A Structured Literature Review on Networks and Organizations

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1 Introduction

In an increasingly complex economic world, networks have become pervasive of business life. Organizations are then seen as embedded in, and composed by, thick networks of interrelationships that develop at the interpersonal, intra- and interorganizational levels of analysis. In the last two decades, scholarly attention has been largely devoted to networks and organizations, and the field has grown rapidly and, to a certain extent, sparsely. Kilduff and Tsai, in 2003, with their book *Social Networks and Organizations* provided a first systematization of the body of knowledge connecting network theories and methods with organizational research. After two decades from their contribution, the present chapter aims at providing an overview about the field evolution and the

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trajectories that have been taken by scholarly debates in the field. As highlighted by Kilduff and Tsai (2003) and Kilduff and Brass (2010), the distinctive lens that network theory brings to the analysis of a wide range of organizational phenomena made it very appealing to organizational researchers, who used the network metaphor to explore both formal and informal organizations and processes of organizing. Rooted in graph theory, network research met organizations initially through the sociological approaches, but lately incorporating contributions from biology and evolutionary theories, psychology, mathematics, information systems, and more traditional management and organization research. These developments, as noted by Kilduff and Brass (2010), contributed to the exploration of new organizational phenomena, but at the same time, they challenged the coherence of the overall research tradition. The goal of the present chapter is to explore how the study of networks and organizations evolved in the past two decades, understanding if and how the field benefited from the contributions coming from very different disciplines. Our results, based on the analysis of 267 articles published in top journals in the field of management, suggest that the field of networks and organizations has developed along three distinctive lines of research that brings different contributions in terms of methodologies, objects of analysis and openness to contaminations coming from different research traditions. The next section of this chapter presents our methodology for the structured literature review; Sect. 3 presents the descriptive results along the time dimension; Sect. 4 presents the three streams of research defined through a cluster analysis; Sect. 5 concludes this chapter with some final remarks.

2 Methodology

This chapter aims at analysing the main trends and characteristics of the literature regarding networks and organizations in the last 20 years (2002–2021). Following Massaro, Dumay, and Guthrie (2016) we developed a structured literature review, starting with setting boundaries to our research. We decided to use the Scopus database, and we defined the following initial inclusion-exclusion criteria:

- limit the search to papers that were published in 4-star ABS journals (Academic Journal Guide, 2021), in order to describe the evolution of the ongoing debate only in top journals ranked top by a multidisciplinary list;
- search for the words "network*" and "organiz*" in the keywords indicated by the author, in the abstracts and in the titles. The asterisk allows us to take into consideration all the words that start with the letters by which it is preceded (so networks, networking, organizing, etc.);
- include only finished and published papers;
- consider only papers focused on networks and organizations, excluding papers using the words "network*" to address particular infrastructures (as in information system, for example) and "organiz*" without referring to specific organizational phenomena.

Eventually, such search has provided us with a dataset composed by 486 papers. We qualitatively analysed the dataset obtained with Biblioshiny (Aria & Cuccurullo, 2017) with the aim of developing a general overview of its characteristics and to detect whether the process included also some papers that were out of scope.

Before proceeding with the categorization and the inclusion-exclusion process, we randomly selected 60 papers and collegially analysed them in order to set a clear and shared list of inclusion-exclusion criteria and a definitive table of attributes to run the categorization of articles in the dataset. This first phase of the exclusion process, as the following ones, was carried out utilizing a shared folder on Mendeley so that everyone would be working on the same dataset.

After such testing phase, the remaining articles present in the whole dataset have been randomly assigned to one of the three co-authors in order to decide for inclusion/exclusion from the final dataset based on the titles and on the abstracts. Additionally, the papers that were excluded by one of the authors were randomly assigned to a second co-author for a double check. If a paper was excluded by at least two authors, the exclusion was definitive. Eventually the final dataset upon which we all agreed comprised 299 papers.

We, then, proceeded with the categorization process: we developed a framework with all the relevant categories to classify the articles in the

dataset. Each category was composed by several attributes. While reviewing a paper, each of us would assign an attribute for each category. This phase was preceded by a coder triangulation: a small sample of papers has been categorized by one of the co-authors utilizing the framework (Thurmond, 2004). The aim of this triangulation procedure is twofold. On the one hand, we wanted to see whether the framework we initially designed was capable of fully characterizing the papers that were read or whether some adjustments or additions were necessary. On the other hand, we wanted to make sure that the characteristics of each attribute were clear and consistently shared among the authors.

The definitive framework is represented in Table 1. On the first column we can see the categories, and on the second, the respective attributes. The table provides single attributes definition an exemplificative reference. As it can be seen, the definitive categories had the aim of defining the methodological approach, the characteristics of the object of analysis, the analytical approach and generally the type of research developed.

The in-depth analysis was limited to 279 papers: 20 papers were dropped due to the presence of missing data. Moreover, within this set of papers the analysis highlighted the presence of 12 literature reviews: given their specificities in terms of methodologies and object of analysis, the 12 articles were excluded by our examination, resulting in a final database with 267 papers. In order to explore general trends in the evolution of the study of networks and organizations, we analysed the historical evolution of the research published in the two decades 2002–2021: results are presented into the next section.

