APPLICATIONS OF KNOWLEDGE STRATEGIES IN BUSINESS THEORY AND PRACTICE: BIBLIOMETRIC ANALYSIS

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Abstract. *Within this paper, we performed a structured exploration of "knowledge strategies" in business theory and practice due to the acceleration and blaze of opinions that flood the academic media and several other media. The concept of "knowledge strategy" has been clearly defined in theory as the type of strategy referring to an organization's mechanism of using its knowledge as a strategic resource, from an economic and competitive point of view. In practice, knowledge strategies differ for each company, domain, or context, depending on internal and external factors. For this exploration, we used a bibliometric analysis realized with VOSviewer software in order to systemize the data from the Web of Science and obtain relevant datasets and outputs to debate. First, we shall present and discuss the evolution of knowledge strategy during the last decade. This step provides the necessary arguments for choosing this subject as a topical one. Secondly, we bring to light the composition of clusters according to keywords co-occurrence analysis in order to comprehend the perspectives of the theoretical approaches in the extant scholarly literature. Thirdly, we closely examine the overlay analysis to have a holistic view of the topic's chronological evolution and to speculate the trend of discussions on this topic in the next years. Our findings reveal both homogenous and heterogenous clusters of keywords regarding "knowledge strategies". Even if the concept has a straight theoretical framework, it is depicted differently by case study research and independent practical experiences. Our results show the core definitions and the trends of discussions for the analyzed concept of "knowledge strategies".*

Keywords: *bibliometric analysis; co-citation analysis; co-occurrence analysis; exploitation strategy; exploration strategy; keywords clusters; knowledge strategy.*

Introduction

The importance of knowledge-based strategies is increasingly activating the interest of companies worldwide. The success of strategies in general is due to the key components they contain and the key processes through which they are implemented. In the course of time, managers, entrepreneurs, and businessmen have resorted to various resources, methods, techniques, or procedures to carry out their plans and thus achieve their objectives (Bratianu & Lefter, 2011; Baesu & Bejinaru, 2020). In some cases, these working methods or plans have become specific strategies for achieving certain types of objectives. We consider it interesting to underline the idea that business strategies can be both generalized and specific, which leads us to the idea that every time implementation of a strategy can also generate innovation.

The standard structure of the paper offers an accessible reading and understanding of the presented issues. First, we present throughout the *Literature review section* the main

conceptual ideas that we consider necessary to connect knowledge strategies to the traditional theories of strategy, strategic thinking, and strategic planning. Secondly, we describe the *Methodology* applied for the bibliometric analysis including some specific and technical information. It follows the *Results and discussion* section, including discussions over three types of analysis. The subsequent section is *Conclusions* which comprises the synthesis of the debate, the summary of results, final comments, and future perspectives.

Literature review

We can think of strategy as a high-level plan designed to achieve one or more objectives under risk and uncertainty. The importance of the strategy derives especially from the consideration of limited resources. Thus, in a complex context, the strategy specifies the objectives, determines the actions, and mobilizes the resources to achieve the objectives (Bratianu et al., 2020). A strategy can describe the course through which the objectives will be achieved by using certain resources. The creation and implementation of a strategy can be premeditated actions, carried out with intention, or they can proceed naturally, and spontaneously, as the organization adapts to the competitive environment and fights for survival (Bejinaru, 2017). In this context, in-depth concepts such as strategic planning and strategic thinking arise (Bratianu & Lefter, 2011; Bratianu & Bejinaru, 2021).

