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Teamwork in the supply chain – a systematic and bibliometric analysis (part 1)[1]

Praca zespołowa w łańcuchu dostaw – systematyczna i bibliometryczna analiza literatury (cz. 1)

Abstract

The success of supply chains depends primarily on integrating and coordinating the activities of network participants. Many supplier companies are shifting toward team-based structures to manage the boundaries with their customers. One of the possibilities of the operational implementation of cooperation in the supply chain is the appointment of teams in the network structure. Teamwork is a specific social group, consisting of at least two people, subject to the same impact, consciously interacting with one another, perceiving themselves as members of a specific group and identifying with it, as well as having a common goal, shared norms and creating a characteristic structure (fulfilling complementary roles). Situation caused by COVID-19 forced a change in defining and functioning of supply chains. It is also a moment of very dynamic development of work and cooperation in a remote environment, which impacted the functioning of teamwork in the supply chain. The paper is composed of two parts and aims to orient researchers who are new to collaborative work in supply chain research. The first article is structured as follows: the systematic literature review procedure is presented, then the bibliometric analysis is conducted, an in-depth analysis of journals and articles is performed with use of the Treecloud tool and VOSviewer software to analyse the selected papers.

Keywords:
teamwork, supply chain, collaboration, inter-organizational relations, team

Streszczenie

Sukces łańcuchów dostaw zależy przede wszystkim od integracji i koordynacji działań uczestników sieci. Wielu dostawców przechodzi na struktury oparte na zespołach, aby zarządzać granicami organizacji wraz ze swoimi klientami. Jedną z możliwości operacyjnej realizacji współpracy w łańcuchu dostaw jest powołanie zespołów w ramach struktury sieciowej. Praca zespołowa jest specyficznym konstruktem społecznym, składającym się z co najmniej dwóch osób, podlegających temu samemu oddziaływaniu, świadomie wchodzących ze sobą w interakcje, postrzegających siebie jako członków określonej grupy i identyfikujących się z nią, a także mających wspólny cel, wspólne normy i tworzących charakterystyczną strukturę (osoby pełnią uzupełniające się role). Sytuacja spowodowana pandemią COVID-19 wymusiła zmianę w definiowaniu i funkcjonowaniu łańcuchów dostaw. To także moment bardzo dynamicznego rozwoju pracy i współpracy w środowisku zdalnym, który wpłynął na funkcjonowanie pracy zespołowej w łańcuchu dostaw. Artykuł, który składa się z dwóch części, ma na celu ukierunkowanie badaczy, dla których badania nad pracą zespołową w łańcuchu dostaw są pewnym novum. W części pierwszej opisano procedurę systematycznego przeglądu literatury, analizy bibliometrycznej, dokonano poszerzonej prezentacji czasopism oraz artykułów z największą liczbą cytowań w poruszanej tematyce oraz wykorzystano narzędzie Treecloud i oprogramowanie VOSviewer do analizy wyselekcjonowanych artykułów.

Słowa kluczowe:
praca zespołowa, łańcuch dostaw, współdziałanie, relacje międzyorganizacyjne, zespół

JEL: J24, L14, M12, M54

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Introduction

The success of supply chains depends primarily on integrating and coordinating the activities of network participants. In particular, regarding the flow of products, information, and financial resources from the places where raw materials are obtained to the places of consumption. It contributes to the creation of a competitive advantage for the supply chain participants and their clients. The previously mentioned integration and coordination of activities of the supply chain participants are conditioned by the vertical collaboration of network enterprises – collaboration with customers, internally (across functions), and with suppliers (Barrat, 2004). Many supplier companies are shifting toward team-based structures to manage the boundaries with their customers (Perry et al., 1999). Enterprises demand special value-adding activities from their suppliers, such as joint product development, advanced personal interaction, or consulting services (Cardozo et al., 1992).

In terms of definition, "supply chain collaboration is the ability to work across organizational boundaries to build and manage unique value-added processes to better meet customer needs. Collaboration involves the sharing of resources – information, people, and technology – among members to create synergies for competitive advantage. Collaboration goes beyond managing transactions for efficiency to managing relationships for creativity and continuous improvement" (Fawcett et al., 2008). Internal collaboration must be connected with external collaboration to develop closer relationships, integrate processes, and share information with customers and suppliers (Barrat, 2004). The literature emphasizes that collaboration is strongly connected to supply chain management. It provides mutuality of benefit, rewards, and risk-sharing together with the exchange of information and knowledge transmission as the foundation of the collaboration (Barratt & Oliveira, 2001; Stank et al., 1999), emphasizes its impact on performance for the entire supply chain networks (Cao & Zhang, 2011; Fugate et al., 2010), and is an essential aspect for successful supply chain formations (Barrat, 2004; Kinder, 2003; Min et al., 2005).

Collaboration directly relates to the strategies regarding working teams within supply chain management (Shetach, 2014). What is more, effective collaboration among supply chain members would lead to a healthy teamwork environment that would benefit projects and the team as a whole. One of the possibilities of the operational implementation of cooperation in the supply chain is the appointment of teams in the network structure.

Integrating team management with knowledge and information sharing in the supply chain is very important (Madani & Rungsrisawat, 2019). Many strategic decisions concerning supply chain management are executed in temporary teams of multifunctional specialists to reap the proven benefits of integration (Franke et al., 2020). These teams are expected to achieve more holistic decisions and better outcomes. Supply chain enterprises expect today's teams to work beyond team boundaries (Marrone et al., 2007; Wageman et al., 2012) and create various activities (linking and building activities) as part of teamwork to deal with increasingly complex, ambiguous and innovative tasks. Some research confirms that teams engaged with external actors (those engaged with horizontal and vertical actors) are more effective (Ancona & Caldwell, 1992; Marrone et al., 2007).

