

Networks and network strategies: New theorization based upon a systematic literature review

Rossella Canestrino¹ , Amir Forouharfar² 

Abstract

PURPOSE: This paper aims to introduce a general all-embracing taxonomy of networks and its relevant strategies to facilitate the teaching and learning of the strategic concepts of networks in strategic management. **METHODOLOGY:** To fulfill its intention, the paper has adopted a systematic literature review (SLR), since the introduced taxonomy and its corresponding strategies should be a compendious reflection and summary of the current literature of the studies on strategic networks. **RESULTS:** The paper unfolded seven potential configurations of the networks and then proceeded with the proposition of their relevant strategies with regard to the networks' relationships and forms. These networks were named as Reciprocally Interdependent Networks, Sequentially Interdependent Networks, Partnering Networks, Complementary (Overlapping) Networks, Supporting (Logistic) Networks, Distributing Networks, and Co-Innovation Knowledge-Sharing Networks. Their corresponding network strategies were identified as Multi-Level Promotion Strategy, Just-In-Time Strategy, Network Partnership Strategy, Compensatory Strategy, Network Logistic Strategy, Distributing Network Strategy, and Network R&D Strategy, respectively. **IMPLICATIONS FOR THEORY AND PRACTICE:** Systematics or a system of classification is a fundamental necessity in any field of knowledge, benefiting both academia and learners. Accordingly, this paper provides a comprehensive but concise means of classifying networks and their strategies to overcome the paucity still existing in the literature. These efforts invite future research and conversation about networks and network strategies, proposing a guiding framework for the debate. **ORIGINALITY AND VALUE:** Lack of consensus about theories and conceptualizations in strategic network studies became an inspiration for this research, which allowed for the clarification of the mentioned existing paucity.

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INTRODUCTION

Global networks in commerce, business, communication, R&D, goods and passenger transportation – which are the fruits of gigantic and massive-scale economic globalization – have culminated in a modern global economy, which is inherently a *network economy*. Thus, as Carmichael (2016) puts it, “As our economy has grown more global and more digital, businesses have had to shift their competitive strategies, marketing techniques, and business models. One of the most powerful changes? The rise of network effects.” Globalization has come hand in hand with the global networks and hence strategic studies of these networks in the organizational world could equip the organizational strategists with the necessary insight, not only for taking advantage of the emerging, current or nascent opportunities, but also for avoiding the potential strategic threats out there. From an academic perspective, a network is certainly not a new topic and previous efforts have been made to introduce conceptual clarity (Blanco et al., 2011; Isett et al., 2011; Berry et al., 2004; Börzel, 1998): disciplines addressing networks include health sciences, management, political science, social science, social work, computer science, ecology, etc. (Hill, 2002). An extensive literature dealing with the analysis of inter-organizational relations and networks within the management field (Mizruchi & Galaskiewicz, 1993; Jarillo, 1993; Ebers & Jarillo, 1998; Sydow, 1998) embeds its roots in organization theory.

Moreover, Oliver and Ebers (1998) performed a literature search culminating in a network analysis of 158 articles published in four leading journals from 1980 to 1996. According to their research, the most frequently employed theories within this field are resource dependence, political power, and network approach. However, the proliferation of different perspectives resulting in the creation of various concepts, definitions, and metrics is responsible for a confusing picture requiring further clarifications (Dal Molin & Masella, 2016). Thus, the current and severe paucity of consensus-making theories and conceptualizations in strategic network studies is the rationale for such a study. One of the primary reasons for such conceptually system-making meagerness could be the network approach, as roughly a new emerging paradigm in strategic management. Context and relations play pivotal roles in this approach. It strongly relates to the organizational environment and it consists of various concepts from the firms’ internationalization to the inter-organizational connections. Despite the mentioned considerations,

network approaches still lack a sound typology for the strategic networks, thus requiring new advancements in the field. The need for such a typology relates to the growing importance of network economy in the truly global organizations day in day out. Thus, this paper's aim is to introduce a general all-embracing taxonomy of networks and its relevant strategies to facilitate the teaching and learning of strategic concepts of networks within a system in strategic management. This process paves the way for reaching an answer to the following research question (RQ):

RQ: What is the literature-supported taxonomy of inter-organizational networks and its relevant network strategies?

Hence, one of the approaches to presenting a typology for the strategic networks is by discovering the strategic networks' configurations in the real inter-organizational world. The logic behind such an approach is the possibility of arranging the salient strategic elements of any network through the outstanding and influential relationships and by their directions. These two features, which could be defined as *structuration* (i.e., finding and presenting justifiable structures in the studied networks) and *directionality* (i.e., finding the relationship directions within each network), contribute to the schematic presentation of the network configurations.

Additionally, even though strategic researchers of networks have reached praiseworthy results, current mainstream strategic literature on networks suffers deep one-sidedness. In other words, the current literature mainly deals with one or at most very limited aspects of networks and strategies. This one-dimensional approach to the strategic study of networks is currently a ubiquitous and prevalent phenomenon easily diagnosable in highly-cited works of scholarly quality, for example from the 'industrial organization (IO) perspectives' in McIntyre and Srinivasan (2017) to 'strategic alliances' in Kale, Singh, and Perlmutter (2000).

Yet, broadly, introducing strategic network typology could be either deductive or inductive. Induction or inference from a general principle is out of the question, since due to the vast and stupendous arena of strategic networks it is nearly impossible to propose a universal general theory. Thus, the only approach for fulfilling the research goal is by applying induction or inference from particulars. The particulars in our study are the secondary data derived out of the precise systematic strategic networks' literature study.