3 Historical Evolution

The papers included in our database show a significantly uneven distribution over time, as showed by Table 2. In particular, the first five years of our analysis' timeframe (2002–2006) count for less than the 3% of the total number of papers. In 2007, thanks to a special issue on "Innovation at and across multiple levels of analysis" edited by Anil K. Gupta, Paul E. Tesluk, M. Susan Taylor on Organization Science, the number of published papers on networks and organizations increased significantly with

Table 1 The analytical framework

Category	Attribute	Attribute Definition	Exemplificative Reference
Analytical level	Interpersonal	The Interpersonal level of analysis focuses on relationships between individuals and not from other type of entities (Singh, 2005)	Ahuja et al. (2012)
	Intra-organizational	The Intra-organizational level concentrates on those ties between groups or organization units (Tsai, 2001)	Fang et al. (2010)
	Interorganizational	The Interorganizational level regards networks in which the ties are formed between organizations and the decision to form a relationship (alliance) is taken at the organizational level (Gulati & Gargiulo, 1999)	Furlotti & Soda (2018)
Object of analysis	Ego	The ego is a single subject that, thanks to its position within the network or its personal characteristics, can better perform a specific activity (Haas, 2015)	Khanna et al. (2015)
	Dyad	Dyads are social structures that are composed by two connected subjects (Szulanski, 1996)	Lomi et al. (2014)
	Set of Dyads	Set of dyads, combined, lead to complex structures, such as triads and cliques (Krackhardt & Kilduff, 2002)	Rhee and Leonardi (2017)
	Whole Network	"Network-level analysis of organizational social networks involves investigating system properties that are beyond individual, dyadic, or triadic approaches" (Kilduff & Lee, 2020, p. 14)	Godart and Galunic (2019)
Type of analysis	Theoretical	Theoretical studies aim at enriching the extant literature by either incrementing or introducing novel and original ideas (Corley & Gioia, 2011)	Ryall and Sorenson (2007)
	Empirical	Empirical studies work on network data that the researcher has collected (also indirectly) (Robins et al., 2007)	Kleinbaum (2012)

(*continued*)

Table 1 (continued)

Analytical approach	Qualitative	A qualitative approach includes data collection methodologies (such as in fieldwork) that allow to have a complex representation of the network that is being analysed (Hoang & Antoncic, 2003)	Operti and Lampronti (2020)
	Quantitative	Quantitative approaches utilize large datasets (with numerous observations) containing, relatively simple, information about the observations (Wagner et al., 2011)	Gulati et al. (2012)
	Experimental	When adopting an experimental approach, researchers utilize particularly numerous simulations with the aim of testing the "plausibility of the assumptions" (Macy & Skvoretz, 1998, p. 646)	Friedkin (2011)
	Literature Review	A literature review gathers the main findings, methods and contributions of the last years with the aim of highlighting the state of art but also potential venue (Podolny & Page, 1998)	Casciaro et al. (2015)
	Conceptual/ Interpretative	Conceptual research does not focus on the data itself, but on the theoretical and conceptual aspects regarding the data, the data collection process or the way in which the network (or part of it) is conceptualized (Whetten, 1989)	Dosi and Marengo (2007)

Type of Network	Business/Formal	Formal networks represent the organizational structure or workflow processes of an organization (Soda & Zaheer, 2012)	Sykes (2020)
	Open/Informal	The informal network regards the relationships that subjects develop autonomously (Krackhardt & Hanson, 1993)	Sterling (2014)
	Process of Organizing	The process of organizing regards networks that are not properly formalized but that, nevertheless, are characterized by an increasing formalization of the rules, dynamics and, sometimes, borders of the network (Ingram & Torfason, 2010)	Choi (2007)
Network stages	Emergence	The emergence of a network is the initial stage of tie formation trying to understand which parameters can favour such process (Grandori & Soda, 1995)	Carnabuci and Operti (2013)
	Evolution	The evolution of a network regards the potential changes in terms of number of participants and ties and, also, in the purpose of ties (Powell et al., 2005)	Leonardi (2007)
	Outcome	The outcome of a network is the "cessation" stage of a network focus on the way in which specific phenomena, dynamics or contingency have influenced on the network (Oliveira & Lumineau, 2019)	Rho and Lee (2018)
Is the study analysing a dynamic process?	The study focuses on a dynamic process	Network dynamics are the changes in a network between two or more timelapses (Snijders et al., 2010)	Shipilov et al. (2011)

(*continued*)

Table 1 (continued)

