Implementation of Knowledge Management in Intelligence Agencies: a VOSviewer bibliometric analysis

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Abstract

This article is based on a literature review regarding the possible connections between knowledge management and intelligence domain. Although intelligence has got, over time, a large variety of interpretations, such as business intelligence, competitive intelligence or national security intelligence, in this research the term intelligence is used to describe the knowledge required by the decision makers and leaders of a country in order to act for achieving the social, economic, political and military stability. The methodology used for conducting this research is based on the capabilities of the specialized software VOSviewer, respectively the bibliometric analysis with the co-occurrence of certain keywords, which emphasizes the correlation of certain fields. Also, the data needed for this research was exported from Web of science core collection and Scopus, the two largest bibliographic databases in the world. The results showed that the knowledge management and intelligence domain were not researched together.

Ke ywords: knowledge management, intelligence, intelligence structures, intelligence organizations, bibliometric analysis
J.E.L. classification: D83, H83, H56

1. Introduction

As both researchers and practitioners concluded, knowledge is one of the most important intangible assets within an organization, being the foundation of the competitive advantage that is widely chased by all parties (Bratianu, 2002; Bratianu, 2022; Grant, 1996; Nonaka, 1994; Nonaka & Toyama, 2003; Porter, 1985; Spender, 1996; Zack, 1999). Knowledge is processed by intelligence that represents a human capacity to gather, analyze and make decisions (Gardner, 2006; Sternberg, 1997). Being a powerful concept, intelligence was used for defining many aspects of our life, including those focusing on the business completion or national security agencies.

The first definition for *intelligence,* used for security reasons, was given by Kent (1949, p. XXI), who saw intelligence "as the knowledge which our highly placed civilians and military men must have to safeguard the national welfare". Although there were formulated a large number of definitions for intelligence over time, it can be concluded that the core meaning is the same: intelligence is obtained after the processing of data, information and knowledge by the special law-enforced entities, in order to inform the decision makers of a country, having the single purpose of ensuring the national security. In the specialty literature, those entities are called intelligence agencies, intelligence organizations, intelligence structures or intelligence community.

Living in an uncertain world, where unexpected events take place on a regular basis (Israel-Palestine war being the last example), intelligence and, therefore, knowledge, are two of the most important intangible assets for a nations, in order to protect their national security and to overcome all types of external or internal threats.

Therefore, the purpose of this paper is to analyze the state of the literature regarding knowledge management and intelligence domain, to identify the lack of publications and literature gaps and to give an understanding on the necessity of these two areas of research to be studied together, in order to enrich the intelligence practices field.

This article is structured as follows: introduction, followed by literature review, research methodology, findings and conclusions.

2. Literature review

Nonaka and Takeuchi (1995, p. 87) defined knowledge as a "justified true belief", being the most used definition in the knowledge studies. They also created the explicit-tacit dyad, representing the explicit knowledge, that can be transferred though symbolic language, and tacit knowledge, represented by experiences, emotions and values (Nonaka 1994; Nonaka & Takeuchi, 1995). Later, the researchers stated that knowledge cannot be defined by an universal definition because of its intangible characteristic. Therefore, knowledge should be understood using metaphors, by mapping the characteristics from a tangible object (source domain) to the intangible concept (target domain) (Andriessen, 2006). For example, knowledge was defined using the image of an iceberg, the visible and hidden parts representing the explicit and tacit knowledge from the nonakian dyad (Nonaka & Takeuchi, 1995).

Bratianu (2011) first introduced the thermodynamics paradigm in understanding the knowledge concept, and later on he developed the theory of knowledge fields, decomposing this concept in three parts: rational knowledge, emotional knowledge and spiritual knowledge (Bratianu, 2022). In this framework, rational knowledge is the correspondent of the explicit knowledge from the nonakian dyad, while emotional (emotions and feelings) and spiritual (values, beliefs and meanings) knowledge form the tacit knowledge. The managers need to understand these fields of knowledge and their transformation from one field to nother one, in order to motivate the employees and to make better decisions. Knowledge management can be understood as a management of intangible resources, as Bratianu (2022, p.1) explained, "knowledge management is a complex process that integrates knowledge creation and acquisition; knowledge sharing and transfer; knowledge transformation, storage, and retrieval; knowledge risks; and knowledge application in creating products and services".