On the other hand, the organizational morphologies were labeled under broad categories as *network*, *network-centric*, *networking* or *networked organizations* and in the management literature each shed light on a specific

dimension of the concept of network, but inwardly. In other words, they mainly refer to the internal networks within organizations, which are irrelevant when referring to the network approaches developed in the organizational/strategic studies.

In this paper, first in the methodology section, our SLR, its criteria and steps were unfolded. After that, both descriptive and content analyses were performed and the network literature was reviewed and analyzed here. Finally, according to our research results, seven network configurations, as well as their relevant strategies were proposed in line with the studied literature.

METHODOLOGY

In the context of networks and their strategy, the Systematic Literature Review (SLR) may be considered an effective and robust way to collect, sum up and evaluate evidence, since an SLR is usually undertaken to deeper understanding into the phenomenon being addressed within existing studies, as well as to provide recommendations for further research (Unterkalmsteiner et al., 2012). For this review, the authors have broadly followed the guidelines proposed by Kitchenham and Charters (2007). These guidelines have established that a review should be comprised of three phases, including its planning, conducting, and reporting. In line with the mentioned guidelines, the research questions should be first stated and then some relevant criteria be developed for collecting the literature. Particularly, two main phases (*desk-based literature study* and *literature compilation*) were managed at this stage. In the next step, a plan for classifying, describing, and coding the literature was developed through *literature filtration* and *variables' distillation*. As a final step, the literature was synthesized (Forouharfar et al., 2019; Merli et al., 2018; Denyer & Tranfield, 2009; Tranfield et al., 2003) in order to provide a taxonomy for networks and their corresponding strategies (Table 1).

Scopus and *Web of Science (WoS)* were selected as sources of data because they were deemed to be the most comprehensive and authoritative scientific catalogs (Merli et al., 2018), featuring full texts and searchable cited references for top journals, as well as providing complete information in the field of networks and firms' strategy. Many scholars (Bakkalbasi et al., 2006; Burnham, 2006; LaGuardia, 2005; Dess et al., 2006; Li et al., 2010) have compared the coverage, features and citation analysis capabilities of *Scopus* and *WoS*, concluding that these two databases are permanently improving their potentiality. Depending on the above, the use of both *Scopus* and *WoS* is in line with the research question in this paper.

Table 1. Systematic approach in reviewing strategic networks’ literature in this study

LITERATURE REVIEW				
Method	Context	Process		Final Results
		a. Phase	b. Purpose	
Systematic Literature Review (SLR)	Strategic Networks	# 1: Desk-Based Literature Study	Acquisition of secondary data	Salient variables/ elements for classifying strategic networks and introducing their corresponding schematic configurations
		# 2: Literature Compilation	Compilation of strategic network literature	
		# 3: Literature Filtration	Filtration of the literature variables/ elements based on their relevance to strategic networks	
		# 4: Variables’ Distillation	Extraction of the strategic as well as network variables/ elements	
		# 5: Variables’ Generalization	Generalization of the extracted variables/ elements of strategic networks	

Thus, after reading several publications on the general network topic (e.g., Håkansson & Laage-Hellman, 1984; Jarillo, 1988; Hinterhuber & Levin, 1994; Borch & Arthur, 1995; Ibarra, Kilduff, & Tsai, 2005; Knobens, Oerlemans, & Rutten, 2006; Hite, 2008; Chang, Chiang, & Pai, 2012; Krzakiewicz & Cyfert, 2013; Kohtamäki, Thorgren, & Wincent, 2016; Christakis et al., 2020), and based on the authors’ experience, five keywords were selected as search strings employed in both databases, namely:

- 1) Strategic network.
- 2) Strategic network configuration/shape/type/typology.
- 3) Network strategy.
- 4) Network strategy element/variable/feature.
- 5) Organizational network configuration/shape/type/typology.

Depending on the selected keywords, the following research string was defined in accordance with Boolean and proximity operators suggested narrowing down the scope of advanced search:

(“Strategic network*” OR “organizational network*”) AND
 (configuration* OR shape* OR type*) OR (“Network strategy*”) AND
 (element* OR variable* OR feature*)

AND NOT

“Internal network” OR “strategic coalition*” OR “organizational relationship*”*

According to the databases’ research functionalities, the chosen keywords were searched in “Topic” (covering Title, Author Keywords, Abstract, Keyword Plus®) on *WoS*, as well as in “Title, Author Keywords, Abstract” on *Scopus*. As recommended in the literature, only journal articles were selected, which inherently improves a literature review’s potential rigor and quality (Vigolo et al., 2018; Orzes et al., 2018; Jia & Jiang, 2018). Since most academic journals are English based, with English being the most used language by researchers in the modern global academic community (Snyder et al., 2016), the research only focused on the English papers.

After defining the language and the type of the papers, articles belonging to Business, Management, and Accounting; as well as Economics, Finance and Social Science subject areas were considered in our databases’ search. Moreover, no chronological restriction was employed. As a result, *WoS* returned 149 papers and *Scopus* 42 papers, giving a total of 191 documents. Table 2 summarized the research strategy adopted to develop the systematic literature review.

Additional exclusion criteria were also adopted for the systematic review, as suggested by De-La-Torre-Ugarte-Guanilo et al. (2011), when rejecting papers referring to:

- 1) Internal organizational networks.
- 2) Internal strategic coalitions.
- 3) Internal organizational relationships.

After the removal of redundant duplications, a final sample of 172 papers remained (77 full papers and 95 abstracts³).