The impact of supply chain resources on performance might be realized through the interfirm business processes integration and interfirm joint teamwork, consisting of members from both supplier and customer companies. Interfirm joint teamwork is defined as integrating interfirm human resources from bilateral partners to act as boundary spanners of the firms, and co-work together as supply chain task force in executing routine operations, specifically in the business process integration (Oliver, 1990; Shi & Liao, 2013). Some authors show the positive influence of inter-organizational teams on team effectiveness (Stock, 2006) and argue that joint teamwork positively contributes to the firms' operational and relational performance in the supply chain (Shi & Liao, 2013). Cross-functional and cross-organizational teams are identified as critical in the success of supply chain management (Madani & Rungsrisawat, 2019).

The crux of making these complex teams work successfully is the ability to convey useful information to those who need it when they need it. The communication process within cross-organizational and cross-functional teams, influencing the flow of information between individual companies in the supply chain, will play a vital role in the cooperation process (Bennett et al., 2008). An important thread related to cross-organizational and cross-functional teamwork in the supply chain is creating and distributing information and knowledge by members of these teams. The dissemination and creation of information are instrumental activities that enable task performance, such as exchanging information with key external actors to improve team decision-making (Cummings, 2004; Hansen, 1999) and learning (Bresman, 2010). Intra-organizational connectivity creates built-in boundary spanning capabilities across teams and improves information

sharing in the organization (Ancona & Caldwell, 1992; Hansen, 1999; Lazer & Friedman, 2007).

Following these researches, our paper aims to orient researchers who are new to collaborative work in supply chain research and to help them answer some questions:

1. What are the main academic journals where most literature on teamwork in the supply chain has been published?
2. How has this subject evolved over the years?
3. What are the main subject areas used in the field of teamwork in the supply chain?
4. What trends can be identified on teamwork in the supply chain researches?

Our study differentiates from the previous studies because we applied both systematic literature review and bibliometric analysis. The research is structured as follows: in the next section of this part of the article, we have presented the bibliometric analysis methodology, then the general findings from the synthesis sample are discussed. The section that follows it presents papers' analysis with the TreeCloud tool, while the last section – the analysis with VOSviewer software. In the second part of this article, the synthesis of both analyses will be conducted with an in-depth reading of the seminal studies according to the identified clusters. Both parts will be summarized with conclusions where trends in the field of supply chain collaboration by teamwork are identified.

Methodology

The systematic literature review (SLR) is intended to identify research in the field, to assess the synthesis sample, and to present the results (Levy & Ellis, 2006; Sekaran & Bougie, 2010; Czakon, 2011). In other words, after identification of the research problem, the researcher should analyze the papers. This step consists of analysis of frequency (prevailing theoretical perspectives), content (intentional goal of the research), and proper bibliometric analysis with evolution of number of papers, number of citations and centrality of the obtained database (connections between publications, ideas, or concepts) (Czakon, 2011). Finally, the analysis should be discussed. Thus, the research procedure is as follows: quantitative analysis of papers in databases (as of 2021), identification of the synthesis sample, and in-depth analysis of papers through lexical network and word analysis, word co-occurrence analysis and cluster analysis.

The first, initial part of the bibliometric analysis refers to the quantitative analysis of the papers published in the two most common scientific databases: Web of Science and Scopus. Therefore, the authors of the article selected several combinations of keywords that relate to the collaboration by teamwork in the supply chain in both databases: "supply chain" AND "team", "supply chain" AND "teamwork", "supply chain management" AND "team", "supply chain management" AND "teamwork." The further process of selecting articles in terms of their eligibility for *a priori* and *a posteriori* analyses included four stages (Figure 1).

