude deriving from the Naples administration projects about the municipalization of gas supply. The threat was successfully bypassed thanks to the effective action of Gustave Ador and, on 9 January 1913, a new contract between Naples municipality and the CNG was established, giving rise to the construction of a new gas plant. At the same time, the *Italo-Suisse* started a recovery program for the electric companies. On September 1913, this program was explained within the Board of Directors of the CNG, which still was the *Italo-Suisse*'s majority shareholder. The plan – which finally involved the SME – provided for a new stock swap to be realized through new SME's shares to be issued and exchanged with the SGI's shares belonging to the *Italo-Suisse*; part of this new SME's issue was directed to pay *Italo-Suisse* credit granted to the SME. Hence, the pyramidal ownership structure was reshaped as follows: the SME had taken over the control of the SGI which, in its turn, had acquired the control of the SNIE. So the two local distribution firms (SGI and SNIE) were now controlled by the higher rank production firm (SME) which still remained under the control of *Italo-Suisse* notwithstanding its wide network of variously linked companies (see Graph 7 Annex 2).

The plan of increasing SME's capital was realized in 1914 and it provided for widening the company's activities both on provincial and regional scale through forming new alliances.

Really, the CNG neither took a stake in the SME's capital increase nor in the *Italo-Suisse*'s twin operation (1914)⁷⁶. Particularly, the *Italo-Suisse*'s capital increase (30,000 shares) was subscribed

⁷³ Confalonieri, 1980, p. 216.

⁷⁴ Confalonieri, 1982, pp. 337-339.

⁷⁵ CNG Archive, Board meetings reports of different dates between 1906 and 1909.

⁷⁶ Since the SME's foundation, the CNG took part to its capital having «pour but principal de protéger son exploitation d'électricité à Naples contre les concurrences dont pourrait la menacer l'utilisation, en dehors d'elle, des forces du Tusciano». CNG Archive, Board meetings reports, 30 May 1900.

for 2/3 by the *Motor*⁷⁷ and for 1/3 by the Franco-Suisse, thus entailing a dilution of the CNG position as a shareholder.

This choice, aimed at concentrating its efforts on the Naples area for the construction of the new gas plants, had no positive results. At that moment, the outbreak of the WW1 entailed many difficulties in coal supply and determined a sharp price increase both of coal and freight with consequent irreversible losses for CNG which hovered on the brink of default. This situation made difficult for the CNG to accede to raise new finance. The financial support on the Geneva place was indeed granted at increasing costs: the condition for further loans entailed the deposit of the Italo-Suisse's shares owned by the company as a guarantee both for its short-term loans and for a new special loan, negotiated by Bouvier in Geneva, and represented by ten-year cash bonds 6% (1915). As a further security on this last special loan, a pre-emption right on the CNG's new share issues was added. This way, the CNG had to give up its persisting and basic choice to reserve new share issues to its own shareholders⁷⁸. As a consequence of all these events, between 1915 and 1919, the Swiss component definitely prevailed within the CNG's Board of Directors (see Graph 8 Annex 2 – the Swiss component increased to five members out of a total of nine)⁷⁹ and a strategy had to be devised in Geneva for new short-term debts the most part of which were burdened on the *Banque de dépôts et crédit*⁸⁰ (2 million francs) and for a smaller part on the *Banque fédérale* and the *Comptoir d'escompte de Genève* (where René Hentsch, son of Ernest, was one of the Directors). Notwithstanding, the CNG financial conditions together with losses forecasts did not make possible to pay out dividends as from 1915. One year later, new losses for 5 million lire (also due to the difficulties of the Italo-Suisse) entailed that the CNG suspended its bond amortization⁸¹ and increased its debt exposure with COMIT and the Banco di Napoli on the Italian financial market. The only commitment that it continued to service was that of the cash bonds 6% which had been guaranteed by a pre-emption right of payment. In 1918, due to this catastrophic situation – further worsened by the Italian lira's sharp devaluation (50%) – the *Banque fédérale* did not renew its credits to the CNG which rapidly headed towards both insolvency and a serious risk of entering a liquidation process⁸².

In the post-WW1 period, a solution for the CNG's financial problems was arranged in Geneva but it fatally led the company towards a definite loss of autonomy. The company's bailout was decided in 1919 and provided for a new financial arrangement based on another stock swap which led the CNG from the top to the bottom of the pyramidal ownership structure. The SME's new shares (deriving from a new capital increase to be realized by 1924) had to be exchanged with 36,300 (out of a total of 46,000 shares) CNG's shares⁸³ held by the French (about 3.000 shares) and the Swiss shareholders (about 33,300 shares) so that the SME could become the CNG's controlling shareholder. This operation assured the SME's Directors “plus des ¾ du capital social ce qui nous [SME] permettra de faire prendre à l'Assemblée toutes les décisions que nous [SME] jugerons

⁷⁷ Segreto, 1994.

⁷⁸ CNG Archive, Board meetings reports, 16 July 1915 and 29 September 1915; CAMT, Roubaix, *Bulletin financier Suisse*, 25 September 1915.

⁷⁹ Between 1915 and 1917, there were some changes in the Board's composition. On 16 July 1915, Pierre Bordier entered to succeed to Arthur Pernolet (died in 1915) and, on 23 August 1915, Jean Mirabaud entered to succeed to De Siervo (died in 1913). Two years later, in 1917, Gustave Ador went away from the Board of Directors after having been appointed as a member of the Swiss Federal Council. Finally, in the same year, the CNG's General Director since 1905, the Swiss engineer Louis Chavannes entered the Board to succeed to René Raoul-Duval died during the WW1.

⁸⁰ The *Banque de dépôts et crédit* was founded in 1902 through the transformation of the *Banque Genevoise de Prêts et Dépôts*, promoted by the Franco-Suisse, Union Financière, Paribas and other financial partners of Franco-Suisse, in order to raise finance for the development of “certaines sociétés formées sous Vos [Franco-Suisse] auspices”. CAMT, Roubaix, Franco-Suisse's General Meeting Reports, 18 October 1902.

⁸¹ CNG Archive, Reports of general meetings 12 October 1916.

⁸² CNG Archive, Reports of general meetings, 27 November 1918.

⁸³ The terms and conditions for the exchange provided for 3 CNG's shares vs 2 SME's shares (ASEN, Copialettere Capuano, letters between 28 September 1918 and 12 December 1920).

utiles”⁸⁴. This financial agreement was kept hidden. It was decided to call a CNG extraordinary general meeting on 31 January 1920, aimed at giving a short and elusive information to the minority shareholders about the outright resignations of the Board of Directors due to the acquisition of the CNG’s majority stake by a “gruppo italiano innominato”⁸⁵ (undefined Italian group)⁸⁶. It was also decided that the new CNG’s Board would have been reshaped with “éléments sûrs [...] qui n’ébruitent pas la part que la Meridionale [SME] prend dans l’affaire”⁸⁷; it would have been formed by nine members among whom the Swiss bankers Bouvier, Mirabaud e Bordier – to protect Swiss creditors’ interests – and six Italian members to be completely chosen by Maurizio Capuano⁸⁸ (see Graph 8 Annex 2). Since January 1920, therefore, the CNG’s governance moved to the SME even if the accomplishment of the financial operation was realized with the 1924 SME’s capital increase, which also meant that the CNG’s French group was completely excluded from the Naples energy business. This way the SME had become the top of local hierarchical firm structure, enhancing its financial function, as testified by its budgets – from 1915-1921 – where the value of its financial portfolio strongly exceeded the value of its fixed assets⁸⁹.