³ The distinction between full papers and abstracts depends on the availability of the documents on the selected databases. Since the key strategic characteristics and variables were important to us for moulding the network strategic figures and we could easily find these key variables in some of the relevant papers’ abstracts, both full papers and abstracts were considered in managing our analysis.

Table 2. Summary of the results for the employed search string

Search string	Scopus	Total sample size on Scopus	WoS	Total sample size on WoS
("strategic network*" OR "organizational network*") AND (configuration* OR shape* OR type*) OR ("network strategy*") AND (element* OR variable* OR feature*) AND NOT "internal network*" OR "strategic coalition*" OR "organizational relationship*"		77		409
LIMITED TO:				
Language	English	75	English	391
Document type	Articles	54	Articles	298
Subject Areas	<ul style="list-style-type: none"> • Business/ Management and Accounting • Economic, Econometric and Finance • Decision Science • Social Science • Multidisciplinary 	42	<ul style="list-style-type: none"> • Management • Business • Economics • Social Science Interdisciplinary • Multidisciplinary Science • Business Finance • Operation Research Management Science 	149
TOTAL PAPERS				191

LITERATURE REVIEW FINDINGS

Descriptive analysis

Following Siva et al. (2016), the year of publication, type of paper, adopted methodology, etc. was established as our analytical categories (Table 3).

Table 3. Our research analytical categories

Category	Description
Year	Year in which the paper was published
Country	Countries where authors have published research
Journal	Journals in which authors have published research
Type of paper	Type of paper (empirical paper, conceptual paper, literature review)
Adopted methodology	Methodology adopted to manage the research (qualitative, quantitative, mixed methods)

Table 4 shows the number of publications published from 1983 to 2021. Our latest access for searching on *Scopus* and *WoS* was on March 18, 2021. This means that potentially some of the publications for the last year (2020) were still under review or publishing by their pertinent journals. Hence, the incorporated data in this research, about the papers published in 2021, should be considered provisional and are expected to increase until the end of the year. In order to evaluate and fully understand the possible trends, we divided the whole period by four, investigating them through a content analysis.

Table 4. Number of papers published from 1983 to 2021

Period of time	No. of publications
First Period (1983–1992)	5
Second Period (1993–2002)	14
Third Period (2003–2012)	53
Fourth Period (2013–2021)	100
Total	172

The first paper about the topic was published in 1983. During the first period (1983–1992), papers mainly belong to the social science subject areas, aiming to explore the role of inter-organizational networks and the way they support formulation of policy, democratization, as well as urban development. However, the papers roughly doubled in the second period. It has only been since the beginning of 2011 that scholars started focusing on inter-organizational networks from the managerial and strategic perspectives. The papers published during the third period (2003–2012) are diverse, as no specific network issue seems to prevail over the others. By contrast,

a predominant approach/method was emerging for the analyses, with several scholars providing conceptual frameworks of networks and network analysis. The final period (2013–2021) shows a significant growth in the number of the strategic network papers to 100 in total, representing an increase of almost 50% in comparison to the previous period (2003–2012). In the fourth period, concepts such as “innovation,” “innovation process,” “business-model innovation,” “innovation systems,” and “organizational learning” were largely emphasized when discussing firms’ networks and strategies, mainly with the intention of exploring the linkage between stakeholders’ interactions and the firms’ potentiality for success. As scholars emphasize (Biemans, 1991; Håkansson & Waluszewski, 2007; Powell, Koput, & Smith-Doerr, 1996; Rampersad, Quester, & Troshani, 2010), firms’ competitiveness in contemporary markets increasingly requires co-operation within extensive networks, as many technological innovations tend to require multi-sectoral collaboration. Researchers have acknowledged that while the involvement and participation of diverse stakeholders in the innovation process are essential, they complicate interaction. Therefore, examining inter-organizational networks and interactions as strategic management issues becomes crucial when discussing the network-participating firms’ relationships.

Moreover, according to the country analysis, pertinent articles from 42 different countries from five continents – Africa, America, Asia, Europe, and Oceania – were identified. The USA (38 contributions) and the UK (24 contributions) represent the highest number of published papers (nearly 36% of all the studied papers).

Table 5 shows countries with the highest contribution in the research field. The ranking is limited to the top 15 countries, since the number of publications under 5 was not considered.

Europe (other than the UK) is the continent with the largest participation with 67 articles (38.9%) from 9 different countries (Germany, Netherlands, France, Italy, Finland, Denmark, Poland, Romania, Spain), where Germany produced 16 articles, as the highest contributing country to the strategic networking literature.

Table 5. Countries with the highest contribution in the field

Ranking	Country	No. of publications	Contribution to the field (% on the whole sample)
1	USA	38	22
2	UK	24	13.9
3	Germany	16	9.3
4	China	12	6.9
5	Australia	11	6.4
6	Canada	9	5.2
7	Netherlands	9	5.2
8	France	8	4.6
9	Italy	8	4.6
10	Finland	6	3.4
11	Denmark	5	2.9
12	Poland	5	2.9
13	Romania	5	2.9
14	Russia	5	2.9
15	Spain	5	2.9

The 172 selected papers come from 126 different journals from within very diverse fields, nevertheless pertinent to management and management studies, thus revealing a significant fragmentation and dissonance in strategic network literature. For example, 53 papers, out of the studied papers, were published in 33 diverse journals, but only in few circumstances; the studied journals accepted more than 4 papers dealing with relevant or the same topics on strategy and networks.

