LITERATURE REVIEW AS SCIENTIFIC METHOD IN DEFENSE RESOURCES MANAGEMENT STUDIES

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Literature reviews are the base of all types of research from defense resources management field. Therefore, any research should begin with an analysis of the literature relevant to the subject of the study, because this analysis allows the identification or positioning of the research in the current context. Literature review is, in fact, an analysis of what has been studied in the field so far, an analysis of the limits of existing research and the consequences of these limits, is an analysis that identifies the need to develop or complete existing studies. Metaphorically speaking, literature review is for scientific research what GPS (Global Positioning System) is for an object or entity on earth.

The aim of this article is to increase the quality of the scientific researches by presenting the literature review as a scientific method that can be used in the field of defense resource management at any time, even in times of crisis, which can provide valuable results with minimal resources only if the right type of review is properly chosen and are followed specific steps. Also, this article can be a guideline for beginner researchers.

Key words: scientific method, literature review, management, research, defense resources.

1. INTRODUCTION

Scientific research is the basis for the rational, sustainable and innovative development of defense field. The scientific research starts from an observation or a question, continues with the definition of a study object and with the formulation of some hypotheses, and later with the positioning of the study object within the scientific researches in the field of the study object and many other steps. This positioning of the object of study can be achieved only by mapping the scientific space of the field of study. This mapping is done by the method of literature review, which thus becomes the

foundation for all types of research in the socio-human, logistical and even informational and economic fields.

In the context of the exponential growth of data and the development of storage and processing systems through applications in the artificial intelligence field, it is becoming increasingly difficult to perform a literature review, and this article provides some easy-to-follow guidelines for conducting a rigorous and precise literature review.

A well done literature review, as a research method of study, creates a solid base for a complex scientific study or can become itself a research study.

2. CONCEPTUAL DELIMITATION

There is no universally accepted definition of *defense resources management*. However, generally, refers to defense organizations, which in order to fulfill the missions and objectives established by defense policies it is necessary to develop efficient and effective processes and mechanisms for planning, organizing, coordinating, executing and evaluating human resources, information resources, financial and logistical resources, on short, medium and long term.

In order to ensure a sustainable development and to integrate in the current geopolitical context the management of defense resources, it is necessary to carry out viable, objective and in-depth scientific studies.

According to the British dictionary, the *scientific method* is the mathematical and experimental technique used in constructing and testing a scientific hypothesis. The way in which observation is conducted, the interrogating of the observation's object and the search for answers through tests and experiments is not unique to any field of science. Thus, the social sciences, as empirical sciences, use mathematical tools borrowed from probability theory and statistics, along with their results, such as decision theory, game theory and operational research. Since the field of defense resource management is a field of interdisciplinary study, which integrates social sciences with economics and information technology, then the scientific methods used are very varied. [11]

Consideration of previous studies is essential for all areas of research, because in any research project, regardless of discipline, the author begins by analyzing previous research to map and evaluate the field

of research, to motivate the purpose of the study and to justify research hypotheses. This approach is called "literature review" or "theoretical framework" or "research fund" or "bibliographic study". [6]

Generally, *literature review* means identifying the bibliographic sources in the field of study, selecting the essential ones based on relevant criteria, synthesizing each selected bibliographic source, analyzing the syntheses and formulating the conclusions. Also, the finality of this process materializes in an article published in scientific journals where the research results are tested and evaluated by other researchers.

3. OVERVIEW OF SCIENTIFIC METHODS, TECHNICS AND INSTRUMENTS USED IN DEFENSE MANAGEMENT RESOURCES FIELD

We cannot talk about scientific research methods without mentioning Karl Popper or Thomas Kuhn, two defining personalities of the epistemology of the last century.

Therefore, a major contribution at the science theory was given by K. Popper who wrote in 1934 the book "*The Logic of Scientific discovery*", in which he presents the "Theory of Falsification" as a fundamental condition of

scientific research. He rejected the principle of induction, considering it scientifically unfounded, and proposed the hypothetical-deductive model. He considered that a single deviation was sufficient to invalidate a hypothesis, which remained true only for a long time, until it was invalidated (proved "false"). In his perspective, we do not start from pure observations (considered today an epistemological myth), but we always have certain hypotheses that we launch outside, because we do not have the observation, but we do it, and the world we live in is a world of invalidation of errors.[8]

Thomas Kuhn, the author of "*The Structure of Scientific Revolutions*"*,* written in 1962, and in which he introduces the term "paradigm" into philosophical-scientific jargon and elaborates an innovative definition of science: "*normal science means firmly based research on one or more past scientific achievements, achievements on which a certain scientific community recognizes them, for a while, as a basis for practice*" (e.g. Kuhn, 2008, p.72). It should be noted that Kuhn's theory has been widely criticized by other epistemologists, especially Karl Popper and his scientific community.

An analysis of the studies of the two scientists is not the subject

of this article, but I considered it necessary to mention them because disparate aspects of their theories are also found in current scientific research methods, even in defense management resources field.