After a long series of financial operations generally consisting in stock swaps, therefore, the interconnections between the firms had deeply changed its nature, becoming stronger than before, when they were essentially based on “relations personnelles”⁹⁰ between their directors. A scheme of nested firms similar to “Russian Dolls” (or Chinese Boxes as well) well depicts the architecture of the system which the Swiss finance had managed to realize via the Italo-Suisse and the SME, this way achieving the monopolistic control of the Naples energy market at the beginning of the 20th century.

Short conclusion

After Italian political unification, the projects for modern urban infrastructures were a crucial challenge to a country lacking both capital and technological resources. The weakness in capital supply and local entrepreneurship led international groups to make investments themselves in order to grasp the numerous profitable opportunities that the new context was opening up. Naples – which had lost its role of capital city and was experiencing the transition towards the *networked city* model – became a pole for broad-ranging investments, beginning from basic public utilities, thus fully entering the wave of financial market openness spreading out from the *core area* of European industrialization.

From a general standpoint, the paper addresses the issue of the long-lasting relationships between a peripheral market, such as Italy and particularly the Mezzogiorno – having problems of underdevelopment and monetary instability (currency inconvertibility, failure of LMU, WWI currency devaluation, etc.) – and the core countries which foreign capital came from. The financial know-how of the foreign investors, their cross relationships, their elasticity in adjusting the financial tools according to the changing dynamics of local and international monetary and financial markets, have been here analyzed through the complex affair of the CNG, which lay on the

⁸⁴ ASEN, Copialettere Capuano, letter of 19 January 1920.

⁸⁵ Ibidem.

⁸⁶ «Cette solution est certainement à préférer sous tous les rapports. Elle a le grand avantage de sanctionner par une réunion solennelle d’Assemblée les changements portés à l’affaire et le procès verbal relatif pourra si nécessaire être communiqué aux tiers. Je comprends que c’est un petit ennui pour les anciens Administrateurs de remplir encore cette formalité, mais j’y vois le seul moyen d’entrer officiellement et ouvertement dans la nouvelle vie de la *Compagnie*» (ASEN, Copialettere Capuano, letter of 23 December 1919)

⁸⁷ ASEN, Copialettere Capuano, letter of 23 December 1919.

⁸⁸ Ibidem.

⁸⁹ De Benedetti, 2006, p. 38

⁹⁰ ASEN, Sme, Segreteria Cenzato, Note n. 71 to the SME’s Committee, 9 December 1921. Still in 1924 the Swiss group maintained the SME’s control. Ivi, *Procès verbal de la réunion des principaux intéressés de la Place de Genève à la Compagnie Napolitaine du gaz et à la Société Méridionale d’électricité*, 9 January 1924.

technological and financial crossroads between gas and electricity in Naples. In this light, the financial perspective of analysis is justified.

Through this specific perspective, the paper emphasizes the financial expertise of the foreign investors in seizing the local energy market control in behalf of making profits, encouraged by municipal-authority-granted monopoly through the concession contracts. The persisting monopoly over Naples' lighting provision by the CNG – even during a period when other Italian municipalities headed towards urban-public-utilities municipalization – remarks, even not specifically touched upon in the present work, problems of agency in behalf of the financial system organized around the foreign investors in a weak institutional environment where monopoly rents could be extracted.

Making use of the basic tools of the network analysis, the reconstruction of the financial function which was structured inside and around the CNG, has highlighted the changing dynamics of a public-utility-project funding during the time. Starting from the beginnings of financial integration, when interpersonal relationships played a crucial role to access to finance, to arrive at the institutionalization of credit – passing through the key turning-point of the 2nd Industrial Revolution – the paper reconstructs the transition from gas to electricity in Naples, as a transition from weak to strong corporate ties according to the evolutionary trends of the international financial markets. The more institutionalized the nature of credit, the more important inter-corporate shareholdings (firm-firm ties) became in any case bound to persistent existing personal ties (actor-actor ties) across time. The network graphs, based on IFESMez dataset, clearly depict these steps: from the business group clustered around the *Parent Schaken et C.ie* to the pyramidal ownership structure of the gas-electricity firms, consisting of a system reminiscent of a nest of Chinese Boxes. The stock swap strategy implemented by the cooperative system of the Genevan high finance/*banque d'affaire* was a progressive rationalization of the business forms addressed to cutting competition in the local energy sector, through merging the operating companies which became part of a structured group, which the clusters of actors continued to be part of. This strategy resulted in the construction of a pyramidal structure of ownership realized by aggregating partners in the lower-standing firms (e.g. COMIT in the SNIE's acquisition) and by co-opting the competitor groups onto the firm system. This strategy allowed Swiss finance to expand the firm system always maintaining the same decision-making power through the control of the company at the helm of the cascade from one time to the next.

At a more general level, one can observe that the SNA used in a dynamic perspective – allowing an overall view of the actors long-term relationships as vehicles of long-term relationships between firms (Paribas- Credito Mobiliare Italiano, Paribas-Fives Lille which could be supposed to have originated the Paribas interest in Southern Italy electricity business) – emphasize the critical role of secondary/marginal network nodes (as the P&S), as well. This approach strongly supports the analytic research perspective of the “return of actors” and further supports the firm to be studied less as a “clear-cut entity” and much more as an entity hooked-up to a wider context of inter-firm and inter-actors strategies.

ANNEX 1

TABLES

Table 1 - Partial overview of the diversified businesses/firms, promoted or variously bound to the P&S