Waltz (2003, p.1) considered that knowledge management is also need to "produce and deliver a special kind of knowledge: intelligence—that knowledge that is deemed most critical for decision making both in the nation-state and in business". In his vision, Waltz (2003, p.3) considered that once the data and information obtained by the intelligence structures is analyzed, understood and explained, it becomes knowledge or foreknowledge. This knowledge is later used either to achieve the competitive advantage in a certain field (Bratianu, *et al*, 2021; Spender, 1996; Zack, 1999), or to ensure the national security of a country (Kent, 1949).

Likewise, intelligence resulted after analyzing the data and information obtained by the intelligence structures can ensure a decision advantage for the decision maker, giving the possibility to better understand a specific aspect, fact or phenomenon and, therefore, being better informed about a subject (MacGaffin & Oleson, 2016; Pili, 2018). In this perspective, the concept of intelligence is related to that of knowledge risk (Bratianu, 2018).

Focusing on national security intelligence, the specific activities for obtaining the data and information needed are conducted by specialized entities enforced by national law, named intelligence structures, organizations or agencies. Their activity is also regulated by strategies formulated at government level, is classified and controlled under strict rules.

The methods and sources used in the intelligence field are also classified, Wirtz (2010, p.59) offering some examples such as "information gleaned from espionage, images obtained by earth-orbiting satellites, intercepted communications, to publicly available media reporting, avoiding detection and surveillance, maintaining secret communications, and the fine art of recruiting and running clandestine agents and various social-science methodologies, computer-based analytic tools, or the use of collaborative work spaces that exploit emerging information-revolution technologies".

Oleson (2016) presented the categories of information based on how it is collected, respectively HUMINT (human source intelligence), OSINT (open source intelligence), IMINT (imagery intelligence), SIGINT (signals intelligence) and MASINT (measurement and signatures intelligence).

3. Research methodology

Based on the VOSviewer software capabilities, which include the identification and visualization of similarities and common subjects within a certain area of literature, this research propose a bibliometric analysis of the publications indexed in Web of Science core collection and Scopus, concerning the knowledge management implementation in intelligence community. In order to achieve this intended purpose, the research was conducted using the co-occurrence investigation procedure, finding the possible connections and similarities within titles, abstracts and keywords.

The data required for this research was retrieved from Web of Science core collection and Scopus (world's largest citation and bibliographic databases) in 09 November 2023, using "All fields", "All types", "All languages" and all the time range criteria.

The expressions used for searching through the Web of Science core collection and Scopus where the following: "knowledge management – intelligence structures", "knowledge management – intelligence organizations", "knowledge management – intelligence community" and "knowledge management – intelligence agencies" (see Table 1).

Table no. 1. Expressions used to retrieve database from Scopus

Expression	Total number of publications in Web of Science core collection	Total number of publications in Scopus
"knowledge management – intelligence structures"	2	133
"knowledge management – intelligence organizations"	2	52
"knowledge management – intelligence community"	6	312
"knowledge management – intelligence agencies"	0	137

Source: Authors' own research

The results obtained from searching using the mentioned expressions were exported containing "Full record" from Web of science core collection, under the ".txt" extension, and Citation information", "Bibliographical information", "Abstract & keywords", "Funding details" and "Other information" from Scopus, under the ".csv" extension.

Given the fact that the databases retrieved from Web of Science core collection contain a relatively low number of publications, the databases for "knowledge management – intelligence structures" and "knowledge management – intelligence organizations" will not be analyzed using VOSViewer as it wouldn't give any relevant information.

Later, these databases were processed and analyzed using the specialized software VOSviewer, in order to identify the co-occurence of certain expressions and keywords and to generate the maps for visualization of links.

4. Findings

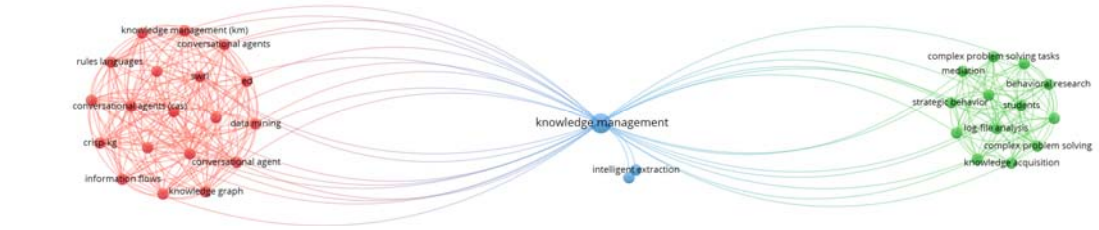
The purpose of this study is to analyze the raw data generated by Web of Science core collection and Scopus, in order to identify the possible connection between knowledge management and intelligence domain and if there were any publications regarding the correlation between these two fields.