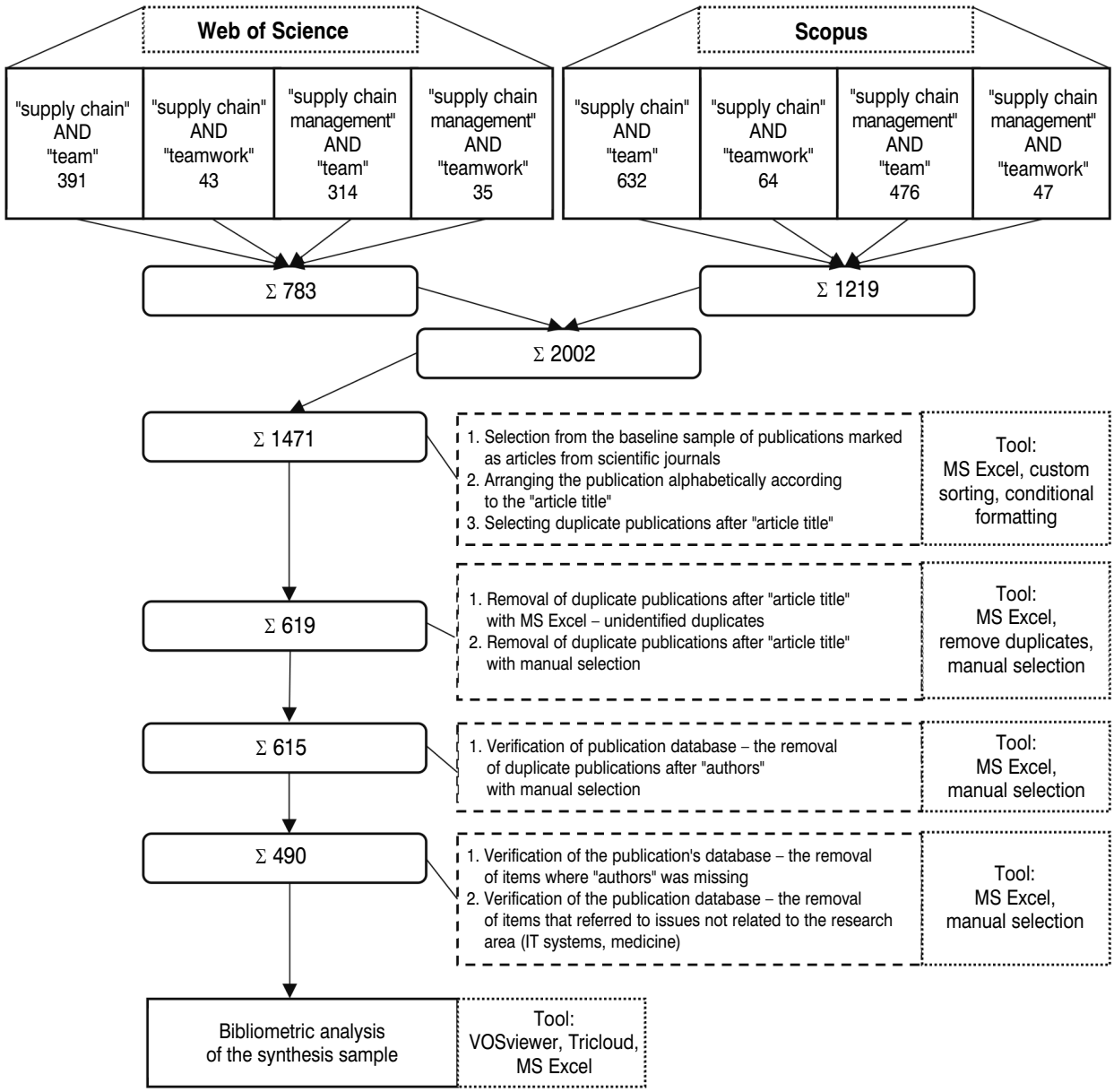
In the first stage, the publications that were marked as articles from scientific journals were selected from the baseline sample (2,002 items). Among other things, those items that constituted scientific notes or chapters in books were rejected. The Excel tool was used for the selection – non-standard sorting on the "document type" item, as a result of which the publication database was reduced to 1,471 items.

The next step was to sort the publications alphabetically by "article title" (feature – custom sort), then select and remove duplicate titles. For this purpose, the conditional formatting function and the automatic deletion of duplicates of the Excel tool were used. As a result of this stage, out of 1,471 items, 644 articles were left for further analysis. Then, automatic selection was supported by manual selection. It turned out that in several dozen cases, the duplicate articles were not identified by the "remove duplicates" function because they differed, for example, by the type of dash, apostrophe, quotation marks, no colon, no spaces between words, an extension of the title with a record in the native language author. Therefore, the duplicate function "treated" the entry as different. Ultimately, after manual selection, a database of 619 articles was obtained. A similar procedure was used for the "authors" item. After manual selection, 615 publications remained out of 619.

The last stage of the selection concerned an in-depth verification of the base of obtained publications. Articles were selected first by reading the title and if deemed suitable, the abstract. The selection by title and abstract reduced the eligible articles to the synthesis sample of 490 papers. The reasons for exclusion were: no outcome of interest (124 records) and identification of one book review (1 record). The research aimed to select only primary studies investigating teamwork in the supply chain, which contributed to the significant reduction in the number of records.

The final part of the bibliometric analysis refers to the qualitative analysis of papers that allows authors to identify the most popular journals in which the papers on collaboration through teamwork in the supply chain are published. Then, as indicated above, 490 items in the synthesis sample were selected for bibliometric analysis using the VOSviewer and TreeCloud tools. Both tools

Figure 1
Procedure for bibliometric analysis of scientific publications from the Web of Science and Scopus databases



Source: own elaboration.

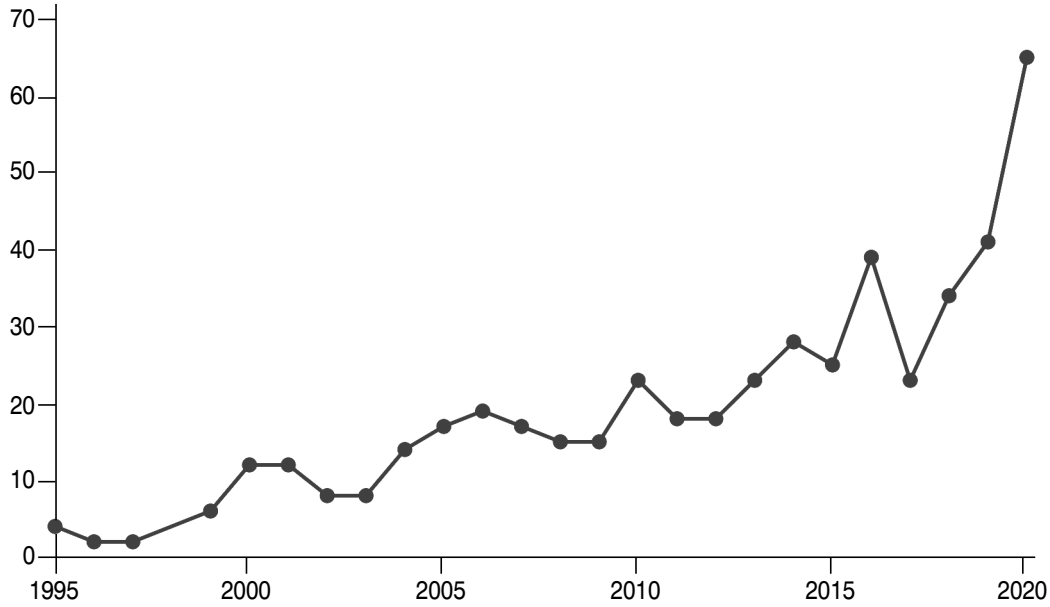
constitute quantitative systematic literature review analysis. VOSviewer software (van Eck & Waltman, 2013) enables authors of the article to investigate relations between keywords and abstracts of the papers selected for the analysis. The visualization conducted in the consecutive stage identified links between the categories as mentioned above and generated clusters grouping topics in several fields. A similar situation has been obtained with the TreeCloud tool. The complete in-depth analysis of papers has been prepared based on the seminal studies in the field.