Firms	Sector of activity	Type of contract	Headquarters	Year	Founders/Directors (the only ones who are functional to understanding the P&S network)
Compagnie du Chemin de Fer du Nord	Railways	Joint-stock Company	Paris	1845	Dassier Auguste, de Rothschild frères, Delahante Boykette et Cie, Ferrari duc de Galliera, Gabriel Odier et Cie, Hottinguer et Cie, Laffitte Blount et Cie, Mallet Louis Jules, Parent Basile , Pereire Emile
Compagnie du chemin de fer de Paris à Lyon	Railways	Joint-stock Company	Paris	1846	Baring brothers & C, Bartholony frères, Dassier Auguste, de Rothschild frères, Delahante Boykette et Cie, Ferrari duc de Galliera, Gabriel Odier et Cie, Hottinguer et Cie, Laffitte Blount et Cie, Lebeuf Louis Martin (Lebeuf de Montgermont's father), Paccard Dufour et Cie, Parent Schaken et Cie , Pereire Isaac
Compagnie des chemins de fer de Lyon à Avignon	Railways	Joint-stock Company	Paris	1852	Blount Edward, Brassey-Peto-Betts, Parent Schaken et Cie , Schneider et Cie, Talabot Paulin
Chemin de fer de Cordoue à Seville	Railways	Joint-stock Company	Paris	1853	Manby Édouard, Parent Basile , Talabot Paulin
Compagnie du chemin de fer Grand-Central de France	Railways	Joint-stock Company	Paris	1854	Chatelus Benoit Charles Antoine, Daru Paul, de Morny Charles, Delahante Adrien, Delahante Gustave, Donon Aubry Gautier et Cie, Ferrari duc de Galliera Raffele, Fould et Fould Oppenheim, Parent Schaken et Cie , Pereire frères, Société générale du Crédit mobilier
Chemin de fer de Lyon à Genève	Railways	Joint-stock Company	Paris	1854	Bartholony François, Blount Edward, Kohler Christian, Parent Schaken et Cie
Compagnie des chemins de fer de l'Est	Railways	Joint-stock Company	Paris	1855	Dubochet Vincent, de Rothschild James, Ferrari duc de Galliera, Parent Schaken et Cie , Pereire Emile
Compagnie du chemin de fer de Cordoue à Séville	Railways	Joint-stock Company	Madrid/Paris	1857	duc Decazes, Laffitte Charles, Parent Schaken et Cie , Pereire Eugène, Pereire Isaac
Compagnie du chemin de fer Paris-Lyon-Méditerranée-PLM	Railways	Joint-stock Company	Paris	1857	Bartholony François, Benoist d'Azy, Blount Edward, Dassier Auguste, de Rothschild James, Ferrari duca di Galliera, Hottinguer Jean Henry, Mallet Charles, Parent Basile , Pereire Isaac, Schaken Pierre
Compagnie Centrale pour la construction et l'Entretien de Matériel de Chemins de Fer	Railway equipment	Joint-stock Company	Brussels	1858	Oppenheim Joseph, Schaken Pierre
Société Générale de Crédit Industriel et Commercial (CIC)	Bank	Joint-stock Company	Paris	1859	de la Bouillerie Joseph Marie, De Morny Charles, Dehaynin Gabriel, Delahante Fernand, Delahante Gustave, Donon Armand, Lichtlin Edouard, Parent Basile , Rostand Albert
Mines de los Santos (then Belmez)	Mines	Joint-stock Company	--	1862	Parent Schaken et Cie (buyers)

Concessione rete di ferrovie da Napoli al Mare Adriatico-Regno Due Sicilie	Railways	Concession contract	Naples	1860	Blount Edward, Brassey Thomas, Chatelus Benoit Charles Antoine, Delahante Gustave, Ferrari duc de Galliera, <u>Parent Schaken et Cie</u> , Salamanca José, Talabot Paulin
Concessione rete di ferrovie da Napoli al Mare Adriatico-Regno d'Italia	Railways	Concession contract	Turin	1861	Blount Edward, Brassey Thomas, Buddicom William Burber, Chatelus Benoit Charles Antoine, Delahante Gustave, Ferrari duc de Galliera, <u>Parent Schaken et Cie</u> , Salamanca José, Talabot Paulin
Parent Schaken Caillet et Cie	Mechanical industry	General partnership	Paris, Place Vendôme 12	1861	Blin Eugène, Boisacq Alexandre Prosper, Borguet Henri fils, Caillet Ferdinand Louis Felix, Chèvremont Henry, Delahante Fernand, Delahante Gustave, des Roys marquis Ernest Gabriel, Houel Jules-César, Lavaurs François Louis, Lebeuf de Montgermont Adrien Louis, <u>Parent Schaken et Cie</u>
Compagnie du chemin de fer de Cordoue à Malaga	Railways	Joint-stock Company	Malaga/Paris, Place Vendôme 12	1861	Cail Jean François, Lavaurs François Louis, Lebeuf de Montgermont Adrien Louis, <u>Parent Schaken et Cie</u> , Stevens Oscar, Vitali Philippe
Compagnie du chemin de fer de Ciudad Réal à Badajoz	Railways	Joint-stock Company	Madrid/Paris, Place Vendôme 12	1861	Blin Eugene, Blount Edward, duc Decazes, Lavaurs François Louis, Lebeuf de Montgermont Adrien Louis, <u>Parent Schaken et Cie</u>
Società generale immobiliare di lavori di utilità pubblica e agricola (SOGENE)	“Travaux publics“	Joint-stock Company	Turin	1862	Blin Eugene Meuricoffre Oscar, Bolmida Vincenzo, Briganti Bellini Bellino, Cahen d'Anvers Joseph Edouard, De Lannoy Jean Edouard, Getti Adolphe, Lavaurs François Louis, <u>Parent Basile</u> , Oppenheim Joseph, <u>Schaken Pierre</u>
Compagnie Napolitaine d'éclairage et de chauffage par le gaz (CNG)	Gasworks/gas heating - lighting	Joint-stock Company	Naples/Paris, Place Vendôme 12	1862	Balsamo Luigi, Dassier Auguste, de Boissieu Alphonse, de Gayffier Eugène Josef, de Martino Giacomo, Dubochet Vincent, duc Decazes, Hemery Emile, Lavaurs François Louis, Lebeuf de Montgermont Adrien Louis, Martino del Tufo Mario, Meuricoffre Oscar, <u>Parent Schaken et Cie</u> , Raoul Duval Fernand
Société générale des chemins de fer romains	Railways	Joint-stock Company	Rome	1862	Benoist d'Azy Denys, Briganti Bellini Bellino, Chatelus Benoit Charles Antoine, Daru Paul, de la Bouillierie Joseph Marie, de la Ferronay Charles, de Martino Giacomo, Delahante Fernand, Delahante Gustave, Lebeuf de Montgermont Adrien Louis, Lichtlin Edouard, Mires Jules, <u>Parent Schaken et Cie</u> , Salamanca José
Vitali Charles Picard et Cie 1862	“Travaux publics“	"Société en commandite"	Paris, Place Vendôme 12	1862	Charles Joseph Sébastien, <u>Parent Schaken et Cie</u> , Picard Firmin, Stevens Oscar, Vitali Philippe
Compagnie Générale de Chauffage et d'éclairage par le gaz Gaz belge	Gasworks/gas heating - lighting	Joint-stock Company	Brussels	1862	Errera Jacques, Oppenheim Joseph, Reinach Adolphe, <u>Schaken Pierre</u>