The possible connection between knowledge management and intelligence domain is researched using the co-occurrence investigation procedure from VOSviewer for the expressions that were mentioned above, respectively "knowledge management – intelligence structures", "knowledge management – intelligence organizations", "knowledge management – intelligence community" and "knowledge management – intelligence agencies".

Thus, VOSViewer generated the maps needed for identifying the possible connections, showing the keywords in different clusters and placing them at a specific distance, based on how closely related they are.

Using the database exported for the "knowledge management – intelligence structures" expression from Scopus, respectively the 133 publications, VOSviewer generated 69 keywords, but none of them met the threshold of minimum 2 occurences. Given so, the map was generated using all the 69 keywords, with only 35 of them being connected to one another, which were placed in 3 clusters (Figure no.1).

Figure no. 1. The map generated by VOSviewer using the keywords for "knowledge management – intelligence structures"- Scopus



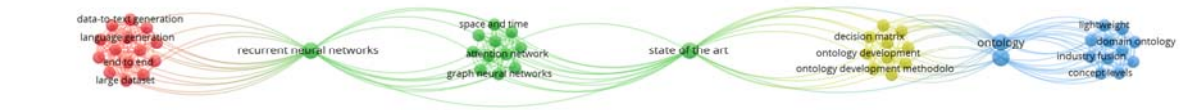
Source: Authors' own research

The specialized software placed the "knowledge management" keyword in the center of the map, in the blue cluster among "intelligent extraction" and "meta-synthesis", being linked with both other clusters, respectively the red and green ones, and with almost all keywords from the map. The green cluster contains keywords specific to knowledge studies, respectively "knowledge application", "system knowledge", "complex problem solving", "knowledge acquisition" or "strategic behavior", while the red cluster is formed by keywords from a broad range of fields like "intelligent robots", "healthcare", "data mining", "semantic web rule language", "information flows" or "conversational agents".

By analyzing Figure no.1 it can be concluded that the publications indexed in Scopus that formed the database for "knowledge management – intelligence structures" cover a various area of research, all connected to knowledge management. However, there cannot be found any possible connection between knowledge management and intelligence domain.

Moving forward, for the database retrieved from Scopus for "knowledge management – intelligence organizations", VOSviewer generated 76 keywords, with only 4 meeting the minimum threshold of 2 occurences. Therefore, the map was generated using all 76 keywords, with only 50 keywords having connections with at least other one. These keywords were placed in 4 clusters (Figure no.2).

Figure no. 2. The map generated by VOSviewer using the keywords for "knowledge management – intelligence organizations"- Scopus