Is the study analysing a multilevel network?	The study analyses a multilevel network	A multilevel network is a network composed by different "levels" of networks, each composed by the same subjects, but that are connected by different types of ties (Kivelä et al., 2014).	Battilana and Casciaro (2013)
Is the study analysing a multiplex network?	The study a multiplex network	In multiplex networks we consider different type of ties (relationships) that connect a group of people (Lazega & Pattinson, 1999)	Smith and Papachristos (2016)
Is the network considered as independent variable?	The network is considered as independent variable	When the characteristics of a network are studied with the aim of understanding their impact on a specific phenomenon they are considered as independent variable (March & Sutton, 1997)	Schomaker and Bauer (2020)
Is the study carrying out a social network analysis (SNA)?	The study carries out a SNA	"Social Network Analysis is motivated by a structural intuition based on ties linking social actors, it is grounded in systematic empirical data, it draws heavily on graphic imagery and it relies on the use of mathematical and/or computational models" (Freeman, 2004, p. 3)	McEvily et al. (2012)
Is the study analysing the performance of the network?	The study analyses the performance of the network	The performance of a network can be seen as the combination of "centralized integration, external control, stability and resource munificence" (Provan & Milward, 1995, p. 27)	Clement et al. (2018)

Source: Own elaboration

Table 2 Distribution of published articles over time (2002–2021)

Year	No. of articles	%
2002	1	0.4
2003	1	0.4
2005	1	0.4
2006	4	1.5
2007	15	5.6
2008	5	1.9
2009	6	2.3
2010	11	4.1
2011	18	6.7
2012	24	9.0
2013	14	5.2
2014	22	8.2
2015	28	10.5
2016	16	6.0
2017	24	9.0
2018	26	9.7
2019	11	4.1
2020	23	8.6
2021	17	6.4
Total	267	100.0

Source: Own elaboration

respect to the previous years, starting the positive trend that characterized the subsequent 15 years. In 2012, the famous Special Issue by Ahuja et al. (2012) on "The Genesis and Dynamics of Organizational Networks" pushed the scholarly production beyond the threshold of 20 papers published in a year (24 articles, 9% of the total papers in the two decades); this figure became the average number of papers per year published from then on.

Given the papers' distribution over time, we propose that the evolution of the field "Networks and Organizations" can be described in three distinct five-year phases, starting from 2007 (the first five-year window, in fact, showed a negligible contribution to the field in terms of number of papers, and its consideration was problematic for the impossibility to compare it to the other five-year time windows): (1) the initial phase (2007–2011); (2) the development phase (2012–2016) and (3) the consolidation phase (2017–2021).

The emergence phase counts 55 articles (21% of the total), the development phase 104 (39%) and the consolidation phase 101 (38%). In the next subsections we propose a detailed analysis of the three phases, using the analytical framework presented at Table 1 as our guidance.

3.1 The Initial Phase (2007–2011)

The scientific production of the initial phase is characterized by mainly two analytical levels: almost half of the papers (49%) adopted an interpersonal level of analysis, while the 44% focused on the study of interorganizational relationships. The predominant objects of analysis have been the whole-network (51%) and the dyad (33%), and the large majority of these articles (85%) adopted an empirical approach. Within their analysis, scholars used mainly the business/formal organization as the organizational context for their study (71%) and developed their analysis using quantitative methodologies (69%). Notably, in this phase, the SNA approach largely influenced the field, since the 62% of these articles used SNA methods to explore their research questions. While this suggests that the structuralist approach to network studies was largely used, the result on the use of the network as an independent variable by the 62% of the articles implies that in this phase most scholars resorted to SNA concepts to *control for* or *explain through* network features other organizational phenomena. In particular, large attention has been devoted to network outcomes (51% of the papers), namely to the results and effects that network activities or structures can bring to network members individually or collectively, followed by the study of the evolutionary phase of networks (49%), namely to the exploration of the processes and activities characterizing networks' life in terms of changes in the number of participants and ties as well as their purpose. Interestingly, one-third of the articles (33%) proposed an investigation of network dynamics, a topic destined to attract a lot of attention with the Organization Science's call by Ahuja et al. (2012) a few years later. The attention towards network performance started to emerge in this phase, as the 29% of the analysed articles proposed such reflections. The roots of two hot-topics of the

2020s' can be found in this phase as well: 9% of the papers proposed the analysis of network's agents as embedded in multiple set of ties (multiplexity), and the 7% studied networks developed at multiple levels of interaction.

3.2 The Development Phase (2012–2016)

The articles published within the second phase adopted the interpersonal level of analysis for the 62%, while the interorganizational level dropped to the 30%. The intra-organizational level of analysis was adopted by the 14% of papers, namely the highest percentage of the three phases. In terms of object of analysis, as in the previous phase, the whole network was studied by almost half of the articles (47%), while the dyad was studied by almost one out of four articles. The object of analysis that attracted much more attention with respect to the previous five years is the set of dyads, studied by the 30% of the articles. The 77% of these articles focused on the business or formal organization, a percentage even larger than before. Almost the 90% of the studies developed were empirical, and the 80% adopted a quantitative approach: in the development phase, the share of articles with such analytical framework is the largest of the entire period under analysis. The SNA was developed by the 67% of the papers analysed, a percentage slightly larger than in the previous phase (62%). The network variable was used as independent by the 67% of articles, and as dependent by the 40%. As expected, in the development phase the topic of network dynamics was largely studied, with 48% of the papers investigating this issue—the largest share registered for the three phases. The other topic that gets its largest share in the development phase is that of multi-layer networks, even if it remains largely marginal with only 13% of articles using this network conceptualization for their studies. In terms of network evolutionary processes, while the outcome remains the phase on which almost half (49%) of the papers focus, the evolution phase gets more attention with respect to the previous years, being studied by the 55% of the papers.