Compagnie de l'Ouest des chemins Suisses	Railways	Joint-stock Company	Lausanne	1863	Aubert Louis, Blin Eugène, Bonna Isaac, Dubochet Vincent, Lavaurs François Louis, Lebeuf de Montgermont Adrien Louis, Odier James, <u>Parent Schaken et Cie</u> , Pereire Emile, Pereire Eugène
Compagnie du chemin de fer direct de Bruxelles à Lille à Calais	Railways	Joint-stock Company	Brussels	1863	Blin Eugène, Oppenheim Joseph, <u>Schaken Pierre</u>
Società italiana Strade ferrate Meridionali	Railways	Joint-stock Company	Turin	1864	Balduino Domenico, Bastogi Pietro, Belinzaghi Giulio, Bombrini Carlo, Carlo de Fernex et C., Cassa del Commercio e dell'Industria (then Credito Mobiliare Italiano) , Cavajani Oneto et C., De la Rue et C., <u>Parent Schaken et Cie</u> , Ulrich et C., Weil Weiss Ignazio, Zaccaria Pisa
Banca di Credito Italiano	Banca	Joint-stock Company	Turin	1864	Aubry Felix, Blin Eugène, Bolmida frères, Briganti Bellini Bellino, Chatelus Benoit Charles Antoine, Daru Paul, de la Ferronay Charles, Dehaynin Gabriel, Delahante Gustave, Donon Armand, Donon Aubry Gautier et Cie, Emery Louis, Filangieri Giovanni, Getti Adolphe, Gladstone William, Lavaurs François Louis, Levi Felice e C, Lichtlin Édouard, <u>Parent Basile</u> , Roberti Jean Albert, Rostand Albert, Sautter frères
Société Générale (pour Favoriser le Développement du Commerce et de l'Industrie en France)	Bank	Joint-stock Company	Paris	1864	Arlès Dufour François Barthélemy, Bartholony Jean François, Benoist d'Azy Denys, Bischoffsheim Jonathan Raphaël, Bischoffsheim Louis Raphaël, Blount Edward, Brassey Thomas, Buddicom William Burber, Cahen d'Anvers Meyer Joseph, Daru Paul, Dubochet Vincent, Hentsch Isaac Edouard, Mirabaud Henry Louis, <u>Parent Basile</u> , Pinard Alphonse Louis, Schneider Joseph Eugène, Talabot Paulin
Compagnie de Fives Lille	Mechanical industry	“Société à responsabilité limitée”	Paris, Place Vendôme 12	1865	Blin Eugène, Boisaq Alexandre, Borguet Henri, Caillet Ferdinand Louis Félix , Chevremont Henry, Des Roys Ernest, Houel Jules Cèsar, Lavaurs François Louis, Lebeuf de Montgermont Adrien, <u>Parent Schaken et Cie</u>
Parent Schaken et Cie dissolution				1866-90	

Source. www.ifesmez.unina.it

Table 3 – Board of Directors of the CNG. 1862-19

Directors	Nationality	Profession	Role	Length of role
P&S GROUP				
Parent Basile	Belgian	Entrepreneur	P	1862-66
Borguet Henry	Belgian	Entrepreneur	D	1863-70
Lebœuf de Montgermont Andrien	French	Landowner	D	1862-76
Lavaurs François	French	Entrepreneur	VP/P	1862-84
Lavaurs Eugène	French	Landowner	D	1866-89
Lavaurs Raymond	French	Businessman	D/VP	1885-1919
Bertrand-Geslin Lucien	French	Landowner/businessman	D	1891-1902
Hemery Emile	French	Entrepreneur	GM	1862-1881
Krafft Victor	German	Engineer	GM/D	1881-94; 1894-1901
DUBOCHET GROUP				
Dubochet Vincent	Swiss	Entrepreneur	D/P	1862-77
De Gayffier Jules	French	Engineer	D	1862-71
Pernolet Nicholas	French	Engineer	D	1871-88
Guichard Jules	French	Politician/Businessman	D/CEO/VP/P	1872-95
Camus Emile	French	Engineer	D/CEO/P	1875-1908
Cabarrus Robert	French	Public Officer	D/CEO	1878-1903
Pérouse Denis	French	Engineer	D/P	1887-1919
De Gayffier Eugène	French	Public Officer	D	1887-1908
Pernolet Arthur	French	Engineer	D	1888-1915
Guichard Robert	French	Businessman	D	1896-1919
DASSIER GROUP				
Dassier Auguste	Swiss	Banker	D	1862
Raoul-Duval Fernand	French	Engineer	D/VP/P	1862-92
Duc Decazes Louis-Charles	French	Mining entrepreneur and Statesman	D	1862-68; 1884-86
Colladon Jean Daniel	Swiss	Engineer	D	1869-92
Comte Edmond	French	Employer	D/CEO	1870-84
Raoul-Duval René	French	Engineer	D	1889-1915
Ador Gustave	Swiss	Banker and Statesman	D/VP	1892-1917
Aubert Edmond	Swiss	Engineer	D	1892-1919
Hentsch Ernest	Swiss	Banker	D	1896-1900
Bouvier Barthélemy	Swiss	Banker	D	1900-20
Mirabaud Jean	Swiss	Banker	D	1915-20
Bordier Pierre	Swiss	Banker	D	1915-20
Chavanne Louis	Swiss	Engineer	GM	1917-19
EX COMPAGNIE POUCHAINE				
De Boissieu Alphonse	French	Landowner	D	1862-88
NEAPOLITAN COMMITTEE				
Meuricoffre Oscar	Swiss-Neapolitan	Banker	D	1862-69
De Martino Giacomo	Neapolitan	Statesman	VP	1862-70
Matino del Tufo Mario	Neapolitan		D/VP	1862-85
Balsamo Luigi	Neapolitan	Merchant	D/VP	1862-73
Auverny Jean	Swiss-Neapolitan	Banker	D	1873-74
Cilento Antonio	Neapolitan	Merchant	D/VP	1870-90
Persico Leopoldo	Neapolitan	Lawyer	D/VP	1876-96
Cacace Giulio	Neapolitan	-	D	1886-91
De Siervo Fedele	Neapolitan	Statesman	D	1891-1913