Synthesis sample

The chart (Figure 2) presents the annual number of publications in teamwork in the supply chain over the years 1995–2020. As shown by the presented data, since 1995, a clear upward trend can be identified in the number of articles dealing with teamwork in supply chains. This increase is evident in recent years, with particular emphasis on 2020.

Narrowing the systematic literature review to keywords precisely specified by the authors of this publication led to the identification and selection of

Figure 2
Annual evolution of the number of papers



Source: own elaboration.

articles in the area of teamwork within supply chains published in journals, very clearly focused on management:

- logistics on a microeconomic scale (*Journal of Business Logistics*);
- metalogistics (*Supply Chain Management: An International Journal, International Journal of Supply Chain Management, International Journal of Physical Distribution and Logistics Management, Journal of Purchasing and Supply Management*);
- processes, including those relating to production planning and organization (*International Journal of Production Economics, Journal of Operations Management, International Journal of Operations and Production Management, Production Planning and Control*);
- projects showing contact points with all the areas mentioned (*publications indicated above*).

Table 1 lists the titles of 11 journals where articles on teamwork within supply chains were published and which aroused the most significant interest in the global scientific and research community. Additionally, after applying the methods and techniques described above, the authors of this publication attempted to describe the achievements in the relevant literature. The significance was determined considering the number of citations and the number of articles from which they were cited as the indicators, implying the significant substantive, scientific and cognitive, and/or application values of the articles.

As shown in Table 1, the journals include those with no IF (*International Journal of Supply Chain Management, Interfaces*) and IF up to 13.210 (*Harvard Business Review*).

The teamwork within supply chains was discussed in the largest number of journals, whose IF ranges from 4.220 to 4.744. It refers to 7 of 11 journals in which the most cited publications in the subject area appeared, as mentioned earlier. The quoted articles were also published in:

- one journal with an IF of 13.210 (*Harvard Business Review*);
- one journal with an IF of 5.134 (*International Journal of Production Economics*);
- two journals with no IF (*International Journal of Supply Chain Management, Interfaces*).

The highest citation rates in terms of the presented subject are those published in IF journals ranging from 4.673 (*Journal of Operations Management*, number of citations: 2,101) to 4.725 (*Supply Chain Management: An International Journal*, number of citations: 744). This means that when conducting scientific research or looking for solutions, models, concepts, and strategies useful for implementation in the field of teamwork within supply chains, the authors most often use highly specialized journals dealing with topics related to various areas of supply chain management and journals in the broadly understood field operational management.

The number of cited articles is also high in this group. The most, 23 articles, were published in

Table 1
Top 11 journals that publish on inter-organizational teams in supply chain (as of 2021)

Journal	Number of papers	Number of citations	Impact Factor
Supply Chain Management: An International Journal	23	744	4.725
International Journal of Supply Chain Management	19	23	–
International Journal of Production Economics	14	495	5.134
International Journal of Physical Distribution and Logistics Management	14	509	4.744
Journal of Operations Management	13	2,101	4.673
Journal of Business Logistics	12	572	4.697
International Journal of Operations and Production Management	12	355	4.619
Interfaces	11	409	–
Journal of Purchasing and Supply Management	10	281	4.640
Production Planning and Control	9	190	4.220
Harvard Business Review	8	216	13.210
Total	**145**	**5,895**	
Percentage share of all dataset	**30%**	**44%**	

Source: own elaboration.

Supply Chain Management: *An International Journal*. Then, there was a journal with no IF index (*International Journal of Supply Chain Management*, number of papers: 19), *International Journal of Production Economics* (number of papers: 14) and *International Journal of Physical Distribution* and *Logistics Management* (number of papers: 14). The 13 articles cited were published in the *Journal of Operations Management*. A detailed analysis does not allow to distinguish a regularity related to, for example, the type of the article. Overall, theoretical, research and utilitarian articles dominate among the scientific cited publications. An in-depth analysis of the seminal studies is included in further described clusters relating to production and distribution, logistics and supply chain management, quality and development, and service management.

The fewest publications from the top 11 journals were quoted by:

- *Harvard Business Review* (number of papers: 8, number of citations: 216);
- *Production Planning and Control* (number of papers: 9, with a lower than average number of citations amounting to 190 number of citations);
- *International Journal of Supply Chain Management* (number of citations: 23).