There are a set of traditional research methods, technics and instruments which can be used, generally, in management field and particularly, in defense resources management field, such as: laboratory study and empirical study or qualitative studies and quantitative studies or deductive and inductive methods or analytical and synthetically methods.

But in defense resources management area the most objective and valuable results are obtained through integrative, trans-disciplinary studies, which used mixed research methods or defined and structured new research methods and tools. For example, the field of Naturalistic Decision Making (NDM) that was started in 1989 to understand how people make decisions in practice which was developed by Gary Klein and his collaborators. Because NDM researchers found that decisions made in natural environments characterized by insufficient information and analysis time are based on intuition, they issued the premise that laboratory studies do not allow the understanding of

intuition, as an essential factor in the decision-making process, because is not consciously generated.[3]

So, they used a complex method, Cognitive Task Analysis. Although methods of cognitive task analysis capitalize on components of the methods used since the late 1800s by psych-technicians, today it focuses on cognitive aspects of human-machine interaction that are not directly observable and is done to gain insight into knowledge representations, thought processes, mental strategies, and goal structures that underlie task performance, and the development of tools for training, testing and selection, for the development of expert systems and as a basis for computer simulations. The main sources of information for data collection are the observations and verbal statements of job experts, data that are collected both by the usual methods using interview techniques, questionnaires or analysis of team communication, and by other methods that include association techniques, sorting techniques, structure forming techniques and grid techniques. Also, for the analysis of cognitive tasks are used the method of critical decision, cognitive procedure and GOMS architecture. [13]

But, all these research studies started with a literature review that identified the limitations of existing

studies. Therefore, in the next part of the article I will analyze the literature review, as a single research study or as part of a complex research study.

4. LITERATURE REVIEW METHOD

4.1. Overview of literature review method

A literature review is first a synthesis of existing researches in the interest field by a set of criteria previously established, according with the objective or with the hypothesis of the study and then an analysis of the syntheses. A literature review include, also a synthesizing of each bibliographic source selected in accordance with study field.

Should be paid a particular attention to the selection and organization of bibliographic sources. For this purpose, 3 types of bibliographic sources have been defined: primary, secondary and tertiary. [20]

Primary sources are those documents that contain the original information, issued for the first time to present reality at a certain point in time. For example: scientific reports and journals, statistics, government documents, interviews, some manuscripts and biographies.

Secondary sources are those documents that contain interpretations, comments, criticisms, analyzes and syntheses of primary sources. For example: some biographies, reviews, textbooks, some articles in newspapers and magazines. Particularly, if the critical analysis of some primary sources generates new, useful information, then these could also be considered primary sources. [21]

Tertiary sources are the documents in which the primary and secondary sources are registered, stored and organized, in order to easily identify them. For example: bibliographies, library catalogs, encyclopedias and treatises. These can also be found online in catalogs such as Google Scholar, Harvard Business Review, Academic Search Premier, and many others. [20]

In order to be able to say that a literature review is well done, it must be evaluated, both in terms of the research methodology and in terms of its results. Therefore, it is essential that each stage of the research to be explained and to be accurately constructed, in order to facilitate the evaluation of the followed steps and the results obtained.

In Table 1 are presented the phases for conducting a literature review compared to those for evaluating a literature review.

Phases in conducting a literature review	Phases in evaluating a literature review
Phase 1: designing	
• Is this review needed and what is the contribution of conducting this review? • What is the potential audience of this review? • What is the specific purpose and research question(s) this review will be addressing? • What is an appropriate method to use of this review's specific purpose? • What is the search strategy for this specific review? (Including search terms, databases, inclusion and exclusion criteria etc.)	• In relationship to the overall research field, is this literature review needed and does it make a substantial, practical, or theoretical contribution? • Are the motivation, the purpose, and the research question(s) clearly stated and motivated? • Does the review account for the previous literature review and other relevant literature? • Is the approach/methodology for the literature review clearly stated? • Is this the most appropriate approach to address the research problem? • Are the methodology and the search strategy clearly and transparently described and motivated (including search terms, databases used, and explicit inclusion and exclusion criteria)?
Phase 2: execution	
• Does the search plan developed in phase one work to produce an appropriate sample or does it need adjustment? • What is the practical plan for selecting articles? • How will the search process and selection be documented? • How will the quality of the search process and selection be assessed?	• Is the search process appropriate for this type of review? • Is the practical search process accurately described and accounted for? • Is the process of the inclusion and exclusion of articles transparent? • Have proper measures been taken to ensure research quality? • Can it be trusted that the final sample is appropriate and in concordance with the overall purpose of the review?