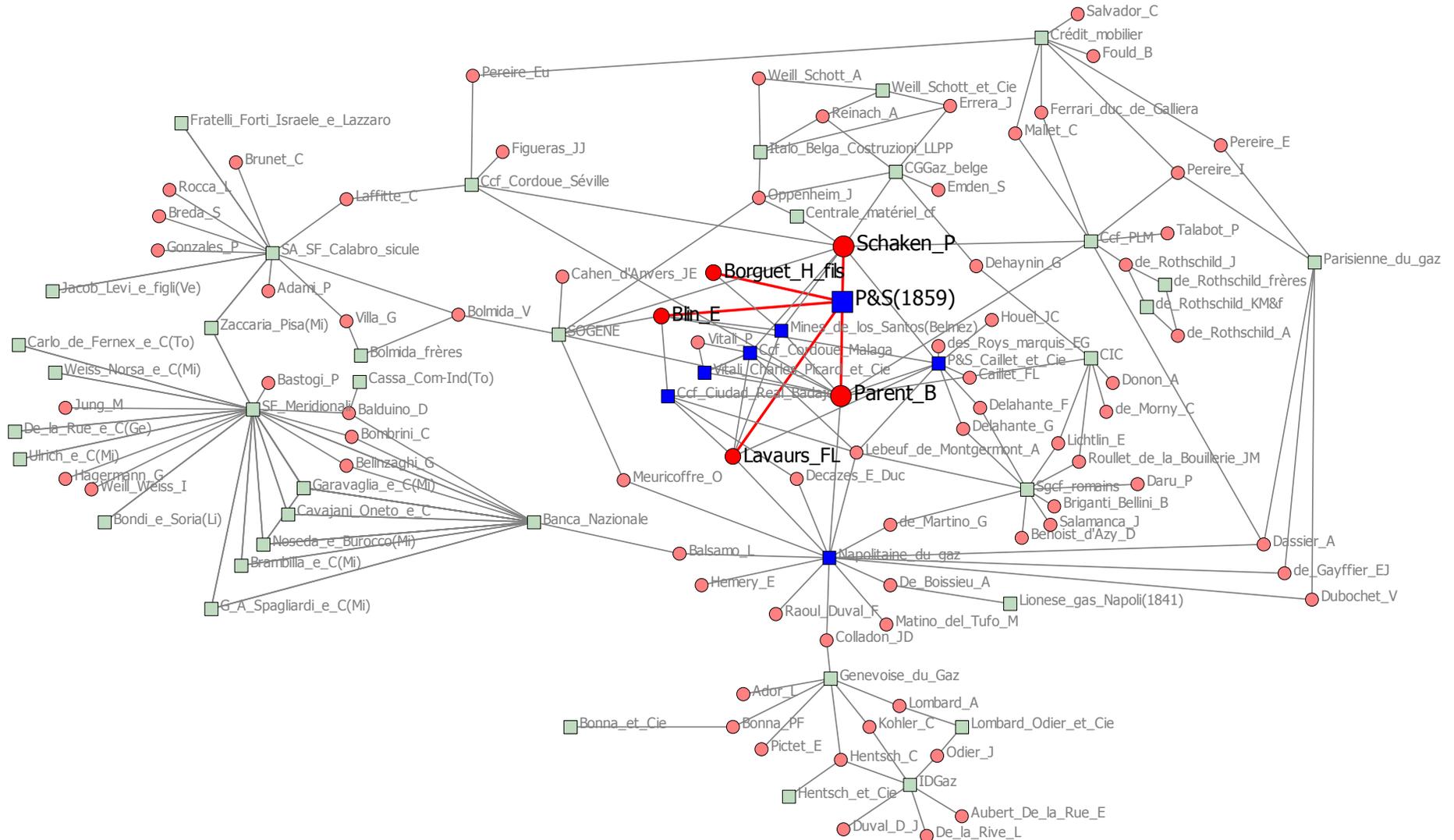
Source. www.ifesmez.unina.it

Note. (D = Director ; P = President ; VP = Vice-President ; CEO = Chief Chief Executive Officer; GM = (local) General Manager)

ANNEX 2

GRAPHS

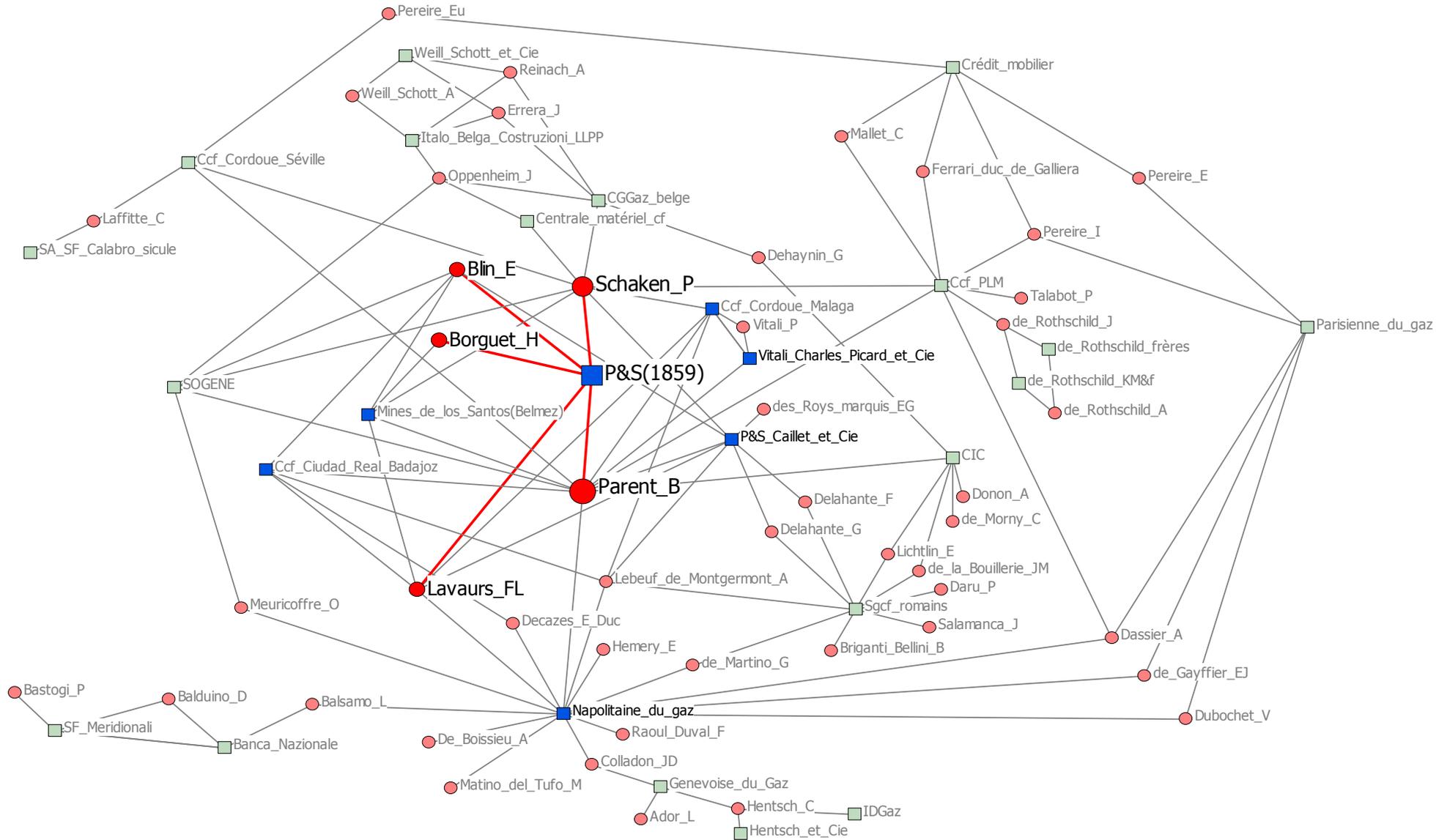
GRAPH 1 – CNG's actor/firm network – 1862



Source. Database IFESMEZ, www.ifesmez.unina.it

Note. 2 mode network - visualization of sets of relations connecting actors and firms (actor/firm matrix). Blue nodes: Firms with the administrative headquarters in Paris, at the P&S's legal domicile, 12 Place Vendôme. Red links: P&S's partners.