In order to highlight the contrast with the concept of planning, Mintzberg (2000) defined strategy as *"a pattern in a stream of decisions"*. Thus, it amplifies the complexity of the strategy and at the same time its dynamics. Max Mckeown (2011) defines human empowerment as shaping the future and achieving the desired objectives through available resources. Vladimir Kvint (2009) proposes a more philosophical definition, considering strategy as a mechanism for identifying, formulating, and developing a vision that will lead to long-term success if strictly applied. The distinction between strategic planning and strategic thinking has been intensely debated, and there are scientific arguments for simultaneously supporting the interdependence and difference between the two. Thus, F. Graetz (2002), explains that strategic thinking and planning are distinct but complementary and support each other for effective strategic management. From this author's perspective, strategic thinking has the role of exploring innovation and creating the future in new and different ways that will cause the company to reshape its basic strategies and even transform the industry. Through strategic planning, the strategies developed through the strategic thinking process that is a nonlinear and entropic process (Bratianu, 2019; Bratianu, 2020; Bratianu & Vasilache, 2009) and they are realized and supported, and integrated into the business (Bejinaru, 2021).

"Strategic thinking operates in the opportunity space of the organization" states Bratianu (2022, p.1) in a remarkably updated definition. Strategic thinking is based on exploiting the “knowledge” resource and is a mental process of understanding and creating the future to look for practical ways to obtain a competitive advantage in the market. Thus, knowledge has always been a strategic resource for the organization and its effective use certainly leads to the acquisition of sustainable competitive advantage (Bejinaru & Iordache, 2010). In the conclusion section, we shall reveal what Knowledge strategies are considered in theory and practice research and how they evolved over time.

Methodology

For this research paper we employed a bibliometric analysis with several components. The method of bibliometric analysis emerged in order to replace the traditional method of statistical bibliography which gradually became outdated and unsuitable for research based on books, journals, and other media of communication (Pritchard, 1969). In recent years, bibliometrics represents a fashionable and reliable instrument to evaluate and describe the state of science in various fields (Zupic & Cater, 2015). In the current research, bibliometric analysis is used to map and systemize the body of scientific literature related to the "knowledge strategies" subject by means of quantitative parameters that characterize the connections between the publications in this area (Alayo et al., 2021; Diez-Martin et al., 2021; Ellegaard & Wallin, 2015; Glinyanova et al., 2021; Hillmann, 2021; Vogel & Güttel, 2013; Zhao & Strotmann, 2014).

The software provides more options for analyzing the database. We chose the co-occurrence analysis of keywords to identify and filter the most relevant items on the investigated topic (Zupic & Cater, 2015). Co-occurrence analysis is the software option that allows mapping the most used concepts, phrases, or keywords in the analyzed field. The function of the co-occurrence analysis is to search within the content of the sampled papers and identify the keywords most frequently cited together. The result of this analysis is important for targeting the conceptual focus of the analyzed papers and revealing the main scholarly perspectives on certain topics (Agostini et al., 2020; Callon et al., 1983). The co-occurrence analysis can be interpreted based on 3 outputs: network map, overlay map, and density map. The first mentioned one, the keywords network shows the colored clusters of terms and the links between them. The higher the number of occurrences, the larger the item symbol and the thicker the lines representing the links. The second-mentioned overlay map shows a chronological evolution based on a different color for each year. Thus, according to the color in this map, we can identify the publication year of the papers that the keywords belong to. The third-mentioned, density map shows the keywords as highlighted bulbs on a blue canvas. The brightest the bulb is means it represents the core of the investigated issue. The closer other yellow bulbs are, the stronger is their link and thus their number of occurrences (Feng & Chen, 2020, p.5-6). According to these technical details, we shall discuss the outputs of this research.

For the sample selection, we decided to search the Web of Science (WOS) database to cover a wider area of scholarly discussions included in conference proceedings, articles in Social Sciences Citation Index journals, book chapters, editorial editorial reviews, and others. We performed the search using the specific key phrase that describes the focus of this research paper and that is "knowledge strategies" but used the codified form "knowledge strategy*" in order to obtain also the related variations like: knowledge strategy, knowledge strategist, knowledge strategies, or knowledge strategic vision and other similar terms (Durst & Runar Edvarsson, 2012). The first filter applied for the query was the "title" and then refined the search for Business & Management fields and thus the search retrieved a number of 138 papers for the analysis database. The data collection was performed in August 2022 according to the following query:
[https://www.webofscience.com/wos/woscc/summary/c4e76738-d854-4ee0-8bcc-30dcbd129a6c-4d1d9bb6/relevance/1]