3.3 The Consolidation Phase (2017–2021)

We called the last five-year window of our analysis the consolidation phase. In this phase, studies of networks and organizations focused mostly on interpersonal (47%) and interorganizational (44%) levels of analysis, while the intra-organizational level was scantly studied (only 9% of articles). In terms of object of analysis, the dyad reached its minimum in terms of share of papers (18%), while the 48% focused on the whole network—a pretty constant trend along the whole period (whose mean, from 2002 onwards, has been exactly 48%). Papers in the consolidation phase started exploring more the informal organization (18%) with respect to the past, at the expenses of the usual business or formal organizational context (68%, the lowest share between the three phases). In terms of analytical approach, empirical papers were still the majority (82%, the lowest percentage of the period), even if we registered an increase in theoretical papers (17%). Interestingly, from a methodological point of view the consolidation phase showed some differences with respect to the previous phases: the 16% of paper used a multi-method approach, the 73% of articles used quantitative methods (the lowest share between phases), and qualitative (17%) and conceptual (11%) approaches registered the highest shares between the three phases. Additionally, also papers using SNA for their analysis decreased, reaching the 55% of all the articles of the consolidation phase. Mirroring these shifts in terms of methodological approaches, the network was used by two-third of the papers (75%) as an independent variable, and by the 26% of papers as a dependent variable. In the consolidation phase, the topic of network performance gathered much attention: 35% of the papers were exploring this issue, the largest share of the whole period.

3.4 Networks and Organizations Across Two Decades

Overall, we note that studies on networks and organizations divided their interest between the interpersonal and interorganizational levels of analysis, leaving largely unexplored the intra-organizational setting. The explanation may be found in difficulties linked to data access, since this type

of contexts require researchers to access team-level data that typically require deep access to organizations and a non-negligible level of trust. In terms of object of analysis, the field started in the initial phase with large attention to the dyad; however, this focus was more and more reduced and shifted towards ego networks and set of dyads. We can interpret such a result as the evidence of networks becoming pervasive of economic life, with their complexity becoming increasingly clear, and management scholars starting to connect organizational phenomena to larger contexts of relationships in which organizational behaviours took place. While the attention of the field has been largely devoted towards formal organizational contexts, in the most recent times we detected the signal of a shift towards the study of informal organizations. As acknowledged by network scholars, informal organizations pose the challenge of data collection, especially concerning the definition of network boundaries. However, digital technologies and social platforms offered the opportunity to explore informal organizations from an innovative point of view that scholars started exploiting in most recent years.

Following a trend similar to that of management and organization studies, the field evolved largely based on the empirical development of quantitative studies; however, probably thanks to the development of more rigorous methodologies for qualitative research (among the others, Gioia et al., 2013), the field showed an increasing interest in qualitative methodologies and mixed methods, as well as theoretical explorations and conceptual analytical approaches. Methods specifically linked to SNA showed a decreasing presence along time, notwithstanding the continuous improvement and sophistication of statistical techniques, now able to represent more complex social phenomena (Amati et al., 2018, 2019). In terms of network processes, studies on networks and organizations delved largely into the evolution and outcome phases, leaving the phase of network emergence still scantly explored. Also in this case, the motivation can be found into the empirical complexities of gathering data on a phenomenon before its actual manifestation or during its very first steps: something made possible often only by the so-called goal-directed networks (Kilduff & Tsai, 2003), when networks are set up and started by agents' intentionality, clearly observable. For what concerns

the "hot-topics" we explored through our analysis, we observe that only network dynamics received significant attention by past research: multi-layered networks, network performance and multiplexity seem to be some promising avenues for future research.

4 The Cluster Analysis: The Three Streams of Research

To explore the characteristics of the body of work on networks and organizations, we developed a clustering analysis that had the scope of grouping the final dataset depending on similarities or dissimilarities between the papers. In order to explore the existence of peculiar and recognizable groups of papers, we run a cluster analysis using as an input all the attributes as described in Table 1. Specifically, dealing with categorical variables, it is more appropriate to work with the so-called *k-modes algorithms* (Huang, 1998). This method defines clusters counting the number of matching categories between data points in the sample. The methodology is run using a Python script. By implementing a classical elbow method, we recognize the number of clusters where mismatches are minimized. After having checked that overlapping among clusters is negligible and that the numerosity of the groups are comparable, it turns out that the best cut-off is at the level three, so we identify three clusters counting, respectively, 59, 102, 94 articles each (12 literature reviews were excluded from this procedure because their features were too far away from other research papers).

To describe the main traits of the three clusters identified through machine learning, we blend two different approaches: (i) a qualitative inspection of the words that are more present in the titles and keywords declared by the authors and (ii) a quantitative analysis to identify the core attributes of the papers belonging to each of the clusters. After having carefully developed these two approaches, we developed an in-depth inspection of the papers belonging to the three clusters, in order to confirm our interpretation of the results presented below.