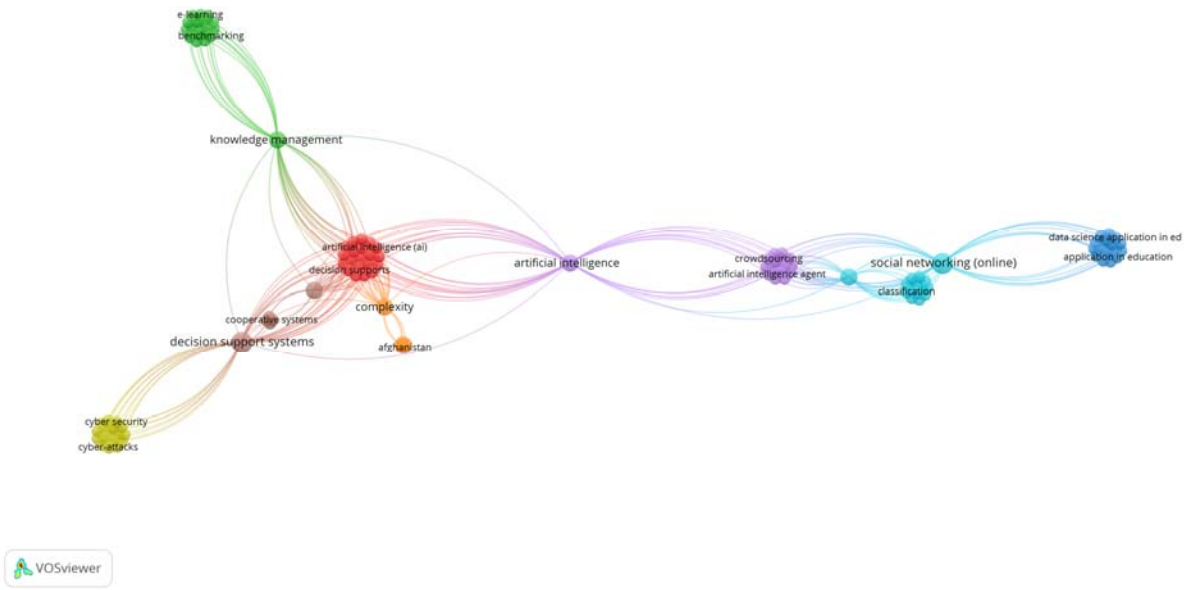
Source: Authors' own research

The red cluster is formed by keywords like "neural-networks", "end to end", "sequence models", "text generations" and "large dataset", specific to computer science and artificial intelligence field. The green cluster, placed in the center of the map, has two keywords, "recurrent neural networks" and "state of the art", linked with all the keywords from the red cluster and the yellow cluster respectively. The other keywords from the green cluster, like "speed", "speed and time", "spatio-temporal data" or "speed prediction", are specific to physics. The other two clusters (yellow and blue) are connected through "ontology" keyword, and both contain expressions specific to knowledge studies: "surveys", "pilot studies", "decision matrix", "development methodology" (yellow cluster), "knowledge sharing", "industry fusion", "concept level (blue cluster).

Therefore, by analyzing Figure no.2 it can be concluded that these publications do not cover the research domain of knowledge management implementation in intelligence area.

Using the 312 publications from Scopus for "knowledge management – intelligence community" expression, VOSviewer found 130 keywords, with only 7 meeting the threshold of minimum 2 occurences. Therefore, the research was continued with all the 130 keywords, while only 115 keywords were connected to at least one another. In this case, VOSviewer generated 8 clusters (Figure no.3).

Figure no. 3. The map generated by VOSviewer using the keywords for "knowledge management – intelligence community"- Scopus



Source: Authors' own research

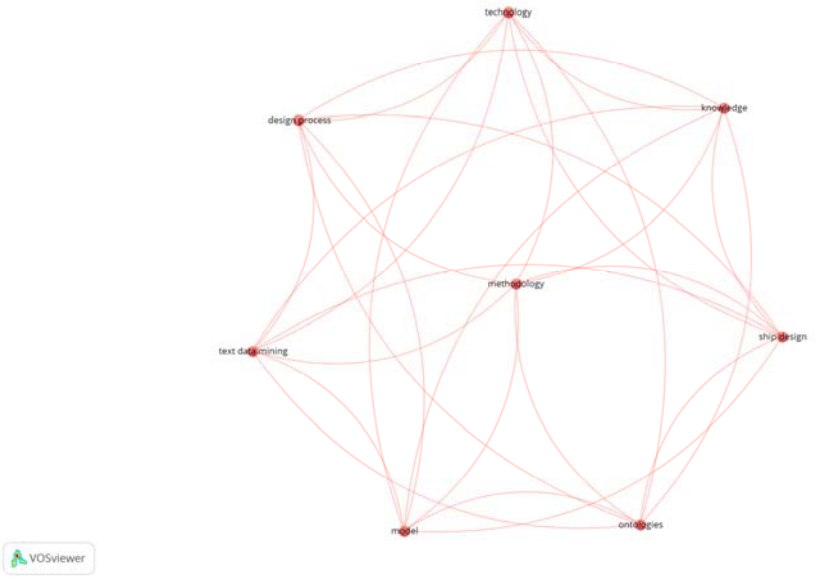
In the center of the map, VOSviewer placed the "artificial intelligence" keyword, from the purple cluster, connected with all the keywords from the red cluster which contains keywords specific to management domain, such as "uncertainy", "decision making", "uncertainy analysis", "decision support". Besides "artificial intelligence", the purple cluster contains keywords related to this field, such as "learning frameworks", "artificial intelligence agent" or "large dataset". Both light blue and blue clusters that are placed near the purple cluster are connected through "social networking (online)" keyword and are specific to computer science domain, with keywords like "social media", "fake detection", "contextual information" (light blue), "online systems", "science applications" and "learning community" (blue).