Results and discussion

In order to highlight right from the start the scope of publications in the field of knowledge-based strategies, we chose to graphically present the evolution of the number of publications and the number of citations in the last twenty years. We consider that figure 1 is representative of the ascending evolution of publications, but especially an exponential evolution of citations on the key topic analyzed, taking into account that all these works contain the key term "knowledge strateg*" right in their title. In figure 1 we can observe a general upward evolution, although in certain years there are also obvious decreases in the number of publications and citations. A peak of publication (violet column) can be observed in 2011 with 16 articles, followed by 2012 with 11 articles. An interesting aspect is that although in the years 2016, 2018, and 2019, the number of publications is considerably lower compared to the peak years, the number of citations is higher and with an increasing trend (purple line). An explanation could be the emergence of a new trend in academic writing, namely that of highly well-documented research based on a rich list of references. This approach requires intensive work for authors in order to gather the appropriate sources to be cited in their research paper and thus can be partially argued the exponential increase of citations. In this sense, we can say that it explains a large number of citations of already prestigious or recently published articles, these being two important criteria according to which the authors choose the references used in their research (Kwiek, 2016).

However, after analyzing the database, we could say that multicultural collectives of authors could be another factor in these upward trends of publications and citations. Furthermore, the research and development funding programs that are implemented by the world's major universities represent another stimulating factor in this equation, certainly with applicability in other research fields as well (Zaqout & Abbas, 2012). At this point, it is worth mentioning the *"accumulative advantage theory"* developed by Robert K. Merton (1968) which implies that academics who have a productive activity of researching and publishing will become even more productive in the future while those academics who have low performance will continue to decrease. Later, Cole and Cole (1973, p.114) presented the "*reinforcement theory*" stating clearly the fact that *"scientists who are rewarded are productive, and scientists who are not rewarded become less productive"*. This type of institutional strategy has an enormous impact, generating a wide gap in rapport with organizations that fail implementing it (Bejinaru & Prelipcean, 2017).

Another basic aspect worth mentioning is that more and more academics have begun to truly recognize the veracity and usefulness of the sources provided through online journals. Let's not forget that this transition of scientific research from inside the reading rooms of large libraries to the study of virtual sources was a long and difficult one in certain cultures with higher skepticism (Yang & Li, 2015, p. 13). In this context, we can appreciate that the effects of validating online publications are already noticeable (McGuigan & Russell, 2008). We limit ourselves to these minimal findings because distinct research can be carried out on the factors, motivations, and mechanisms that lead to increased academic publications and citations.

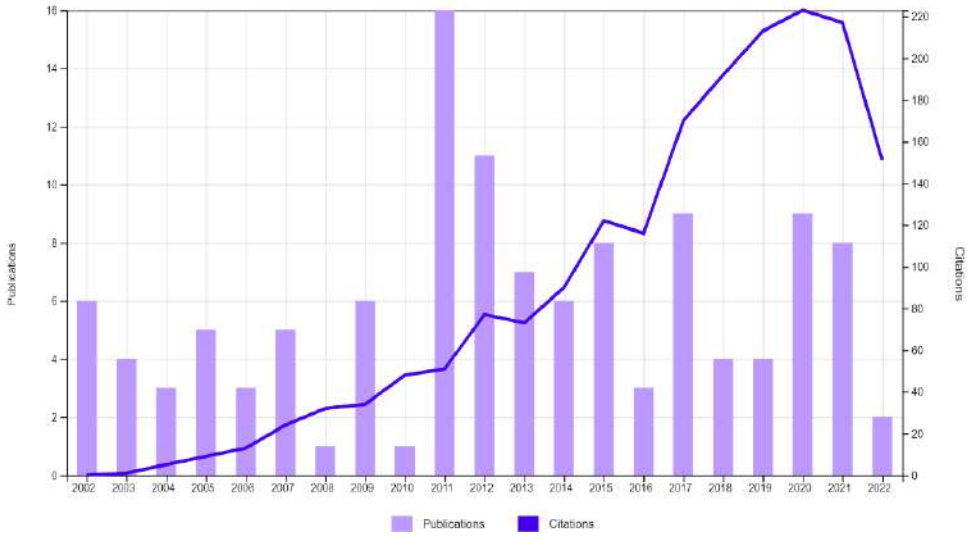

Figure 1. Evolution of "knowledge strategy" field during 2002-2022
Source: (own elaboration from WoS)