Harvard Business Review is a journal relating to the broadly understood management of an organization, often in a general sense. While teamwork, efficiency, and team management are interdisciplinary, teamwork within supply chains is a subject with a strictly specialized dimension and character, which may translate into a lower tendency to publish and search for such scientific articles in journals outside the logistics area.

In the last of the journals mentioned (*International Journal of Supply Chain Management*), a low number is correlated with many cited articles (number of papers: 19). The analysis of the indicated dependence, supplemented by the analysis of the quoted articles from the journal, shows that the cluster differentiation related to teamwork within supply chains is necessary. It would give authors, researchers, and practitioners the possibility of a multidimensional and multifaceted view of the problem, as they use only a few interesting threads relevant to their research domain even though they refer to many publications.

It cannot be ignored that among as many as 409 citations concerning the subject of teamwork within supply chains, the authors have identified in 11 publications in the *Interfaces* journal. The quoted publications refer to technology, not so much in a strictly technical sense as in organizational terms, related to concepts, theories, models, techniques, and organization and management standards.

The most frequently cited publications (seminal studies, see Table 2) appeared in the years 1995–2012, i.e., in the period when the practice of economic life, both on the local and global level, began to evolve from transactional relations towards partnership and long-term (strategic)

cooperation within chains and networks deliveries, between diverse teams of producers, suppliers, sub-suppliers, production partners and recipients (1990s), in order to be treated in the first and second decades of the 21st century as one of the key success factors on the way to gaining and maintaining a competitive advantage. A detailed analysis of the seminal studies will be carried out as part of the bibliometric analysis using software tools, i.e., TreeCloud and VOSviewer in the next section of this article.

Lexical network and word analysis with TreeCloud tool

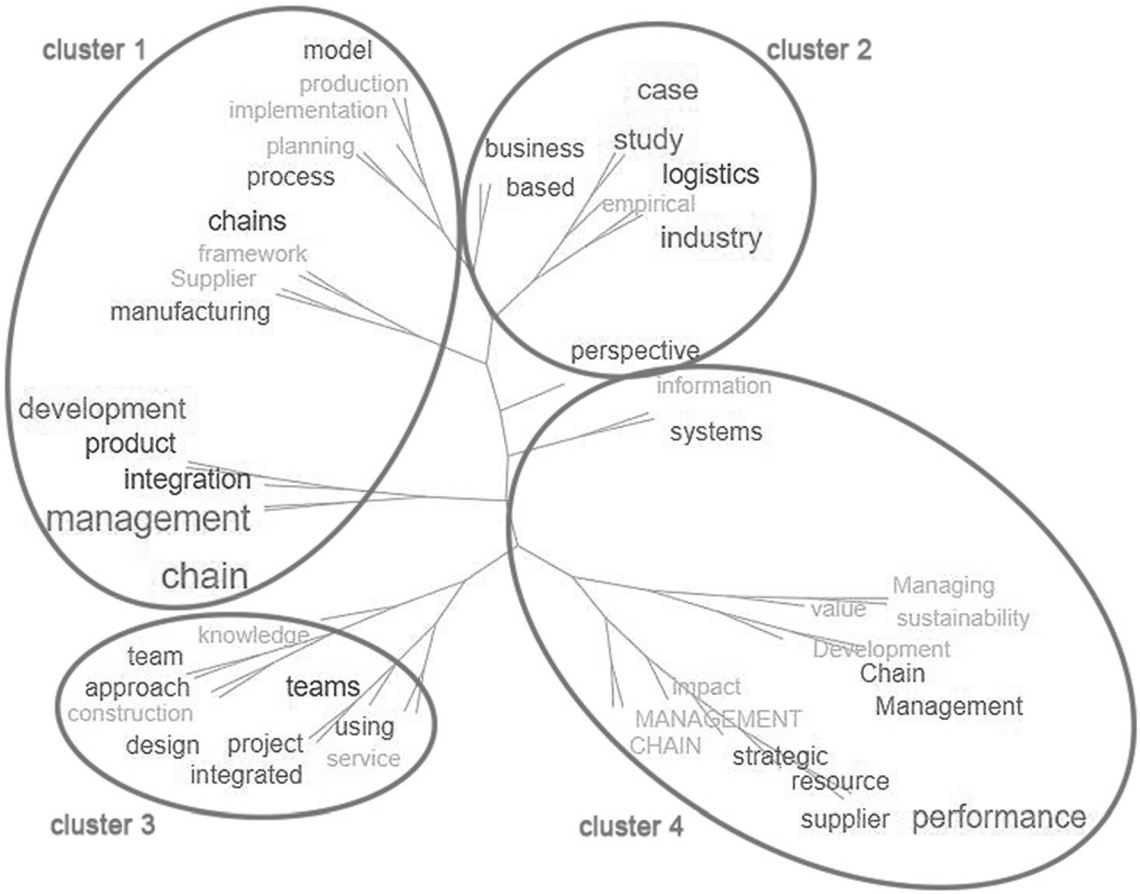
In 490 articles in synthesis sample on teamwork in the supply chain, lexical analysis on the most frequently found words in titles was performed to gain knowledge about dominant themes. The analysis was performed through the TreeCloud tool using a tree of words (Figure 3). It shows the most frequent words of the text, where the size reflects the frequency, but the words are arranged on a tree