Table 6 shows the list of journals that have published the study sample of articles from 1983 and 2021. Journals with fewer than five papers were not included, as their number of publications was considered irrelevant. Information about the Impact Factor (IF), and SCImago ranking were collected from the journals' official websites, as well as from SCImago's ranking system. The IF provides scholars with an objective measure of the importance of different journals within a given category (Rey-Marti et al., 2016). In addition, SCImago is a prestige metrics based on the idea that not all citations are the same. It provides a quantitative and qualitative measure of the Journal's impact, based on a similar algorithm to Google page ranking.

Table 6. Journals publishing the articles

Ranking	Journals	Publisher	No. of publications	Impact factor (IF)*	Scimago journal rank (SJR)**
1	Industrial Marketing Management	Elsevier	9	4.695	125
2	Journal of Business and Industrial Marketing	Emerald	7	2.497	62
3	Strategic Management Journal	John Wiley and Sons Ltd	6	5.463	269
4	Journal of Business Research	Elsevier	4	4.874	179
5	Technological Forecasting and Social Change	Elsevier	4	5.846	103

*IF measures the average number of citations received in a particular year by papers published in the Journal during the two preceding years (Clarivate Analytics, 2020 – www.clarivate.com)

** SJR is a prestige metrics based on the idea that not all citations are the same. It provides a quantitative and qualitative measure of the Journal's impact (Elsevier Analytics, 2020 – www.elsevier.com)

Source: Authors' own work (last access to the online data: March 27, 2021).

Our study reveals the need for improving the quality of contributions in the field of networks, since only 30 papers (in the studies sample) were listed among the top 5 high-ranked journals, with the *Strategic Management Journal* hosting 6 of them.

In order to provide a full understanding of the selected papers, they were finally categorized according to the article type (i.e., empirical, conceptual, review) and the applied methodology, namely qualitative *versus* quantitative. The results showed that the majority of the reviewed contributions were empirical studies (62%), followed by conceptual papers (30.63%) and reviews (7.37%). From a methodological perspective, 34.6% of the empirical studies adopted qualitative approaches, 57.1% adopted quantitative approaches, and only 8.3% used a mixed-method approach (combining both qualitative and quantitative methodologies).

Thematic analysis

According to our literature review, three main issues were outstanding:

First, “*The term ‘network’ is often misconstrued*” (Satell, 2015; p. 1). In any organization, we could have two types of networks: (1) internal networks and (2) inter-organizational networks. The network approach deals with the second type of networks – the networks that constitute the surrounding environment.

Second, any study of organizational networks is a *contextual* phenomenon. That is strictly relevant to the context such as organizational structure, environment, relationship, or inter-synergism. Particularly, Satell (2015) referred to a network as an organizational structure, stating “... *networks are informal structures. If it can fit on a traditional org chart, it’s not a network.*” Moreover, he continues, “*For functional purposes, networks have two salient characteristics: clustering and path length. Clustering refers to the degree to which a network is made up of tightly knit groups while path length is a measure of distance – the average number of links separating any two nodes in the network.*” There is not a unanimously/commonly accepted or developed definition for these organizations (Krzakiewicz & Cyfert, 2013); but, “*A ‘network organization’ is usually conceived as an organization that is quick and flexible in adapting to changes in its environment*” and hence they are *adaptable* and have a special organizational structure (Vega-Redondo, 2013, p. 72) for the facilitation of inter-organizational/inter-company cooperation. Yet, in network approaches, we search for the constituting elements of the sophisticatedly inter-organizational interwoven networks, which are replete with idiosyncratic motifs and incentives for their involvement and participation in the networks. In other words, setting aside the common tendency of network organizations for *adaptability* and *environmental cooperation*, they all share another common salient feature, which is the undeniable strategic propensity for synergistic inter-organizational connections and even network generation and later network sophistication. Besides, two main phenomena, fostering the emergence of the concept, were the nonstop globalization and the necessity for inter-organizational connection, cooperation, competition and, in many cases, rivalry.

According to Krzakiewicz and Cyfert (2013), the rising relevance of international business cooperation, especially in the 1960s, called for the exploration of inter-organizational solutions. The emerging globalized markets and the ever-growing necessity for outsourcing required new organizational designs and structure. Thus, ‘hollow corporation’ and ‘modular organization’ have soon become established as two of the most familiar network organizational designs. Particularly, the introduction of the “hollow corporation” in the 1980s could be interpreted as one of the earliest signs of emphasizing inter-organizational solutions and approaches. ‘Hollow corporations’ “*focus on their core competencies and outsource peripheral processes*” and ‘modular organizations’ “*order different parts [modules] from internal or external providers and assemble them [the product modules] into a product*” (Narasimhan & Yu 2021, p.1); they act for “*the vertical disaggregation of the firm [structural modules] and the use of market mechanisms within hierarchies*” (Kuntz & Vera, 2007, p. 48).

Although outsourcing and its benefits were not the only strategic necessity for accentuating the need for designing organizations with the emphasized tendency towards inter-organizational networking and interrelation-makings, it played one of the major roles for the justification of the trend. The ever-increasing contracting out of manufacturing and services providing jobs needed precisely defined networks. Thus, inter-organizational networks were not only limited to nongovernmental entities, but they also extended to the governments' execution of their departmental affairs and public service provision through contractors. For example, only by 1980, 80% of the people involved in implementing the United States departments' programs and plans were contractors (Crawford & Krahn, 1998).

Third, as discussed above, networks could be found either within organizations (in network organizations) or outside of the organizations (in the organizational environment). The strategic network approach mainly focuses on the organizational environment, its emergence, texture, and sophistication.