Following we present the outputs of VOSviewer co-occurrence analysis of all keywords to the end of identifying all clusters and links, in figure 2. In order to generate the network in figure 2 we applied the standard sequence of commands. The network in figure 2 clearly shows the most relevant issues approached by researchers in relation to the investigated phrase of "knowledge strateg*". The reading of the network must be done according to simple principles, namely: - the dots in the center and with larger sizes are representative of the keywords most frequently found (together) in the analyzed database; - dots of the same color form a cluster, which means that they are most strongly interconnected and appear most frequently used together in the analyzed articles; - the dots towards the extremities, which are also smaller in size, are used less often and in a smaller number of works, which means either that they describe problems indirectly connected to the central topic, or that they are insufficiently debated, or that they are barely at the discovery stage. Regarding the curved lines between the dots, we must mention that their thickness shows the strength of the connection between those terms, that is, how frequently they are used together in the analyzed articles. We can see that the dots in the center are connected with thick curved lines, and as we look at the dots from the edges of the figure, we can see that they become finer, as if they are erased in terms of color intensity, which shows a weaker connection.

In order to have a detailed approach regarding the clusters we structured the information offered by the software, which is not visible in figure 2, in table 1 below. To start with, we clarify that there are three clusters among which the red one is the largest and carries a lot of significance according with all the keywords included. The composition of the RED Cluster is not a surprise as it clusters the core issues about knowledge strategy, as: knowledge management, knowledge sharing or organizational performance.

The GREEN Cluster brings some novelty to the discussion due to its composition: absorptive capacity, capabilities, competitive advantage, knowledge strategies, and technology. This cluster conveys that knowledge strategies are important for achieving competitiveness and sustainable advantage in the market. It includes also technological support.

Even if the smallest, the BLUE Cluster is the most scattered and combines interesting concepts: exploitation, exploration, innovation, networks, and performance. This combination of keywords sends the message that organizational efforts should be made in order to generate optimal knowledge strategies. The papers behind these keywords approach the organizational processes and models necessary for obtaining performance through implementing knowledge strategies.

Although they are simple and homogeneous, these clusters convey clear and strong messages about the importance given by the analyzed publications to the key concept of "knowledge strategies". Moreover, the analyzes of the VOSviewer program clearly show the chronological trend of the scientific discussions on the subject; thus, moments, results, and information relevant to a particular subject can be identified (figure 3).