Table 2
Top papers with over 200 citations

No.	Authors	Title	Journal	Publication year	Number of citations
1.	Chopra & Sodhi	Managing risk to avoid supply-chain breakdown	*MIT Sloan Management Review*	2004	877
2.	Vickery et al.	The effects of an integrative supply chain strategy on customer service and financial performance: An analysis of direct versus indirect relationships	*Journal of Operations Management*	2003	631
3.	Petersen et al.	Supplier integration into new product development: Coordinating product, process and supply chain design	*Journal of Operations Management*	2005	625
4.	Ragatz et al.	Success factors for integrating suppliers into new product development	*Journal of Product Innovation Management*	1997	458
5.	Cousins & Menguc	The implications of socialization and integration in supply chain management	*Journal of Operations Management*	2006	317
6.	Bititci et al.	Performance Measurement: Challenges for Tomorrow*	*International Journal of Management Reviews*	2012	283
7.	Fawcett et al.	Information sharing and supply chain performance: The role of connectivity and willingness	*Supply Chain Management*	2007	275
8.	Lambert et al.	An evaluation of process-oriented supply chain management frameworks	*Journal of Business Logistics*	2005	255
9.	Graves & Willems	Optimizing strategic safety stock placement in supply chains	*Manufacturing and Service Operations Management*	2000	242
10.	Lee & Billington	The evolution of supply-chain-management models and practice at Hewlett-Packard	*Interfaces*	1995	225
11.	Tracey & Tan	Empirical analysis of supplier selection and involvement, customer satisfaction, and firm performance	*Supply Chain Management*	2001	216
12.	Birdi et al.	The impact of human resource and operational management practices on company productivity: A longitudinal study	*Personnel Psychology*	2008	215
13.	Van Echtelt et al.	Managing supplier involvement in new product development: A multiple-case study	*Journal of Product Innovation Management*	2008	212

Source: own elaboration.

Figure 3
TreeCloud visualization



Source: own elaboration with TreeCloud tool.

to reflect their semantic proximity according to the text (Gambette & Véronis, 2009). Such tree clouds help identify the main subject areas.

Based on the results of the TreeCloud analysis of the keywords in the 490 article's titles, four clusters were identified:

1. The first cluster groups together articles focused on issues related to the impact of teams on supply chain integration. It also touches upon topics related to teams' place and role in the supply chain structure, planning processes in which teamwork occurs, and their implementation in the product design/development and production process.
2. The second cluster brings together methodical issues concerning the analyzed articles. These are business-based case studies or quantitative research carried out in the industry sector, often in the area of logistics.
3. The third cluster groups together studies focused on the micro-perspective of teamwork in the supply chain (creating and transferring knowledge by teams, areas in which teams operate in supply chains such as design, construction, service, project management).
4. The fourth cluster brings together studies focused on supply chain management (teams as strategic resources, the impact of teamwork on the enterprise's performance and value and the supply chain, the development of sustainable supplies and threads related to sustainability, and information systems).

The analysis carried out using the TreeCloud tool allowed for identifying clusters showing a broad perspective of articles on teamwork in the supply chain. The coexistence of words in the titles of the analyzed publications is undoubtedly an insufficient action; hence an in-depth bibliometric analysis is necessary, considering abstracts of selected articles and a detailed look at the most significant publications in a given subject area (seminal studies).

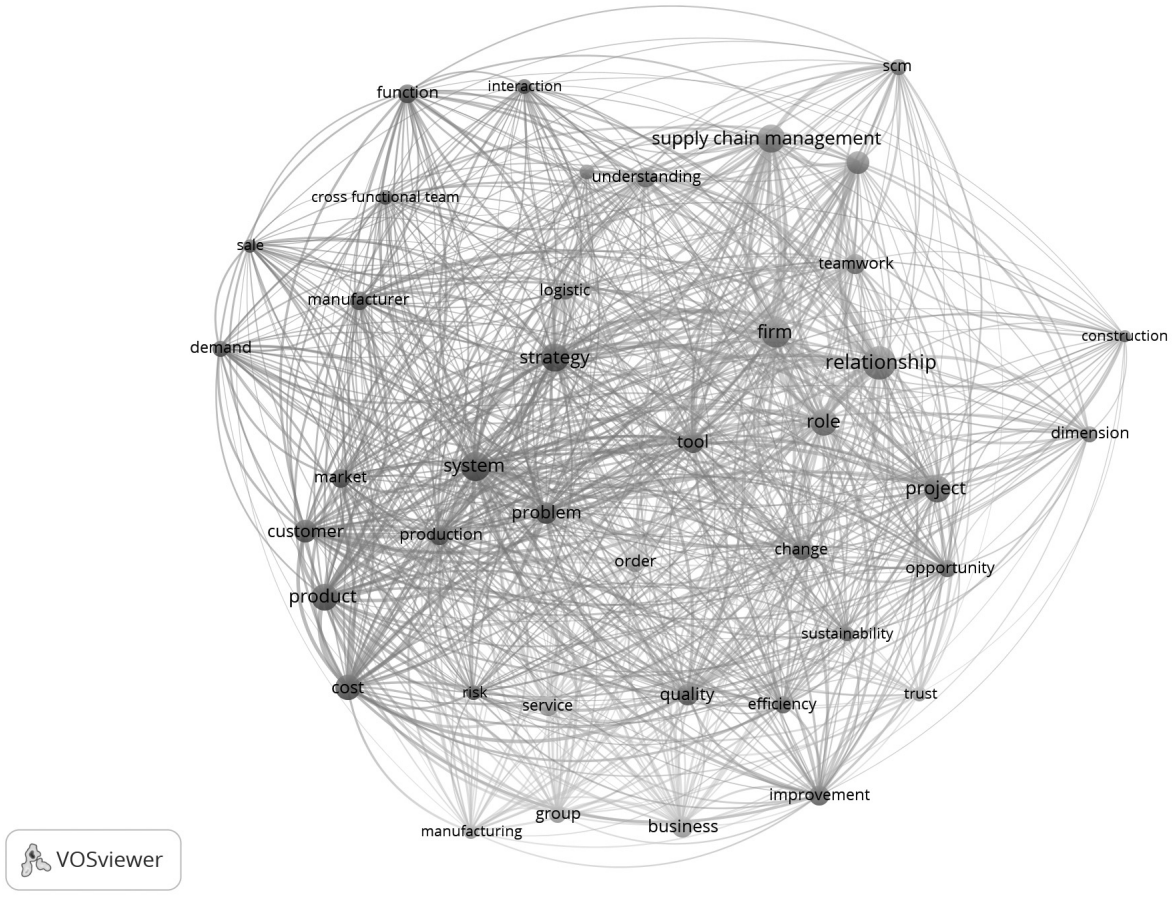
In-depth word co-occurrence analysis with VOSviewer software