4.1 The Keywords of the Three Clusters

Figure 1 represents the results of the qualitative inspection through the representation of the word clouds related to the entire sample (panel A) and to the three clusters (panels B–D). The most recurrent words are then reported in Table 3.

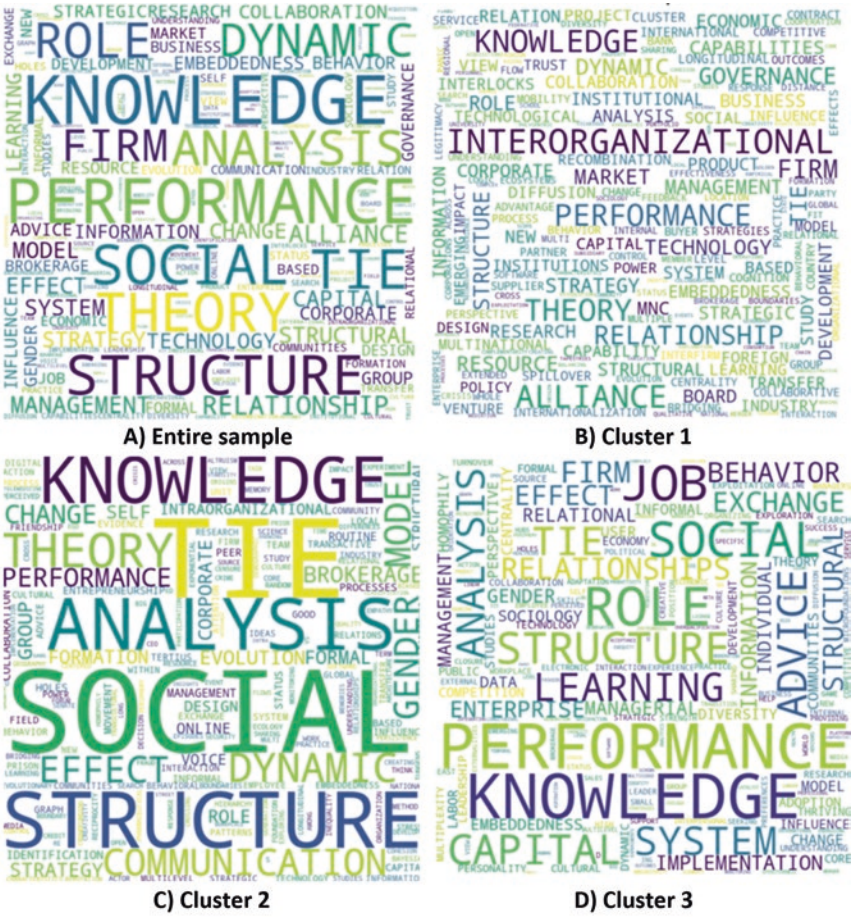

Fig. 1 Word clouds for (A) the entire sample; (B) Cluster 1, (C) Cluster 2, (D) Cluster 3. (Source: Own elaboration)

Table 3 The most recurring words in Titles, abstract and keywords of the three clusters

Cluster 1	Cluster 2	Cluster 3
Interorganizational	Tie	Job
Alliance	Social	Role
Relationship	Gender	Advice
Firm	Effect	Learning
Governance	Change	System
Board	Communication	Capital

Source: Own elaboration

The results highlight that the three clusters showed quite different traits from each other, confirming that commonalities and differences in the papers' attributes (the variables used for the clustering procedure) are reflected also in the articles' contents (recurrent words describing titles, abstracts and keywords).

Table 3 indicates that Cluster 1 covers the topics usually addressed by innovation literature, focusing in particular on strategic alliances, interorganizational relationships and network governance. Cluster 2, on the contrary, is centred on network concepts (as suggested by "tie" and "social") and covers topics related to social networks dynamics (as suggested by "change" and "communication"). Cluster 3's most recurring words suggest that papers in this cluster are grounded in social network analysis and use the network concepts as a metaphor for knowledge exchange, learning processes and system dynamics.

4.2 The Attributes of the Three Clusters

As a second step to characterize the three clusters, we looked at the attributes as reported in Table 1, and we identified the most persistent traits. Specifically, we computed the proportion of articles in the cluster which showed each attribute. As an example, considering the dimension "Business/formal" organizational context, we see that Cluster 1 shows a score of 0.89, namely about nine out of ten papers have got such trait. By looking at "Evolution", we see that as far as Cluster 2 is concerned, 88% of papers consider such dimension, whereas only 10% of papers in

Cluster 3 do. In order to have a more robust result, we have standardized such results implementing a "Z-scores" transformation. In this way, we can identify the dimensions where the cluster shows a distance from the average value of at least one standard deviation (a Z-score above the value 1). For example, along the dimension "Evolution", Cluster 2 receives a score of 1.12 (significantly above the mean), whereas Cluster 3 has got −1.13 (significantly below the mean). In Table 4, we report the result of such analysis expressed in terms of the categories we identified in Section "Methodology". Missing values in the cells refer to situations in which there were no significant values in the Z-score analysis for the category under investigation.