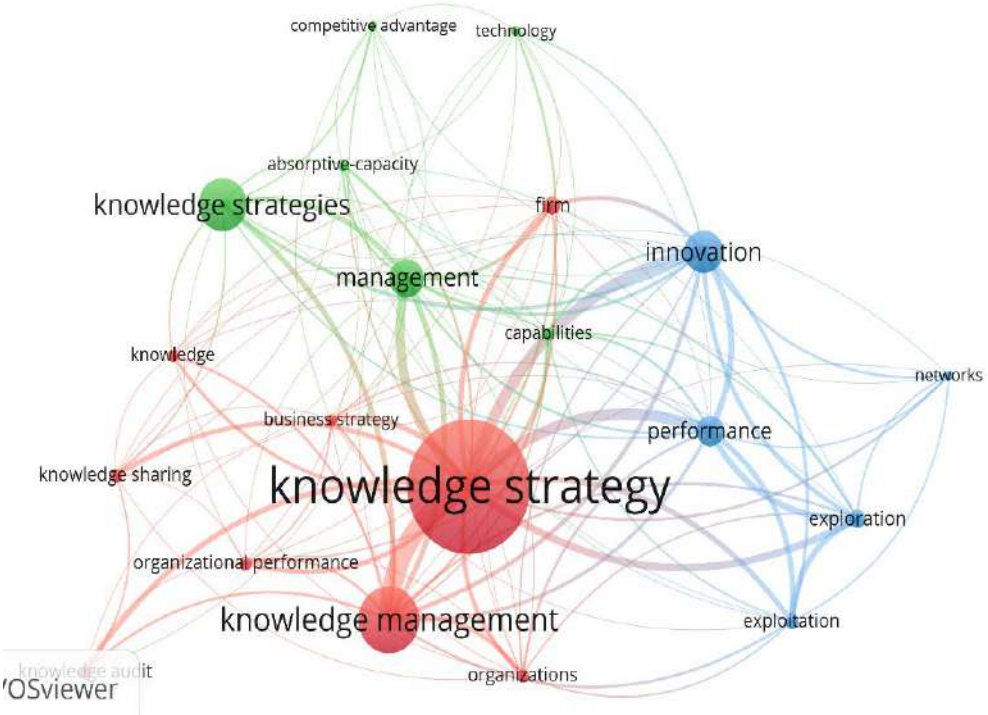

Figure 2. Co-occurrence analysis of all keywords
Source: (own elaboration from VOSviewer)

Table 1. Co-occurrence keywords clusters *(Source: elaboration based on VOSviewer)*

Cluster	ITEMS	Occurrences	Link strength
RED CLUSTER	business strategy	6	23
	firm	9	27
	knowledge	6	15
	knowledge audit	7	14
	knowledge management	33	74
	knowledge sharing	7	17
	knowledge strategy	66	126
	organizational performance	7	20
	organizations	7	27
GREEN CLUSTER	absorptive-capacity	6	17
	capabilities	6	27
	competitive advantage	5	11
	knowledge strategies	26	30
	management	19	50
	technology	5	13
BLUE CLUSTER	exploitation	7	35
	exploration	9	40
	innovation	21	62
	networks	5	15
	performance	15	55

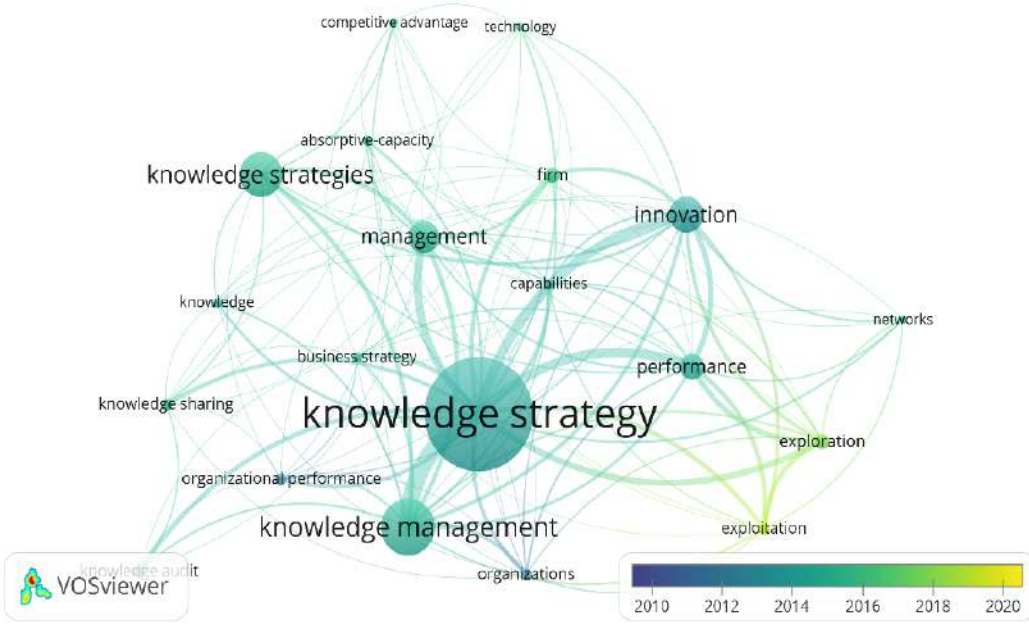

Figure 3. Overlay network for 2010-2020
Source: (own elaboration from VOSviewer)

