

Chapter 1

Introduction



Firms do not interact only through prices, quantity or quality: rather they employ many other ways to coordinate their behavior. However, it is still rather unclear under which circumstances the mix of different ways is built, neither the relative relevance of each of them. What is sure is that one of such ways is through sharing a director between boards of related companies: this is the phenomenon named interlocking directorates or, more recently, board interlock (BINT), known since long, but still deserving a lot of attention. Actually, this is a form of coordination which occurs at a company's highest level, because boards decide—or at least address to—the strategic behavior. There are indeed many reasons to share a director, reasons that do neither always nor intentionally deal with strategic issues. However, whatever they are, the effects of board interlock always impact, to a more or less extent, the sphere of strategies. Further, and more noteworthy, more or less intentionally and extensively, they imply some form of knowledge creation and sharing, especially under its tacit form. In fact, what should actually be done when one sits in a board and how to perform this is not a task so precisely defined: its concrete execution depends primarily and essentially on the personal characteristics of each involved director and on various organization-specific circumstances. Hence, this is the conceptual perspective applied into this book: Board interlocks are inter-firm coordination forms that channel strategic knowledge, which is a resource particularly precious in innovation-based industries, and one becoming progressively more important also in all other industries. Due to these characteristics, the main research streams employed in this work are the four following: board interlocks, knowledge networks, inter-firm networks and Social Network Analysis (hereafter, SNA) as the main methodological approach.

Our work innovates the literature on board interlocks in a number of ways. First, it takes a macro (or, to better say, meso) perspective, because it investigates a network

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formed by dyadic board interlocks at the level of the whole EU28 Aerospace Industry as of 2019, and of its neighbor companies coming from a whole range of sectors, but primarily from Manufacturing, Financial, Wholesale, Professional Activities, and ICT. Actually, approaches rooted in the Management and Organization Sciences (hereafter, MOS) focused traditionally on a very micro-level by investigating the reasons for building board interlocks, while we leave them in the background and point only at its knowledge flow implication. Organizational Sociology as well ran studies at macro level, but they focused only on largest companies—usually listed or public ones—across all sectors and sometimes across different countries. Conversely, we take a single industry view, which allows to associate our findings to its main features, primarily its high-tech characteristic and its “glocal” structure: global in sales, local in production. Hence, this industry-specific approach is a second element of novelty of our work. Finally, studies on Industrial Economics and Policy Issues focus usually on the same samples of those in Organizational Sociology, though from the perspective of measuring market inefficiency generated by the collusive behavior that is supposed to be at the grounds of board interlocks. Moreover, they do not deal with the topological aspects, neither at company level nor at geographical level.

The third element of novelty of this book is that of considering *all* limited liability companies, thus not only the listed or public companies, which usually are less than 0.1% of all limited liability companies. This choice is due to our conviction that, though statistically not prevalent, 99% of companies are topologically very important, as they facilitate ways in which the 1% is connected, disclosing additional, potentially hidden structures. Therefore, they determine how and how much strategic knowledge flows within the industry and between it and its neighbors. Because the identification of our object of study is based on the two criteria of being Aerospace Industry and being in the EU28, the neighbors can be Aerospace companies out of the EU28 or any non-Aerospace companies, within or outside the EU28.

The fourth element of novelty concerns the “discovery” of other two, still person-based, forms of inter-firm coordination, namely department interlocks and department-board interlocks. The former (hereafter named DINT) is built by sharing a manager between two (or more) companies’ departments and the latter by sharing a person who covers a manager’s position in one company and a director’s position in another. We have called them, respectively, as department interlocks and hybrid interlocks. Scientific literature has overlooked so far both phenomena, likely because there was a lack of big data about them, a lack recently filled in, among few, by the Orbis database provided by Bureau van Dijk.