To address the specific theme of this paper, namely strategic networks and their configurations, we should not neglect that theoretical arenas as diverse as embedding, dependence on resources, social capital and industrial networks have been studied. As Lin et al. (2011, p. 183) report, "*researchers have realized the crucial impact of embeddedness on governance structures of strategic alliances.*" Based on the data from strategic alliances among semiconductor firms in Taiwan, the authors also revealed the influential significance of 'network structural embeddedness' on 'the design of alliance governance' among the companies within the network. *Network embeddedness* is not only crucial for knowledge sharing but also for the innovation and development of enterprises (Liu & Tang, 2020; Canestrino & Magliocca, 2019). In addition, network relationships among organizations could lead to *resource dependence* and even *external control* by the outside constituting organizations within the network. For example, a study by Mitchell (2014) on the strategic responses to resource dependence among transnational NGOs registered in the United States, demonstrated that these organizations engagement in fundraising activities to support their operations globally led to their excessive dependence on the external environment for financial support and hence resource dependence which could culminate in external control. Additionally, *corporate social capital*, "*as processes of forming and mobilizing social actors' network connections within and between organizations to gain access to other actors' resources*" (Knocke, 1999, p. 17) deserve close study in understanding the strategic networks' configuration formations and dynamics. Finally as Baraldi (2008, p. 99) has emphasized, in organizational networks, "*Network strategies cannot be used as shortcuts to compensate for severe weaknesses, but instead*

can only be pursued by firms that possess adequate competences, external organizational interfaces, and network-oriented cultures.”

Taking into account the adopted criteria for the SLR (see Table 1), the content analysis allowed us to extract main network variables/elements, as well as network strategies, out of the highly-cited literature. Therefore, the study results are presented in the following section.

RESULTS

Adopting the following search string:

(“strategic network” OR “organizational network*”) AND (configuration* OR shape* OR type*) OR (“network strategy*”) AND (element* OR variable* OR feature*) AND NOT (“internal network*” OR “strategic coalition*” OR “organizational relationship*”)*

and, according to the five phases of the SLR previously described in Table 1, the salient variables/elements of strategic networks, organizational networks, and network strategies were identified, allowing us to finally propose a taxonomy for various networks and their corresponding strategies. Table 7 summarized the main outputs of the literature review process, particularly referring to its derived concepts.

Then by fulfilling the generalization phase (the fifth and the last phase of the SLR in this study), we identified 7 different configurations and their dominant relevant strategies. For each configuration, salient features were presented, revealing the key relationships each network possesses.

Table 7. Literature review and its derived key concepts

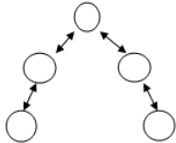
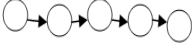
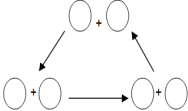
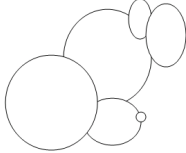
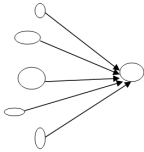
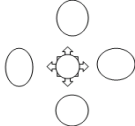
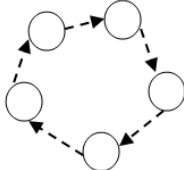
Main category/keywords	LITERATURE REVIEW PROCESS	
	Derived key concepts	References
Strategic network	- Cooperative behavior	Jarillo, 1988
	- Aspects of firm behavior (cooperative vs. competitive)	
	- The cooperative relationships of a firm can be the source of its competitive strength.	Goetschalckx & Fleischmann, 2005
	- The strategic network design have both interrelated spatial and temporal characteristics	
	- The decisions made during the strategic network planning have a major impact on the long-term profitability and competitive position of a corporation	
	- Expansion into a new geographical area	
	- Design of world-class supply chains	
- A holistic view of a supply chain does not focus exclusively on a single aspect of the supply chain performance such as inventory or direct labor cost, but takes an integrated and comprehensive view of the whole supply chain from the raw material suppliers, through the various transformation facilities and transportation channels, to the final customers.		