The "knowledge management" keyword is placed in the green cluster, being connected with all the keywords from the red cluster, specific to management. "Knowledge management" is also connected to "decision support systems", from the brown cluster, who also has strong links with the red cluster. In the brown cluster, VOSviewer placed keywords like "local government", "intelligent systems" and "strategic planning". "Decision support" is also linked with the yellow cluster, specific to information security, with keywords like "cybersecurity", "security operations", "private data" and "defence mechanism".

Although "knowledge management" is related to the red and brown clusters, by analyzing the distribution of keywords and the placement of clusters inside the map it can be concluded that the publications indexed in Scopus that generated the database exported and used in this case do not cover the domain of knowledge management in intelligence area.

The "knowledge management – intelligence community" expression is the only one that generated relevant results in Web of science core collection and, by using this database, VOSviewer generated 23 keywords, with only 8 being connected. These keywords were placed in only one cluster (Figure no.4).

Figure no. 4. The map generated by VOSviewer using the keywords for "knowledge management – intelligence community" – Web of science core collection

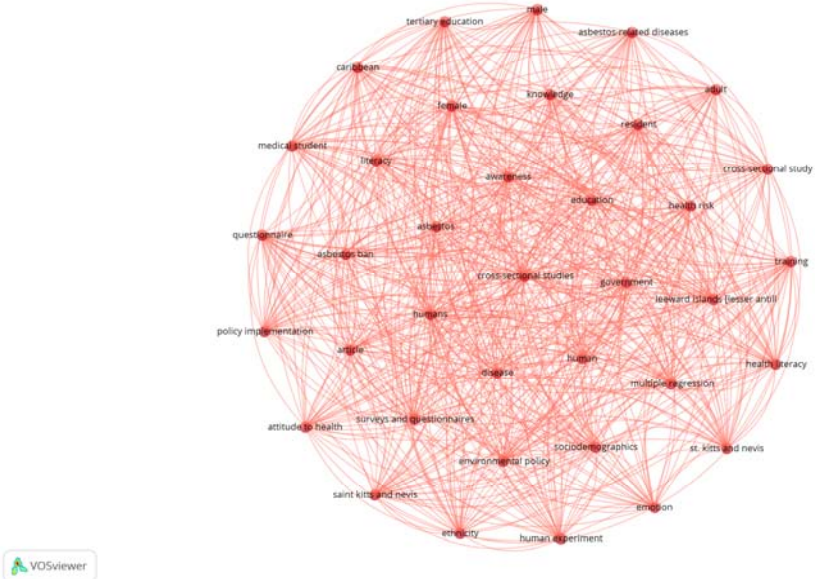


Source: Authors' own research

The only cluster is formed by the following keywords: "knowledge", "ship design", "ontologies", "model", "text data mining", "design process", "technology" and "methodology".

The database for the last expression, respectively "knowledge management – intelligence agencies", generated a total number of 112 keywords in VOSviewer, but none of them met the threshold of minimum 2 occurences. From this total number, only 37 were connected to each other and VOSviewer placed them in only one cluster (Figure no.5).

Figure no. 5. The map generated by VOSviewer using the keywords for "knowledge management – intelligence agencies" – Web of science core collection



Source: Authors' own research

The only cluster generated by VOSviewer contains keywords specific to social sciences, like "education", "awareness", "humans", "disease", "environmental policy", "ethnicity", "female", "male", "adult" or "health risk". Given so, it can be stated that this publications do not refer to knowledge management implementation in intelligence domain.

5. Conclusions

The purpose of this research was to analyze the state of the literature regarding the implementation of knowledge management in intelligence area, as well as the possible relationships between these two domains.

In order to achieve this goal, it was conducted a bibliometric analysis using data retrieved from Web of science core collection and Scopus, the two largest bibliographic databases in the world, for the following expressions: "knowledge management – intelligence structures", "knowledge management – intelligence organizations", "knowledge management – intelligence community" and "knowledge management – intelligence agencies".

By analyzing the results generated by the specialized software VOSviewer, it can be concluded that these two domains, respectively knowledge management and intelligence, were never researched together in a publication indexed in Web of science core collection or Scopus. Although Scopus generated a significantly larger number of publications, it cannot be found any correlation between knowledge management and intelligence.

In conclusion, I consider that these domains need and should be researched together, in order to find the possibility of implementing the knowledge management concepts in intelligence area that could support the decision making process with high value information and new capabilities.

The main contribution of this study represents the bibliometric analysis conducted for the expressions indicated above, which is the first one to cover these fields, being thus demonstrated that the knowledge management and intelligence fields need to be researched together.

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