According to the overlay map, in figure 3, it is interesting to observe that there is a concentration of publications during 2014-2016 corresponding to the blue-turquoise colors that predominate. A slight colorful variation is given by years 2018-2020 in yellowish nuances emphasizing key terms like: exploration, exploitation, and networks. This clue reveals a new trend of discussions towards a more practical dimension of knowledge strategies, not only conceptual models, definitions, or theories but also pragmatic business issues of how to benefit from knowledge throughout exploration, exploitation, and networks.

For example, according to the database, we identified that the "exploration" keyword on the overlay map is common for a set of papers that focus their research on exploring the knowledge strategies in fields like ICT-information and communication technology (Hartono et al., 2022), in digitalization of healthcare (Zhao & Canales, 2022), or emergent knowledge strategies in business education in a time of crisis (Tomé & Gromova, 2021). It must be pointed out that, as the map indicates, these are recently published papers, in 2021 and 2022.

Another example of researchers' intentions on providing solutions for increasing business performance is revealed by papers including the "exploitation" keyword. For instance, Revilla & Rodriguez (2011) present how knowledge strategy influences the team vision regarding product development in their paper. The authors developed complex research on 87 companies and discovered that the organizations' knowledge strategy greatly influences teams in achieving product development. The results show that low exploitation results from a low ambidexterity strategy whereas high levels of exploitation were achieved based on a high ambidexterity strategy. The authors state

that "*this result illustrates the strong cumulative nature of scientific knowled*ge" (Revilla & Rodriguez, 2011, p.18).

In recent years, there has been an increased awareness and interest regarding exploiting strategies with the knowledge to obtain a competitive advantage in various fields of activity. Thus, research in the field of tourism has channeled its attention to the efficient exploitation of organizational capital for high financial performance through strategies based on knowledge (Martínez-Pérez et al., 2021). The research of Martinez-Perez (et al., 2021) shows that the companies analyzed in the field of tourism should implement "*a knowledge exploration strategy rather than a knowledge exploitation strategy*" (p.1). According to their findings, exploitation strategies have a negative effect on bridging the organizational capital and financial performance compared to knowledge exploration which reduces the negative effects in the process.

Conclusions

This research paper aimed to investigate the literature available in the WOS database and pin up the main scholarly streams under the umbrella of the "knowledge strategies" topic. We chose for this scope the bibliometric analysis also supported by a literature review on traditional theories - like strategic planning and thinking accumulative advantage theory, and reinforcement theory - and emergent approaches – like knowledge exploitation and exploration. The results obtained throughout the bibliometric analyses led to several concluding ideas. First, we reiterate that literature on the explored topic has certainly an ascendent trend and a number of citations. Secondly, the composition of the clusters revealed two contrasting research behaviors/preferences of the authors collectively. In this sense, we explain that there were two homogeneous clusters, including semantically very similar keywords, meaning that the respective research papers also presented similar approaches. However, there was one cluster with rather heterogeneous keyword composition, meaning that some novel research directions are emerging in relation to the "knowledge strategies" concept. Finally, the paper's theoretical contribution provides an insightful perspective on the "knowledge strategies" literature indexed in WOS.

From a practical point of view, these discussions could be further exploited by other researchers and businessmen in order to guide their own work in the field of knowledge strategies. Still from a technical view, we believe we provided the necessary details about the implementation and interpretation of bibliometric analyses, which could also be useful for other researchers. The limitations of this research work refer to the bibliometric restrictions and filters, like: the use of a single database (WOS); the restricted query used to filter the papers' title, and the limitation of the domain to Business & Management. This type of research could be extended by including also another major database as Scopus, and adding to the query other keywords in order to immerse into more specific approaches.

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