LITERATURE REVIEW PROCESS		
Main category/keywords	Derived key concepts	References
	<ul style="list-style-type: none"> - Establishment of reverse logistics (RL) networks for various original equipment manufacturers (OEM's) is gaining significant importance. - Various green legislations are forcing OEMs to take back their used, end-of-lease or end-of-life products, or products under warranty to minimize wastes and conserve resources. - OEMs have turned to a better design of their products for maximum reuse and recycling and to retrieve back the used products through a network for reuse, remanufacture, recycle or disposal, so that maximum value can be achieved from their used products. - Designing of network points and assigning capacities to them depend not only on the volume of returned products but also on the demand for remanufactured products and the parts of used products. - Dismantled parts are sent for remanufacturing or to the secondary market as spare parts. - A firm's relationship management practices serve as antecedents to its strategic network identity. - Network sensing, relational embeddedness and partner integration lead to strong strategic network identity and, subsequently, to enhanced market performance. - Network relationship management activities can create enduring strategic advantages for the firm. - Formation of R&D partnerships - Strategic network capabilities, specifically centrality-based capabilities and the efficiency, with which companies choose their partners, are found to facilitate the formation of new partnerships. - A link will be formed if both agents view the link as beneficial to them. - The network formation as a sequential process - They base their decision on their own characteristics, the characteristics of the potential partner, and on features of the current state of the network, such as whether the two potential partners already have friends in common. - Network marketing - The Strategic Network Marketing Model (SNMM) typology: firms use intra-firm, social, customer, business, innovation, and marketing and sales networks to leverage additional resources that create value for the firm. - Information and communication technology (ICT) sector, where the development of competitive offerings often requires a coalition of platform and service providers. - Resource-based view and the value creation system approach - The construction of a strategic network can be divided into parallel, although not necessarily simultaneous, sub-processes based on the required value activities in the entire business concept. - Building a strategic network is not necessary a stage-wise process but can be divided into several sub-processes. - Early recognition of value capturing is essential - Local socio-economic context and its social capital - Cluster policies - Social capital can create value for companies by closure of the network structure (bonding), which maintains internal mutual trust 	<p>Mutha & Pokharel, 2009</p>
		<p>Bonner, Kim, & Cavusgil, 2005</p>
		<p>Hagedoorn, Roijakkers, & Van Kranenburg, 2006</p>
		<p>Christakis et al., 2020</p>
		<p>Jones, Suoranta, & Rowley, 2013</p>
		<p>Partanen & Möller, 2012</p>
		<p>Eklinder-Frick, Eriksson, & Hallén, 2012</p>
	<p>but bonding can also over-embed companies in their social context, whereas sparse networks that provide links to other parts of relevant business networks. (bridging) often provide greater innovation benefits.</p>	
	<ul style="list-style-type: none"> - The importance of bonds between actors - Social reciprocity strengthens network bonds - Network formation: agents have heterogeneous tastes over links, and allows for anonymous and non-anonymous interaction effects among links. - Controlled (or co-ordinated) networks - Uncontrolled networks - Strategic network effectiveness is directly influenced by building actor webs and collective sense making - Strategic network efficiency is directly influenced by developing activity patterns and utilizing resource constellations - Co-operatives have been likened to a 'network of contracts' or 'coalition'. - Small firms use co-operatives as a strategic network. - Adaptability and the maintenance of member trust and loyalty - Partnerships 	<p>Menzel, 2015</p>
		<p>Hinterhuber & Levin, 1994</p>
		<p>Bayne, Schepis, & Purchase, 2017</p>
		<p>Mazzarol, Limnios, & Reboud, 2013</p>
		<p>Kohtamäki et al., 2006</p>

LITERATURE REVIEW PROCESS		
Main category/keywords	Derived key concepts	References
	<ul style="list-style-type: none"> - Trust in network relations (Inter-organizational exchange) - Socio-economic relations of actors within strategic networks - Uni-entity networks vs. multi-entity networks 	<p>Borch & Arthur, 1995 Fernandes, Relvas, & Barbosa-Póvoa, 2013 Lorenzoni, 2010</p>
	<ul style="list-style-type: none"> - Relational capabilities and cooperation, both of which affect a firm's competitive position - Collaborative networks - Strategic nets of domestic and foreign partners 	<p>Rui & Bruyaka, 2021</p>
	<ul style="list-style-type: none"> - Firms in government-supported strategic networks tend to rely on professional network board members for support and assistance - Ties are not all the same and not all equally strategic - Multi-zone dispatching 	<p>Thorgren, Wincnt, & Anokhin, 2010 Hite, 2008 Üster & Maheshwari, 2007</p>
	<ul style="list-style-type: none"> - Firm adaptations within strategic networks 	<p>Kohtamäki, Thorgren, & Wincnt, 2016</p>
	<ul style="list-style-type: none"> - Formation of strategic networks under high uncertainty 	<p>Jussila, Mainela, & Nätti, 2016</p>
	<ul style="list-style-type: none"> - Close network relationships and interdependences of industrial clusters have contributed significantly to the competitiveness of high-technology clusters in the Asia-Pacific region. - Binary network marketing organizations 	<p>Niu, Miles, & Lee, 2008</p>
		<p>Pedroo, Ahmadi, & Charafeddine, 2008</p>
Organizational Network	<ul style="list-style-type: none"> - Inter-organizational network 	<p>Ibarra, Kilduff, & Tsai, 2005 Szeto, 2000</p>
	<ul style="list-style-type: none"> - The two factors dynamically interact within inter-organizational networks creating a cycle of improvement and contributing to the development of innovation capacity for improved organizational competitiveness. - Co-innovation - Network structures 	<p>Peters et al. 2010 Knoben, Oerlemans, & Rutten, 2006</p>
	<ul style="list-style-type: none"> - The inter-organizational network was valued by participants as a way to share and transfer knowledge about better practice. 	<p>Hartley & Allison, 2002</p>
Organizational network configurations/shape	No relevant results found	-
Network Strategy	<ul style="list-style-type: none"> - Supply network strategy (role and competence requirements): six network management roles: network structuring agent; co-ordinator; advisor; information broker; relationship broker; innovation sponsor. - Social network marketing strategy - Supply network strategy - Network R &D Strategy 	<p>Harland & Knight, 2001</p>
	<ul style="list-style-type: none"> - Cooperative strategy 	<p>Nobre & Silva, 2014 Yee & Platts, 2006 Håkansson & Laage-Hellman, 1984 Chang, Chiang, & Pai, 2012</p>

Table 8 presented our results, summarized the network configurations, as well as their salient features, schematic figures, and their relevant dominant strategies.