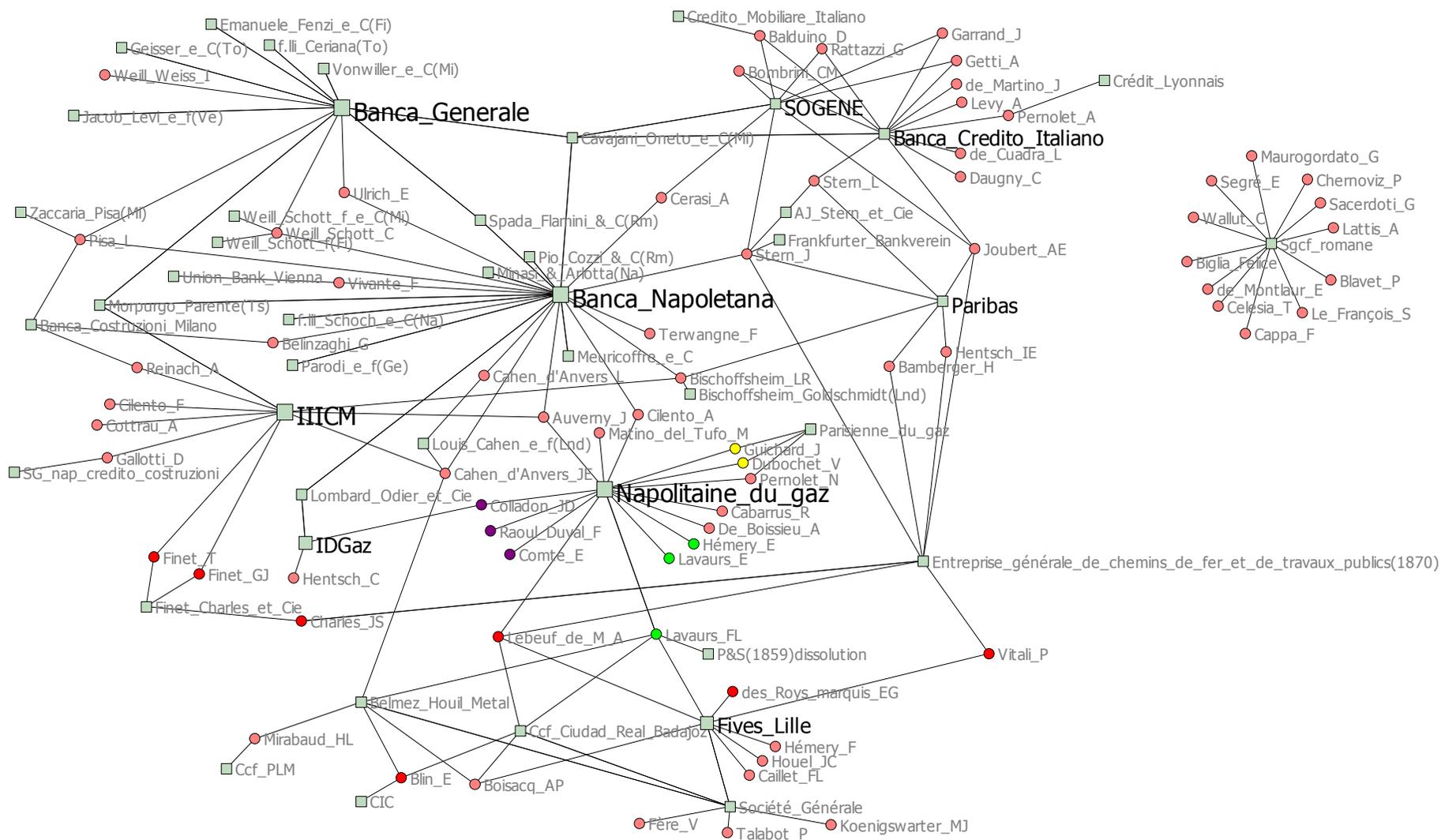
GRAPH 2 – Detail of Graph 1 – CNG's actor/firm network – 1862



Source. Database IFESMEZ, www.ifesmez.unina.it

Note. P&S's core network (see Graph 1). Blue nodes: Firms with the administrative headquarters in Paris, at the P&S's legal domicile, 12 Place Vendôme. Red links: P&S's partners

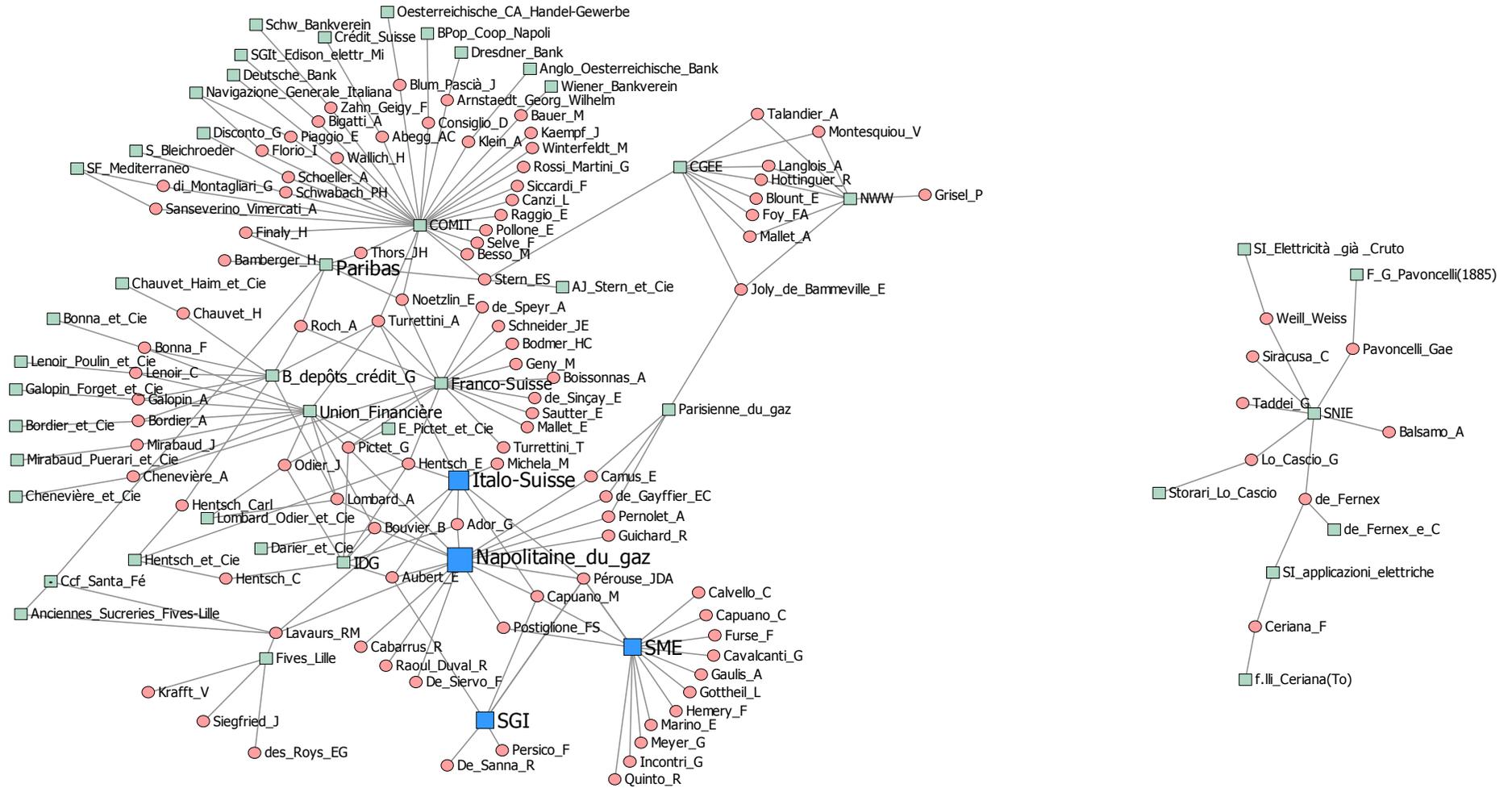
GRAPH 4 – CNG's actor/firm network – 1874