While board interlocks convey strategic knowledge, department interlocks convey the operative one, that is, knowledge mostly dealing with the know-how about technological, managerial or market operations a firm should employ and develop. In this case, the share of tacit knowledge is supposed to be smaller than in the case of board interlock, though still rather important. In the case of hybrid manager-director coordination form (hereafter named HINT), we argue that an unequal knowledge exchange is at stake, because operative (manager-related) knowledge is “exchanged” (indeed, shared) for strategic (director-related) knowledge. Likely,

even many BINTs or DINTs hide some sort of asymmetric relationship in favor of the company that appoints the shared person into the board or the department of the other company, respectively. However, our research is not about the composition of boards and departments, but rather about the amount of conveyed knowledge and the network of connections through which that knowledge is distributed among companies in the EU28 Aerospace Industry and with their neighbors. Therefore, we will consider only HINTs as asymmetric relationships, because in this case the "unfair" exchange is evident.

Therefore, applied to the case of the EU28 Aerospace Industry and its neighbors, we analyze three types of inter-firm coordination forms based on interlocks: Director-to-Director (D2D), Manager-to-Manager (M2M) and Manager-to-Director (M2D). Each type generates a specific topology (structure, distribution of connections) and involves a specific mix of countries and, when concerning neighbors, also a specific mix of sectors. Hence, we deal with a huge multi-layer network, whose layers are the three coordination forms. The fact that the same director or manager can be involved in more than one interlock of the same or different types—for example, a manager can be shared in one or more departments and in one or more hybrid interlocks—makes the analysis rather complicated but, at the same time, very interesting. When we wish to stress more the phenomenon of interlock in its whole, we will use the label of Board Interlock (BINT) or Department Interlock (DINT) or Hybrid Interlock (HINT), while when we are more interested to underline the topological and connectivity aspect, we refer to D2D, M2M and M2D.

This multi-layer aspect adds to this work a fifth element of originality, because it is still seldomly employed in current SNA studies. Indeed, we run both statistical and network methods, some of which are also not popular, like the Snijders' and the Katz centralization indexes, the geodesic reciprocity, the reach centrality and other centralization indexes. Moreover, we introduce also a variant of the measure of structural equivalence according to the Jaccard Matching. The inclusion of those less-popular methods is yet another novelty of our work.

Let us give a hint at some basic features of our object of study, as it came out to be after the preliminary analyses, like the number of companies, persons and connections involved. Out of the 3143 companies forming the European Aerospace Industry (hereafter, EASIN) in 2019, 1402 resulted to have at least one of the three types of interlock coordination. They were connected to more than 6600 neighbors, mostly operating in the Manufacturing sector and geographically in the US. Hence, it immediately comes clear that *the EU and the US companies, despite being harsh competitors especially in this industry, do exchange a lot of strategic and operative knowledge, and coordinate their behaviors*. The EASIN network is coordinated through the significant number of 1151 connections, most of which (61%) are made by managerial (M2M), 35% by directorial (D2D), and the remaining 4% by hybrid (M2D) positions.

When including also the neighbors, the number of connections raises up to more than 357,000 ties, with a larger predominance of DINT (88%), followed by BINT (11%), and the remaining 1% by HINT. Hence, it appears clear that *EASIN coordinates its strategic and operative behaviors more with neighbors than within itself*

and that, either within or with neighbors, operative knowledge counts quantitatively much more than strategic knowledge, and the hybrid forms are residual. However, in qualitative terms, these latter are as well important, because they are employed by companies that play a relatively more bridging role than others and more related to the Financial sector. Further, still in *the juxtaposition of the EU28 and the US, the American companies are mostly on the side of the “exploiters” of strategic knowledge rather than on the side of the “exploited”*.