One of the most frequently used tools for a detailed analysis of the coexistence of words in the analyzed database's title and abstract areas is the VOSviewer software. It will allow to detail the clusters previously substantively identified using the TreeCloud tool. While both tools are entirely independent of each other, they methodically enable completely different bibliometric analyzes. Accordingly, using the VOSviewer system nomenclature, the "text data" was chosen by authors in that software. This form of analysis allowed for an in-depth review of the coexistence of words in the "title" and "abstract" areas. Therefore, those fields were chosen to be extracted from the synthesis sample. Accordingly, structured abstract labels and copyright statements were ignored not to disturb the clusters' substantive structure.

The counting method chosen for analysis is binary counting, where the presence or the absence of a term matters. In this type of analysis, the 'occurrences' attribute "indicates the number of documents in which a term occurs at least once" (van Eck & Waltman, 2013). The minimum number of occurrences of a term is 20 to exclude terms with a low relevance score. Such a dataset comprises 128 terms for binary counting (of 11,462 terms in all datasets). In this case, 60% of the most relevant terms are selected: 77 terms. The normalization method is association strength that normalizes the strength of the links between items (van Eck & Waltman, 2013). The following terms were excluded from the analysis in order to obtain a clean dataset: future research, addition, research limitations implication, country, part, practical implication, number, sample, insight, design methodology approach, originality value, time, effort, effect, survey, article, practitioner, need, researcher, application, influence, basis, benefit, literature, attention, view, year, importance, data, outcome, context, impact, issue, implication, form, study.

There are 4 clusters with 41 items that constitute the objects of interest (see Figure 4, Table 3). The

Figure 4
VOSviewer analysis – network visualization of words co-occurrence



Source: own elaboration with VOSviewer software.

Table 3
VOSviewer data in the field of teamwork in supply chain

Cluster	Items	Links	Total link strength	Occurrences
Red – production, and distribution	cost	40	444	78
	cross functional team	34	104	26
	customer	39	384	69
	demand	37	179	35
	function	38	211	42
	interaction	37	107	26
	manufacturer	39	213	42
	market	40	230	45
	problem	40	297	58
	product	40	454	87
	production	40	228	42
	risk	38	142	28
	sale	36	132	22
	strategy	40	500	98
	system	40	532	108
Green – logistics and supply chain management	competitive advantage	36	136	29
	dimension	36	152	36
	firm	40	518	110
	logistic	40	187	38
	relationship	40	564	134
	role	40	403	92
	scm	36	157	34
	supply chain management	40	424	98
	teamwork	37	201	48
	theory	40	269	68
	understanding	39	250	52
Blue – quality, and development	change	38	218	49
	construction	30	80	20
	efficiency	39	181	37
	improvement	39	259	53
	opportunity	40	210	40
	project	39	367	91
	quality	40	327	57
	sustainability	34	115	28
	tool	38	281	60
Yellow – service management	business	39	239	57
	group	39	201	39
	manufacturing	35	169	30
	order	40	290	54
	service	39	278	51
	trust	37	151	27

Source: own elaboration.

number of connections and/or relations between items (links) is 784. The total link strength that means the number of publications in which terms occur together (van Eck & Waltman, 2013) is 5,392. We can distinguish a red cluster that focuses on production and distribution, a green cluster closer to logistics and supply chain management, a blue cluster concerning quality and development, and a yellow cluster strictly connected to service management (Figure 4 is in the grayscale, while cluster colors are explained in Table 3).