In terms of analytical approaches, in Cluster 1 prevailed the qualitative approach, in Cluster 2 the conceptual/interpretative approach and in Cluster 3 the quantitative one. Generally, research categorized in Cluster 1 focused more on empirical research studying formal organizations and looking at interorganizational relationships based on formal/business ties. Cluster 2 gathers papers aiming at developing theory also through theoretical development. In this cluster are grouped papers that focus on network as the dependent variable and providing contributions on more recent topic of interest of network studies, such as multilevel networks, multiplexity and network dynamics. Papers in Cluster 3 are those focused on social network analysis and using its metrics and measures to explain individuals' or networks' behaviours (the network is used as an explanatory variable). Emphasis is given on network performance, reflected also in the focus on the last stage of network development, that of outcome.

4.3 Defining the Three Clusters

The final step of our analysis, to confirm the results presented above, is the in-depth analysis of the articles belonging to the three clusters. Generally speaking, when looking at the papers forming the three clusters, we confirmed the consistency of the results coming from the qualitative and quantitative analysis exposed above on the papers' keywords and main attributes. Therefore, our results are presented through the clusters labelling and description.

Table 4 The most relevant attributes for the three clusters

Category	Cluster 1	Cluster 2	Cluster 3
Analytical approach	Qualitative	Conceptual/interpretative	Quantitative
Object of analysis	Set of dyads/triads/cliques	Whole network	Ego
Analytical level	Interorganizational	—	—
Type of tie	Formal/Business/Partnership/ Proprietary	—	Advice Network
Type of analysis	Empirical	Theoretical	—
Organizational context	Business/formal	Process of organizing	—
Dependent/Independent variable	—	Network as dependent variable	Network as independent variable
Other properties	—	Multilevel, Multiplexity, Dynamics	SNA, Network performance
Network stages	—	Evolution/Emergence	Outcome

Source: Own elaboration

4.4 Cluster 1: Business Studies and Networks

This group of papers includes all papers related to interlocking directorates, innovation and the discussion about knowledge transfer among organizations linked by formal/business ties. It is characterized by a clear interorganizational perspective, related to the role of formal business ties in enticing the performance of participants in partnerships (such as alliances for knowledge sharing). Here the network perspective is used to describe the relationships connecting business organizations, and topics related to governance of ties, trust, coordination and interorganizational exchanges are treated by this branch of literature. As an example, a significant group of papers is related to the study of interlocking of boards among firms.

4.5 Cluster 2: Networks and Organization Studies

This cluster is more characterized by a network perspective on organizations, not limited to formal ones, but enlarging the scope of investigation to social movements, informal organizations and the process of organizing (e.g. information in web-based platforms). A lot of papers in this cluster discuss social change and informal organizations and are characterized by a sociological perspective. Generally, this group is more focused on the organization structures and the relevance of specific roles in the organization network. Here, the type of tie can be both formal or informal, and the impact of the positioning in a network to the outcome of single actors is addressed by this type of studies.

4.6 Cluster 3: Social Network Analysis and Management Science

This cluster collects a large number of papers related to classical social network analysis at the ego level; the focus is often on single actors and their ego networks. It collects mainly papers based on a structural approach, often related to modelling techniques, mathematical

elaborations and SNA-related methodologies. Often, the main research question is the performance of the network, seen as a "metaphor" for the organization. For example, in this cluster are grouped the majority of studies related to advice networks.

4.7 The Bibliographic Analysis of the Three Clusters

To conclude our analysis of the three clusters, we also performed some bibliographic analysis to identify the reference journals for each group and the respective co-citation networks. Such information, in fact, help in describing the stream of research connected to each cluster and identifying the key ongoing debates. Concerning the journals, Organization Science is by far the more relevant across all clusters, accounting for 78 publications in total. Disregarding Organization Science, the three more represented journals for each cluster are, respectively:

- Business studies & Networks (Cluster 1): *Public Administration Review* (12), *Journal of International Business Studies* (11), *Administrative Science Quarterly* (9);
- Networks and organization studies (Cluster 2): *American Sociological Review* (10), *Strategic Management Journal* (10), *Administrative Science Quarterly* (6);
- Social Network Analysis and Management Science (Cluster 3): *Management Science* (9), *Strategic Management Journal* (8), *Journal of Management* (7).

The fact that Journal of International Business Studies (JIBS) collects 11 out of 59 papers reinforces our claim on the relevance of strategic alliances and interorganizational relationships (in the context of MNCs) for Cluster 1. The sociological perspective of Cluster 2 is made clear by the predominant presence of American Sociological Review (ASR) and Administrative Science Quarterly (ASQ). The quantitative nature of Cluster 3 and the focus on an analytical approach is corroborated by the presence of *Management Science* and the *Journal of Management* among the reference journals of this cluster.