Source. Database IFESMEZ, www.ifesmez.unina.it

Note. 2 mode network - visualization of sets of relations connecting actors and firms (actor/firm matrix). Yellow nodes: Dubochet's family ties; green nodes: Lavaurs' family ties; violet nodes: Dassier's family ties.

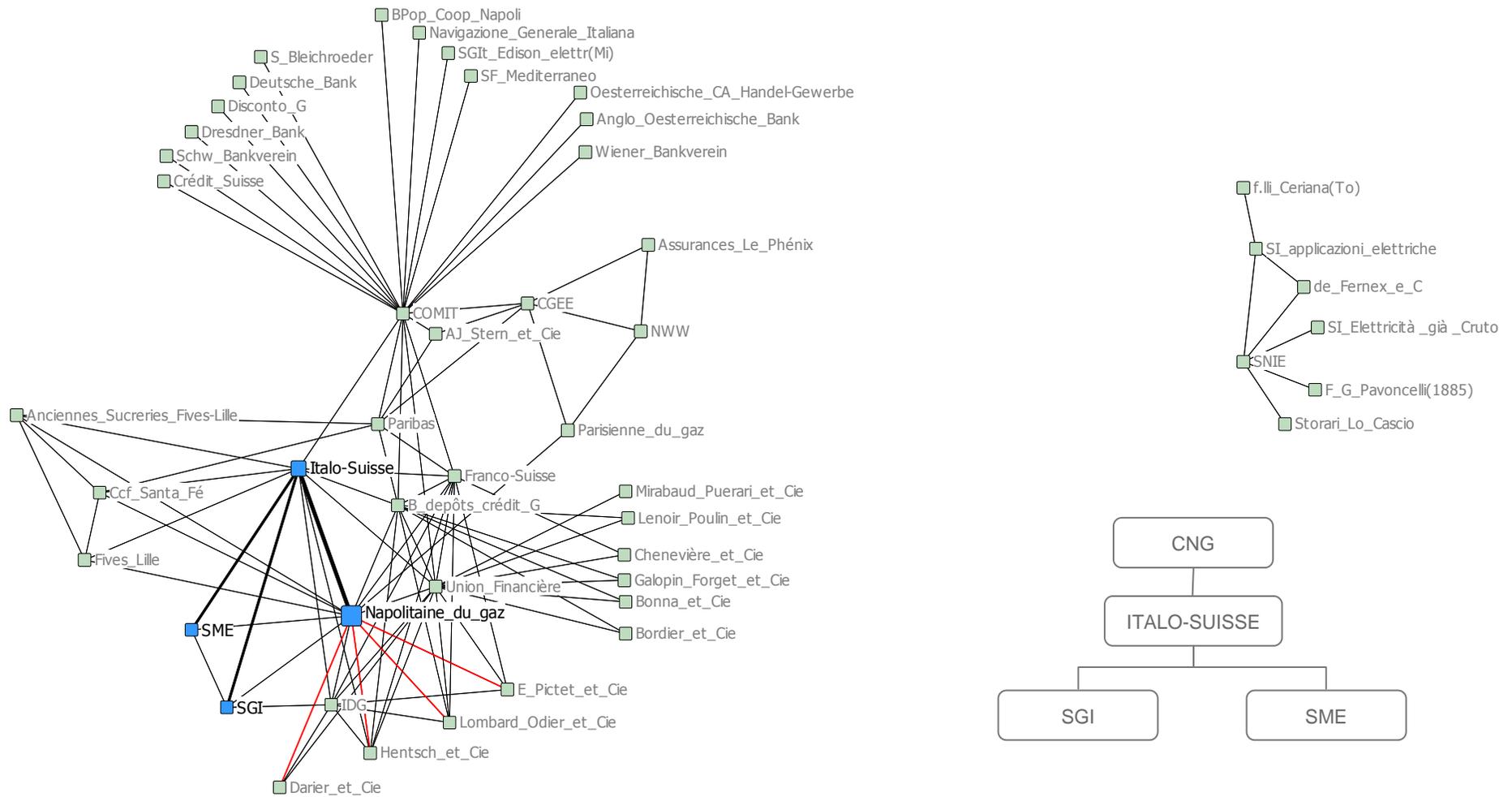
GRAPH 5 – CNG's actor/firm network – 1903



Source. Database IFESMEZ, www.ifesmez.unina.it

Note. 2 mode network - visualization of sets of relations connecting actors and firms (actor/firm matrix). Blue nodes: firms included in the hierarchical scheme in the following graph.