In terms of people who are the carriers of knowledge sharing and who concretely make interlocks happen, in the extended network, *7344 individuals (6272 managers and 1710 directors) are employed directly into the coordination forms, mostly (83%) among neighbors*. Noteworthy, the distribution of the positions covered by these coordinators is a clear example of an uneven distribution generally occurring in economic networks and for other parameters of inter-firm coordination: 90 managers coordinate more than 110 operative positions each. Inter-board positions are less polarized, because only 10 people seat in at least 110 boards, but anyway one director is member of 256 boards and another one of 153.

Besides investigating the structure of the networks generated by each type of interlock coordination, in chapter eight we have also tested seven hypotheses, which basically correspond to the main topics discussed in the debates related to BINTs and recalled in chapter one. Such tests - listed here below - have been applied also to the other two types of coordination:

1. Interlock coordination enhances a better economic performance;
2. The relation between interlock coordination and economic performance can be nonlinear;
3. Proximity influences the propensity to employ interlock coordination;
4. The interlock connectivity of EASIN with the Financial sector is higher than with other sectors;
5. The interlock connectivity of EASIN with the Financial sector is higher for continental Europe than for Anglo-American companies;
6. There is a positive association between company size and interlock coordination;
7. If any, that association is country-specific.

This book deals with a number of topics crossing different disciplinary fields, like Management and Organization Sciences, Sociology of Organizations, Organizational Economics, Industrial Economics, Evolutionary Economics, Geographical Economics, and Anti-Trust and Industrial Policy, to name the most important areas of research. Indeed, inter-firm networks, board interlocks, strategic knowledge exchange, the influence of proximity on firms' behavior, the relation between centrality and performance or size and performance, and the collusive (anti-competitive) effects of strategic alliances are all issues investigated by those disciplines from different (and sometimes the same) perspectives. We hope that, by focusing on a specific (albeit big) case study, our work could also facilitate an inter-disciplinary debate. Though the approach is essentially academic, we believe that our work is worth also for other two types of readers: the officers working for

regulating institutions and the policy makers. The former could draw some suggestions to improve their current analyses of the collusive behaviors and settings. In fact, though we did not go deeply into their methods, at a first sight they seem to focus only on the most evident situations, thus overlooking the middle and basic part of the pyramidal structures of inter-firm interlock networks. Our impression is that the disclosure of the whole pyramid shows a more massive adoption of this type of strategic alliances. Further, if this picture is combined with that corresponding to the pyramid of ownership inter-firm networks, industry structures appear under a new light, which is useful also to support the analyses and interventions of policy makers, because actually its effects vary considerably according to the topological features in terms of interlock and ownership coordination.

This book can be divided in three parts: one part is made by a “condensed content”, which includes this introductory chapter, the literature review (Chap. 2), the overview (Chap. 3) of main feature, the comparisons across networks and hypotheses testing (Chap. 8), and the conclusions. Hence, the “efficient reader”, who is interested mostly in the essential findings and not to the way in which they have been reached, can focus his/her attention only on this part.

Another part of the book is constituted by Chaps. 4–7 that deepen the analyses of the four networks: the ALL (resulting from the combination of the other three), the M2M (DINT), the D2D (BINT) and the M2D (the hybrid manager-director interlock). In each of these chapters, the following methods are applied: aggregate network analysis through the most known indexes, like size, density, average degree centrality, fragmentation, reciprocity, centralization, etc., and some less known indexes. Further, analyzed are the inter-sectoral and inter-country networks, built by collapsing groups of companies into same sectors and same countries, respectively. Network method applications proceed then to analyze: (i) components’ and cliques’ structure; (ii) distribution of topological or non-topological parameters; (iii) key-players represented as bridging companies; and finally, (iv) assortativity. Moreover, there are also statistical descriptive analysis of the whole aggregates, plus correlation and cluster analysis. Finally, the third part is made by Data Appendix and Methodological Appendix, which provide a good support for the reader who wishes to work on the same data or replicate the application of our methods to other business, economic, or social networks. Data Appendix contains tables and figures at a very disaggregated level or for not crucial findings, and it is available only as Electronic supplementary material (see below about how to access it).

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