Regarding co-citation networks, that is, the ties that connect two papers that have been cited—at least—twice together by the papers in our dataset, we were able to understand and discern the main theoretical base on which the researchers included in our dataset developed their own theories. Eventually, the ultimate scope of co-citation networks was to individuate and isolate the classics, that is, the papers that were cited the most in each macro-group. For the stream of literature *Business studies and networks*, the three main references were Ahuja (2000), Burt (1992) and Granovetter (1985); for the cluster labelled as *Networks and organization studies*, the main references were Burt (1992, 2004), Borgatti and Foster (2003) and Podolny and Page (1998); for the *Social network analysis and management science* group, the main references were Burt (1992), Brass (1984); Wasserman and Faust (1994). If Burt (1992) can be identified as a milestone transversal to all streams of literature in the field of networks and organizations, the three clusters are confirmed as rooted in different debates within the field: the first closer to management studies, the second closer to economic sociology and the third closer to structural analysis of networks and organizations.

5 Concluding Remarks

The present chapter explored how the study of networks and organizations evolved in the past two decades, through a structured literature review of 267 paper published in top journals in the management field, overall representing the different disciplines contributing to this field of study. The results here presented showed that the literature on networks and organizations has evolved harmonically in three different streams of research that contributed at advancing the field through their different views: the stream on *Business studies and networks* explored particularly interorganizational phenomena linked to knowledge transfer and innovation; the stream on *Networks and organization studies* investigated social phenomena transversal to formal and informal ways of organizing; the stream on *Social network analysis and management science* focused on how social structures impact on individuals' behaviours and performance. The interesting point of our results is that these streams of literature not only

are identifiable for similarities in the phenomena at the centre of their investigations but also for their methodological and analytical approaches. Overall, the results suggest that the multi-disciplinary approach to the study of networks and organizations contributed at advancing our understanding of a broad range of organizing phenomena in the management field, for which networks represent a metaphor, a specific organizational form and a structural pattern of interactions. Notwithstanding the richness of approaches and the appeal that networks represented for management scholars, the results here presented suggest that despite the rapid growth of contributions on networks and organizations, the research tradition has organized coherently around three different streams of research: their acknowledgement and characterization is a first step towards a more clear and tidy evolution of this field of research.

To conclude, our investigation highlighted also some under-investigated areas of research that could be profitably explored by future research. A general trend towards qualitative, theoretical research emerged, even if quantitative and empirical studies are still dominating the field: further exploitation of the opportunities coming from qualitative methodologies and theoretical development could enrich the field in the future, in particular for the *Business studies and Networks* and *Networks and organization studies* streams of literature. In terms of network stages, the emergence phase is still partially uncovered by extant research, probably because of empirical difficulties in gathering data and observing organizational phenomena from the very beginning: in this sense, the methods proper of the *Social network analysis and management science* stream of research, such as theoretical models or agent-based models, could push further the knowledge on this topic. Informal organizations and organizing processes have gained increasing interest in recent times, even if they remain the least investigated organizational contexts. Future research within the *Networks and organization studies* and *Social network analysis and management science* streams could be profitably developed towards this direction. While multi-layer networks, multiplexity and network performance have been under the attention of scholars within the *Networks and organization studies*, these topics are still underdeveloped overall: we encourage future research to focus on these promising and interesting topics.

Appendix: List of the Papers Analysed

Cluster 1: Business Studies & Networks

Abouassi, K., & Tschirhart, M. (2018). Organizational response to changing demands: Predicting behavior in donor networks. *Public Administration Review, 78*(1), 126–136.

Akkus, O., Cookson, J., & A. Horta ṃcsu. (2016). The determinants of bank mergers: A revealed preference analysis. *Management Science, 62*(8), 2241–2258.

Andersson, U., Forsgren, M., & Holm, U. (2007). Balancing subsidiary influence in the Federative MNC: A business network view. *Journal of International Business Studies, 38*(5), 802–818.

Alcàcer, J., & Minyuan, Z. (2018). Local R&D strategies and multilocation firms: The role of internal linkages. *Management Science, 58*(4), 126–136.

Argyres, N., Bercovitz, J., & Zanarone, G. (2020a). The role of relationship scope in sustaining relational contracts in interfirm networks. *Strategic Management Journal, 41*(2), 222–245.

Arya, B., & Lin, Z. (2007). Understanding collaboration outcomes from an extended resource-based view perspective: The roles of organizational characteristics, partner attributes, and network structures. *Journal of Management, 33*(5), 697–723.

Baum, J., McEvily, B., & Rowley, T. (2012). Better with age? Tie longevity and the performance implications of bridging and closure. *Organization Science, 23*(2), 529–546.

Bel, R. (2018). A property rights theory of competitive advantage. *Strategic Management Journal, 39*(6), 1678–1703.

Bell, G., & Zaheer, A. (2007). Geography, networks, and knowledge flow. *Organization Science, 18*(6), 955–972.

Bentona, R. (2017). The decline of social entrenchment: Social network cohesion and board responsiveness to shareholder activism. *Organization Science, 28*(2), 262–282.

Berardo, R., & Lubell, M. (2016). Understanding what shapes a polycentric governance system. *Public Administration Review, 76*(5), 738–751.

Berns, J., Gondo, M., & Sellar, C. (2021). Whole country-of-origin network development abroad. *Journal of International Business Studies, 52*(3), 479–503.

Berry, H. (2018). The influence of multiple knowledge networks on innovation in foreign operations. *Organization Science, 29*(5), 855–872.