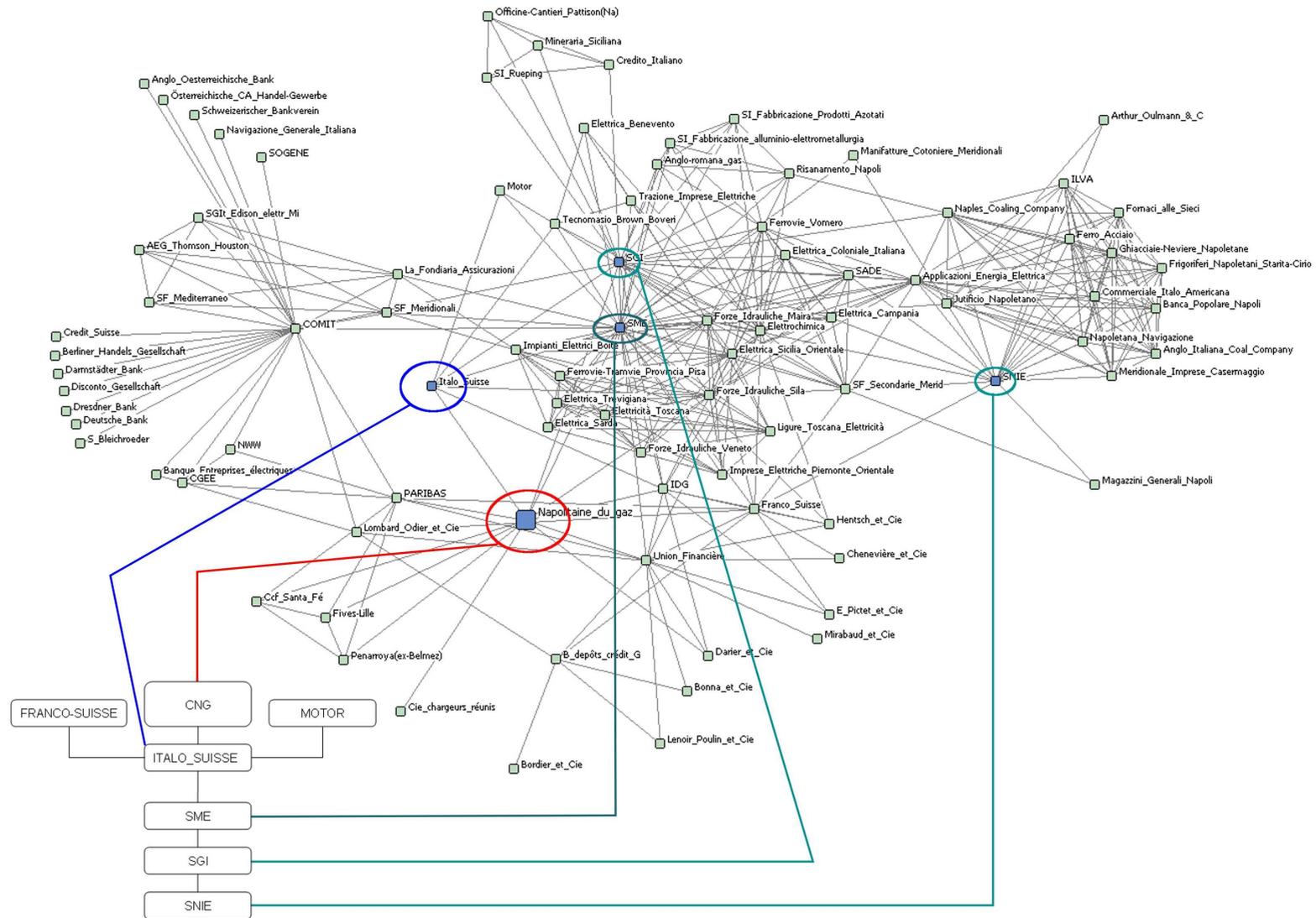
GRAPH 6 – CNG's firm/firm network – 1903



Source. Database IFESMEZ, www.ifesmez.unina.it

Note. 1 mode network - visualization of sets of relations connecting firms and firms via interlocks with shared actors (firm/firm matrix). Blue nodes and thick links: firms included in the hierarchical scheme on the right side; red links: CNG's debt relations

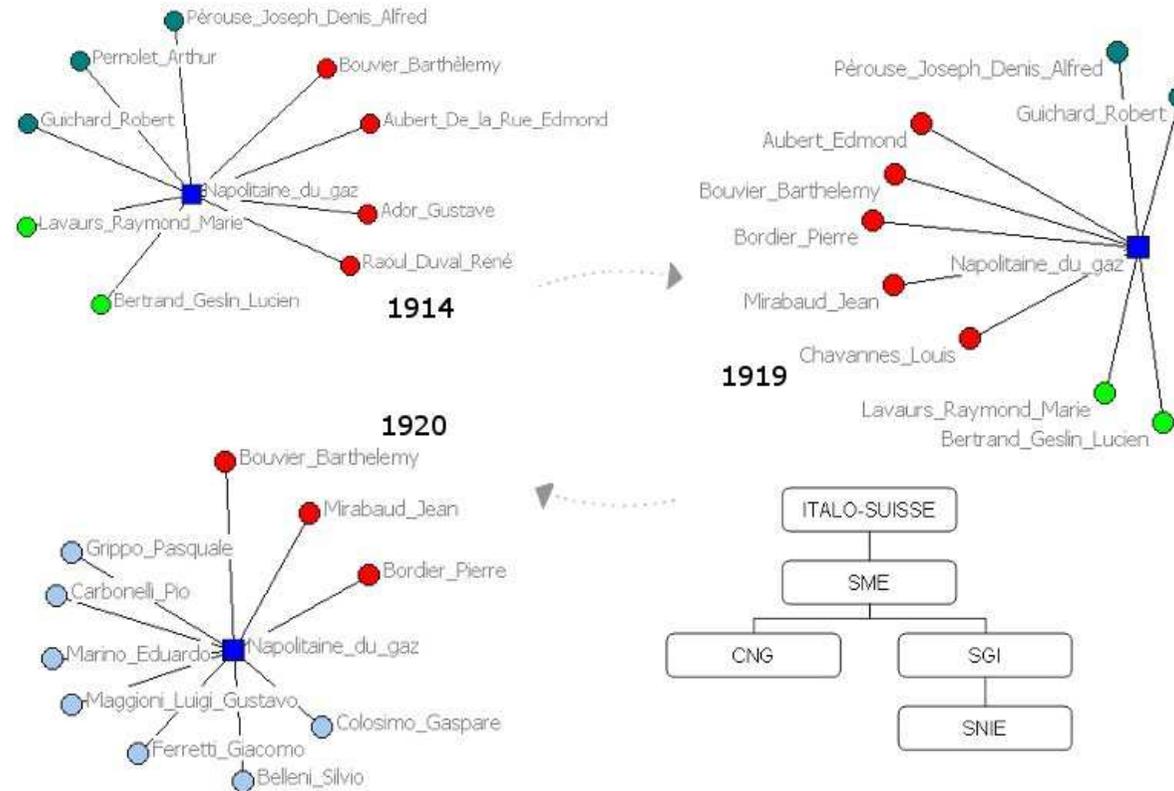
GRAPH 7 – CNG's firm/firm network – 1914



Source. Database IFESMEZ, www.ifesmez.unina.it

Note. 1 mode network - visualization of sets of relations connecting firms and firms via interlocks with shared actors (firm/firm matrix). Blue nodes: firms included in the hierarchical scheme on the left side.

GRAPH 8 – CNG's Board of Directors – composition in 1914; 1919; 1920



Source. Database IFESMEZ, www.ifesmez.unina.it

Note. CNG's Board of directors in 1914, 1919 and 1920; the arrows indicate the sequence of events. Between 1919 and 1920, the 1919 reshaping of the pyramidal ownership structure with the SME at the top of the local firm scheme. Red nodes: Swiss directors; dark green nodes: Dubochet's group; green nodes: ex-P&S' group (now Lavaurs family ties); sky blue nodes: Italian directors appointed by SME.

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AP (Archives de Paris), Paris;
CARAN (Archives Nationales de France), Paris;
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PARIBAS Historical Archive;
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