Table 8. Networks' taxonomy and their corresponding strategies

Network configurations	Salient features	Schematic figures	Relevant strategies
A Reciprocally Interdependent Networks	Interdependence, binary relationship		Multi-Level Promotion Strategy
B Sequentially Interdependent Networks	Sequence, linearity, interdependence		Just-In-Time Strategy
C Partnering Networks	Cooperation, partners' networks		Network Partnership Strategy
D Complementary (Overlapping) Networks	Partial relationship in/for specific intentions/activities		Compensatory Strategy
E Supporting (Logistic) Networks	Multiple entities cooperation for a single goal		Network Logistic Strategy
F Distributing Networks	Maximization of the possibility of distribution		Distributing Network Strategy
G Co-Innovation Knowledge-Sharing Networks	Innovation and knowledge synergism		Network R & D Strategy

The Reciprocally Interdependent Networks (Configuration A) is based on a binary relationship. This configuration is usually seen among *Multi-Level Marketing (MLM)*, or network marketing/pyramidal selling. In this configuration, 'binary relationship' means each member of the network

is only attached to another member that has chronologically joined the network sooner. The prevailing network strategy for this configuration is *The Multi-Level Promotion Strategy*, which is based on a convincing policy. In other words, the newcomers should be convinced that joining the network could be beneficial for them and their businesses.

The second derived configuration (*The Sequentially Interdependent Networks*—Configuration B) is usually witnessed in supply chain and production networks, where sequence, linearity, and interdependence usually prevail. In the sequentially interdependent networks, members should always be arranged in order of appearance; that means a specific place in the sequential chain network for each member (link) is always established and cannot be violated; otherwise, the configuration falls apart. The network usually gains its competitive advantage through *The JIT Strategy*; i.e. the materials and goods are strategically ordered, received, distributed, and stored, once it was the exact time for them. This strategy relies on a sophisticated and experienced strategic timing. In other words, the fittest strategic time for each of the JIT procedural entities; e.g. ordering, receiving, distributing, storing, etc.

The next derived configuration (C) is *The Partnering Networks*. Here, two or more partners join and form the network, and relate to the other partners, by means of cooperation. Partnering networks are likely to emerge in high-tech industries, in which organizations are used to cooperating for the production of sophisticated products. By this network, firms could compensate their strategic weaknesses by the strengths of the joined partner(s). In a more complicated and advanced formation of the partnering configuration, the cooperating entities could also make a close liaison with other networks' entities and expand the network into a humongous one. The corresponding core strategy in the *Partnering Networks* is the *Network Partnership Strategy*. The strategic efficiency and effectiveness of the participating network entities stem from strategic partnership and synergism. For example, one of the entities supplies spare parts, raw materials, or any other supporting backups, then the next entity in the partnering network manufactures, the other with efficient and superb distribution channels distributes, and so forth. Each entity shares its own competitive advantage(s) in the network and, hence, in the big picture they reach an insurmountable competitive synergism, since each entity has put forth and shared its best strategic part.

Furthermore, the *Complementary (Overlapping) Networks* (Configuration D) was derived through the SLR for partial relationships in/for specific intentions/activities and it is usually established among organizations aiming to complement some departments/units, without directly investing in their development. Thus, complementary networks allow partners to compensate each other's needs, weaknesses, and lack of technology, as well as to reach

higher levels of efficiency, as this coexistence also helps organizational lives to be efficiently elongated.

On the other hand, when multiple entities cooperate to pursue a single goal, a *Supporting (Logistic) Network* emerges (Configuration E). The most frequent configuration of the logistic networks involves multiple supporting organizations linked to one leader company/organization (the target company/organization). Thus, in this configuration, we have supporting entities and the leading entity. The former are usually behind-the-scenes and the latter presents the network façade. In the *Network Logistic Strategy*, the prevalent strategy of such networks, the target company selects and arranges a network of supporting/logistic companies to be able to reach its strategic organizational goals, such as the increase in production, or upgrading the quality of its manufactured goods.

Maximizing the chance and scale of distribution is usually the final aim of many distributing networks, inspired via an exclusive distribution philosophy. In these networks, there is a core company that promotes its distribution policy via a dominant strategy, the *Distributing Network Strategy*, in other words, under this strategy, the *core company does its best* to expand the network until it reaches its full potential hence maturity; (i.e., until it was not possible to be expanded or further expansion jeopardizes the efficiency and effectiveness of the core company). A *Distributing Network* (F) forms around the core company and attaches as many distributing channels as possible to the so-called core company.

Finally, Configuration G, or the *Co-Innovation Knowledge-Sharing Network* emerges once the collaboration among the partners aims to foster knowledge sharing and innovation synergism, thus supporting the efficacy of both the actors and the system/network. That is, the innovative companies join a network for the dissemination, promotion, and partial or complete sharing of emerging knowledge. In such circumstances, the *Network R&D Strategies* could dominate the network, allowing organizations to share their scientific research, support each other, and create new outputs due to their co-innovation. *Silicon Valley*, in the southern part of the San Francisco Bay Area in Northern California, as the global center for high technology and innovation, is a good example of such *Co-Innovation Knowledge-Sharing Networks*. What made the difference? According to sociologist Annalee Saxenian (1996), a major factor was the development of a “collective learning” environment in Silicon Valley in which fierce industrial competitors agreed to collaborate and share basic technical knowledge for the benefit of all.