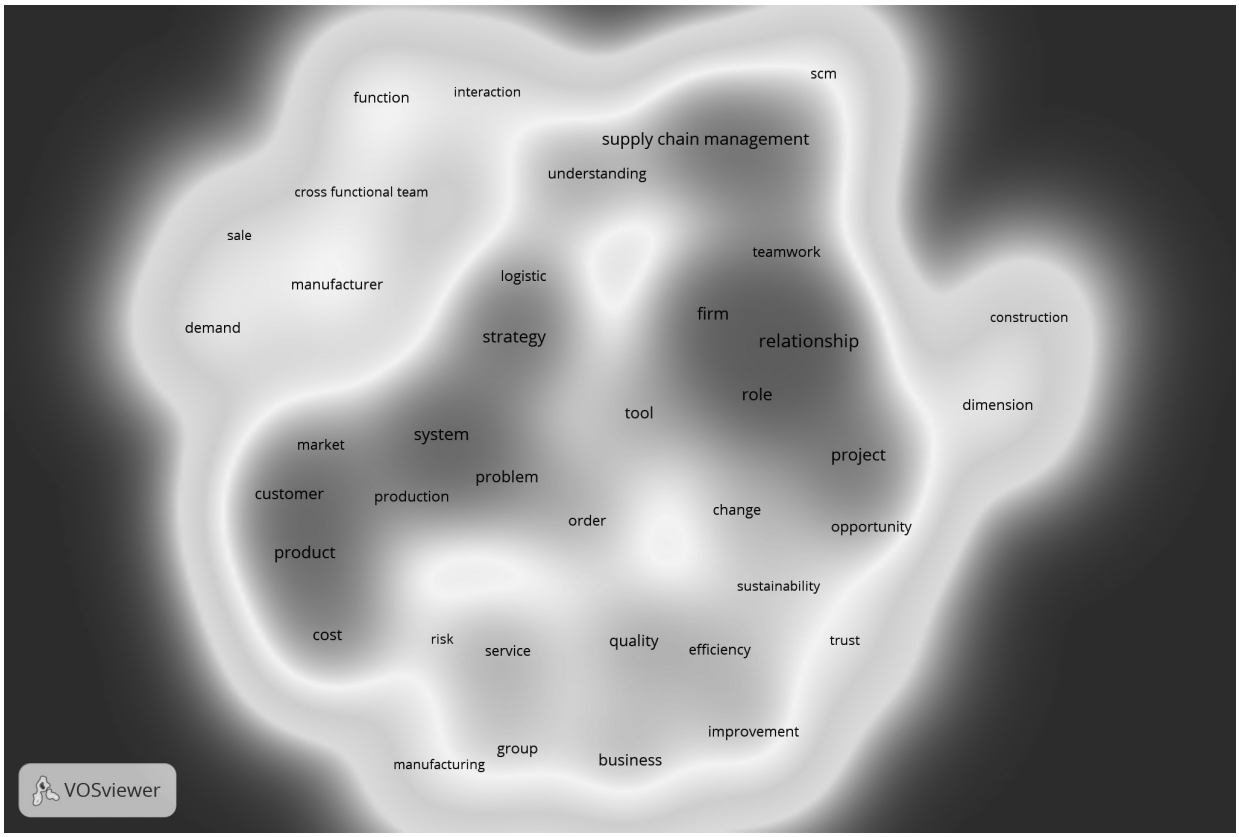
Two items associated with teamwork in the supply chain have been bolded in Table 3 in the column "Items". The cross-functional team belongs

to the red cluster. It informs that such teams are one of the important topics discussed in the analyzed papers from the perspective of production and distribution activities. The second item, teamwork, belongs to the green cluster, which is strictly connected with logistics and supply chain management. Both items in these two clusters indicate a place of teams (cross-functional, inter-organizational) in the theory and scientific research in the supply chain. Accordingly, those teams are analyzed from an organizational and functional perspective rather than a quality and development or services perspectives.

The density visualization has been presented in Figure 5. The density is based on item density with a kernel width: 2.0. Each item has its color indicating the density of items. The larger the number of items, the closer the color of the point is to the dark gray, and vice versa; the smaller the number of items, the closer the color of the point is to the white (van Eck & Waltman, 2013).

An in-depth analysis of clusters will be presented in the second part of the article.

Figure 5
VOSviewer analysis – density visualization



Source: own elaboration with VOSviewer software.

Notes/Przypisy

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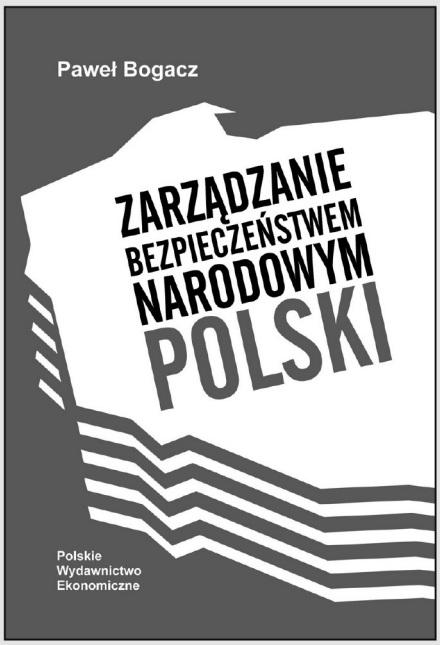

Paweł Bogacz

ZARZĄDZANIE BEZPIECZEŃSTWEM NARODOWYM POLSKI

W prezentowanej monografii autor podejmuje zagadnienia zarządzania w dziedzinie bezpieczeństwa narodowego Polski, rozumianego jako proces zapewniania przez władze RP warunków niezbędnych do współpracy między przemysłem obronnym, siłami zbrojnymi, nauką i polityką. Autor odwołuje się do dorobku podejścia systemowego i teorii podejmowania decyzji. Praca stanowi studium przypadku na przykładzie zastosowań metod wielokryterialnych: AHP, ANP, REMBRANDT, DEMATEL. W badaniu wzięło udział 75 przedstawicieli przemysłu obronnego, sił zbrojnych, nauki, polityki i dyplomacji. Dla każdej z grup badanych opracowano hierarchie czynników, subczynników, wariantów oraz przeprowadzono analizę korzyści, szans, kosztów i ryzyka (BOCR) w odniesieniu do zarządzania w dziedzinie bezpieczeństwa narodowego RP. Respondentami byli eksperci i decydenci, z których część pełni (lub pełniła) najbardziej odpowiedzialne funkcje publiczne.

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