Bowman, A., & Parsons, B. (2013). Making connections: Performance regimes and extreme events. *Public Administration Review, 73*(1), 63–73.

Braha, D., & Bar-Yam, Y. (2007). The statistical mechanics of complex product development: Empirical and analytical results. *Management Science, 53*(7), 1127–1145.

Brenner, B., & Ambos, B. (2013). A question of legitimacy? A dynamic perspective on multinational firm control. *Organization Science, 24*(3), 773–795.

Briscoe, F., & Tsai, W. (2011). Overcoming relational inertia: How organizational members respond to acquisition events in a law firm. *Administrative Science Quarterly, 56*(3), 408–440.

Brouthers, K., Geisser, K., & Rothlauf, F. (2016). Explaining the internationalization of business firms. *Journal of International Business Studies, 47*(5), 513–534.

Cai, J., & Szeidl, A. (2018). Interfirm relationships and business performance. *Quarterly Journal of Economics, 133*(3), 1229–1282.

Carnabuci, G., & Operti, E. (2013). Where do firms' recombinant capabilities come from? intraorganizational networks, knowledge, and firms' ability to innovate through technological recombination. *Strategic Management Journal, 34*(13), 1591–1613.

Chellappa, R., & Saraf, N. (2010). Alliances, rivalry, and firm performance in enterprise systems software markets: A social network approach. *Information Systems Research, 21*(4), 849–871.

Choi, E., Özer, Ö., & Zheng, Y. (2020). Network trust and trust behaviors among executives in supply chain interactions. *Management Science, 66*(12), 5823–5849.

Choi, J. W. (2007). Governance structure and administrative corruption in Japan: An organizational network approach. *Public Administration Review, 67*(5), 930–942.

Clough, D., & Piezunka, H. (2020). Tie dissolution in market networks: A theory of vicarious performance feedback. *Administrative Science Quarterly, 65*(4), 972–1017.

Corredoira, R., & Mcdermott, G. (2014). Adaptation, bridging and firm upgrading: How non-market institutions and MNCs facilitate knowledge recombination in emerging markets. *Journal of International Business Studies, 45*(6), 699–722.

Davis, J. (2016). The group dynamics of interorganizational relationships: Collaborating with multiple partners in innovation ecosystems. *Administrative Science Quarterly, 61*(4), 621–661.

Davis, J., & Eisenhardt, K. (2011). Rotating leadership and collaborative innovation: Recombination processes in symbiotic relationships. *Administrative Science Quarterly, 56*(2), 159–201.

Dequiedt, V., & Martimort, D. (2015). Vertical contracting with informational opportunism. *American Economic Review, 105*(7), 2141–2182.

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Dong, M., Fang, Y., & Straub, D. (2017). The impact of institutional distance on the joint performance of collaborating firms: The role of adaptive interorganizational systems. *Information Systems Research, 28*(2), 309–331.

Dyer, J., & Hatch, N. (2006). Relation-specific capabilities and barriers to knowledge transfers: Creating advantage through network relationships. *Strategic Management Journal, 27*(8), 701–719.

Fang, C., Lee, J., & Schilling, M. (2010). Balancing exploration and exploitation through structural design: The isolation of subgroups and organizational learning. *Organization Science, 21*(3), 625–642.

Fiss, P., Kennedy, M., & Davis, G. (2012). How golden parachutes unfolded: Diffusion and variation of a controversial practice. *Organization Science, 23*(4), 1077–1099.

Fonti, F., Maoret, M., & Whitbred, R. (2017). Free-riding in multiparty alliances: The role of perceived alliance effectiveness and peers' collaboration in a research consortium. *Strategic Management Journal, 38*(2), 363–383.

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Gazley, B., Chang, W., & Bingham, L. (2010). Board diversity, stakeholder representation, and collaborative performance in community mediation centers. *Public Administration Review, 70*(4), 610–620.

Germonprez, M., Levy, M., Kendall, J., & Kendall, K. (2020). Tapestries of innovation: Structures of contemporary open source project engagements. *Journal of the Association for Information Systems, 21*(3), 615–663.

Godart, F., Shipilov, A., & Claes, K. (2014). Making the most of the revolving door: The impact of outward personnel mobility networks on organizational creativity. *Organization Science, 25*(2), 377–400.

Greve, H., Kim, J. Y., & Teh, D. (2016). Ripples of fear: The diffusion of a bank panic. *American Sociological Review, 81*(2), 396–420.

Grugulis, I., Vincent, S., & Hebson, G. (2003). The rise of the 'network organisation' and the decline of discretion. *Human Resource Management Journal, 13*(2), 45–59.

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Gözübüyük, R., Kock, C. J., & Ünal, M. (2020). Who appropriates centrality rents? The role of institutions in regulating social networks in the global Islamic finance industry. *Journal of International Business Studies, 51*(5), 764–787.

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Shipilov, A., Li, S., & Greve, H. (2011). The prince and the pauper: Search and brokerage in the initiation of status-heterophilous ties. *Organization Science, 22*(6), 1418–1434.

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Cluster 2: Networks and Organization Studies

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