DISCUSSION AND CONCLUSION

As shown by this paper, there is a large array of different ways to define inter-organizational networks and their role in formal organizational settings. The huge amount of available studies and perspectives about the topic fostered confusion and fragmentation, hindering a greater understanding and coherence of the field. The mentioned lack of clarity grows even more when referring to network strategies (Wheelwright & Hayes, 1985), network strategies extending strategic frameworks to larger and more complex network systems in terms of competitive priorities, structure and infrastructure (Harland et al., 1999, Brun & Castelli, 2008). Harland and Knight (2001) assumed that companies may be able to manage networks in which they operate and that it is therefore important to understand and develop an appropriate network strategy. In line with the mentioned, many authors (Kathuria, 2000, Zhao et al., 2006, Miller & Roth, 1994) emphasize the need to investigate firms' strategies through the use of configurations (Kathuria, 2000, Zhao et al., 2006, Miller & Roth, 1994). However, the development of configurations in the field of network strategy seems to be a still unexplored field (Macchion et al., 2015; Vereecke & Van Dierdonck, 2002; Bozarth & McDermott, 1998). As a consequence, this paper aimed to fill the existing gap, by providing a new and valuable framework to classify inter-organizational networks and their corresponding strategies.

In line with the above, an SLR – including literature *acquisition*, *compilation*, *filtration*, *extraction* and finally *generalization* – was managed, resulting in a literature-supported taxonomy of both inter-organizational networks and network strategies. Particularly, *Scopus* and *WoS* were referred in order to collect data and refine them in accordance with each database's functionalities. Next, a wide thematic analysis was employed to derive and form seven strategic network configurations and then to introduce and define their corresponding preponderant network strategies. The authors named these networks as *Reciprocally Interdependent Networks*, *Sequentially Interdependent Networks*, *Partnering Networks*, *Complementary (Overlapping) Networks*, *Supporting (Logistic) Networks*, *Distributing Networks*, and *Co-Innovation Knowledge-Sharing Networks*. Besides, their corresponding network strategies were identified as *Multi-Level Promotion Strategy*, *Just-In-Time Strategy*, *Network Partnership Strategy*, *Compensatory Strategy*, *Network Logistic Strategy*, *Distributing Network Strategy*, and *Network R&D Strategy*, respectively.

The theoretical contribution of this study is its presentation of the taxonomy of networks and network strategies in strategic management as a pioneering work. Since existing taxonomies were mainly developed for

production and supply network configurations (Macchion et al., 2015), as well as for specific industries – electronic, machinery, and electrical sectors (Caniato et al., 2009, Brun & Castelli, 2008, Luzzini & Ronchi, 2010) – this is the first research attempting to extend the focus of the analysis to the whole range of networks.

The strength of the study is its reliance on the two major scientific databases of *Scopus* and *WoS*, which include some of the best-published papers on network studies. Moreover, the introduced network taxonomy and its related network strategies present a literature-supported *systematics* or a system of classification for the strategic studies of networks.

Future research that includes more databases could build upon this study by extending its positive features/classes and compensate for its potential shortages. Moreover, the study's implications for research and practice are, first, the classification and labeling of prevalent networks (taxonomy), which provides future researchers with a referential network system with its pertinent strategies in the strategic studies and, second, this classification system could facilitate the teaching and learning of network strategic issues in the academic atmosphere.

We think that this perspective of the study is particularly interesting and can contribute to advancing the research stream on network strategies by providing a complete understanding of the phenomenon within different industries.

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Abstrakt

CEL: Celem niniejszego artykułu jest wprowadzenie ogólnej, wszechstronnej taksonomii sieci i jej odpowiednich strategii w celu ułatwienia nauczania i uczenia się strategicznych koncepcji sieci w zarządzaniu strategicznym. **METODYKA:** Aby spełnić swój zamiar, w artykule przyjęto systematyczny przegląd literatury (SLR), gdyż wprowadzona taksonomia i odpowiadające jej strategie powinny być komplementarnym odzwierciedleniem i podsumowaniem aktualnej literatury dotyczącej badań nad sieciami strategicznymi. **WYNIKI:** W pracy przedstawiono siedem potencjalnych konfiguracji sieci, a następnie przystąpiono do zaproponowania ich odpowiednich strategii w odniesieniu do relacji i form sieci. Wyróżniono sieci wzajemnie współzależne, sieci sekwencyjnie współzależne, sieci partnerskie, sieci komplementarne (nakładające się), sieci wspierające (logistyczne), sieci dystrybucyjne oraz sieci współinnowacji i dzielenia się wiedzą. Odpowiadające im strategie sieciowe zostały zidentyfikowane odpowiednio jako wielopoziomowa strategia promocji, strategia just-in-time, strategia partnerstwa sieci, strategia kompensacyjna, strategia logistyczna sieci, strategia sieci dystrybucyjnej oraz strategia sieci badawczo-rozwojowej. **IMPLIKACJE DLA TEORII I PRAKTYKI:** Systematyka lub system klasyfikacji jest fundamentalną koniecznością w każdej dziedzinie wiedzy, z której korzystają zarówno środowiska akademickie, jak i osoby uczące się. W związku z tym, artykuł ten dostarcza wyczerpujących, ale zwięzłych sposobów klasyfikacji sieci i ich strategii w nadziei na przezwycięzenie niedostatku wciąż istniejącego w literaturze. Wysiłki te zachęcają do przyszłych badań i rozmów na temat sieci i strategii sieciowych, proponując ramy przewodnie dla debaty. **ORYGINALNOŚĆ I WARTOŚĆ:** Brak konsensusu co do teorii i konceptualizacji w badaniach sieci strategicznych stał się inspiracją dla tych badań, co pozwoliło na wyjaśnienie wspomnianego istniejącego niedostatku.

Słowa kluczowe: taksonomia sieci, konfiguracja sieci, strategia sieci, zarządzanie strategiczne, systematyczny przegląd literatury (SLR)

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Conflicts of interest

The authors declare no conflict of interest.

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