Phase 3: analysis	
• What type of information needs to be abstracted to fulfill the purpose of the specific review? • What type of information is needed to conduct the specific analysis? • How will reviewers be trained to ensure the quality of this process? • How will this process be documented and reported?	• Is the data abstracted from the article appropriate in concordance with the overall purpose of the review? • Is the process for abstracting data accurately described? • Have proper measures been taken to ensure quality data abstraction? • Is the chosen data analysis technique appropriate in relation to the overall research question and the data abstracted? • Is the analysis process properly described and transparent?
Phase 4: structuring and writing the review	
• Are the motivation and the need for this review clearly communicated? • What standards of reporting are appropriate for this specific review? • What information needs to be included in the review? • Is the level of information provided enough and appropriate to allow for transparency so readers can judge the quality of the review? • The results clearly presented and explained? • Is the contribution of the review clearly communicated?	• Is the review article organized coherently in relation to the overall approach and research question? • Is the overall method of conducting the literature review sufficiently described? Can the study be replicated? • Is the result of the review reported in an appropriate and clear way? • Does the article synthesize the findings of the literature review into a clear and valuable contribution to the topic? • Are questions or directions for further research included? Are the results from the review useable?

Table 1: Phases in conducting and evaluating a literature review
Adapted from Hannah Snyder, Journal of Business Research, Volume
104, November 2019, Pages 333-339, *Literature review as a research
methodology: An overview and guidelines,* https://www.sciencedirect.com/
science/article/pii/S0148296319304564#bb0125

The comparative presentation of the two processes allows the easy observation of the connections between the two processes and the interdependence relations between them, as follows:

- Accurately going through each stage and making them explicit leads to the fulfillment of the condition of transparency and permits to another researcher to obtain similar findings by going through the stages presented in the study. [6]

- The realization of a logical and precise syntheses can leads to the fulfillment of the condition of falsifiability of the research.

- The analysis of the syntheses with objectivity, in depth and the clear explanation of the analysis can leads to the fulfillment of the condition of utility and innovation of the research.

Because, in the evaluation process of the literature review, the fulfillment of the following conditions is pursued: to be replicable, to be falsifiable, to be transparent, to be innovative and to be useful.

According with Hannah Snyder there are different types of review methodologies, such as: systematic, semi-systematic and integrative approaches. [6]

In my opinion, it cannot be said that one type of review is better than another, but that the type of review must be chosen in correlation with the defined purpose and object of study, because each type has its own characteristics that define it. Therefore, in the next part of the article, I will present the most important characteristics of each type of literature review.

4.2. Review – systematic type

Characteristics of literature review systematic:

- A systematic review can be explained as a research method and process for identifying and critically evaluating all empirical evidence that meets the pre-specified inclusion criteria to answer a particular research question or hypothesis. In this way, bias can be minimized, thus providing reliable findings from which conclusions can be drawn and decisions can be made [6].

- Initially, the method of systematic review was developed in medical science, later attempts were made to create guidelines in the social sciences and implicitly in defense resources management.

- These studies are also used to determine whether an effect is constant between studies and conclusions can be drawn about future studies to be performed to demonstrate the effect or can be used to find out which study level or sample characteristics have an effect on the phenomenon studied, such as whether studies conducted in one cultural context show significantly different results from those conducted in other cultural contexts [6].

- It have strict requirements regarding the databases in which articles are searched and selected for inclusion in the review.

- They are effective in synthesizing the collection of studies by providing evidence of the effects of existing studies, evidence that could be used later in developing strategies and policies and in operational and tactical practice.

- It is a good choice when you what to cover almost all articles ever published on the studied topic.

- It is not effective in the case of the study of broad topics, which have been subjected over time to interdisciplinary debates.

4.3. Literature review – semi-systematic type

Characteristics of literature review semi-systematic:

- A semi-systematic review can analyze how research in a selected field has progressed over time or how a topic has developed in different research paradigms. In general, the review aims to identify and understand all potentially relevant research paradigms that have implications for the subject studied and to synthesize them using meta-narratives, but does not allow measuring the magnitude of the effect [5]. Although this method covers a wide range of topics and different types of studies, the research process must be transparent and

have a developed research strategy that allows readers or critics to assess whether the arguments for the judgments made were relevant to the chosen topic or if the methodological approach was the most appropriate.

4.4. Literature review – integrative type

Characteristics of literature review integrative:

- It is also called a critical review approach. An integrative review usually aims to evaluate, critique, and synthesize literature on a research topic in a way that allows for the emergence of new theoretical frameworks and perspectives [9] or to be able to re-conceptualize and expand. The theoretical foundation of a specific, mature subject as it develops. For emerging subjects, the goal is rather to create initial or preliminary conceptualizations or theoretical models and often requires a more creative collection of data from different fields or research paradigms.

- An integrative review method should result in a new conceptual framework or theory. Although an integrative analysis can be performed in several ways, it is necessary to ensure the transparency of the way in which the integration was done and the way in which the articles were selected [9]. Only in this way can well-done integrative analyzes make a valid and strong contribution to his

field of research, otherwise, in most cases, reviews labeled as integrative are only summaries of studies and are not really integrative.

4.5. Software used in conducting a literature review

There are some software which can be used in order to obtain a well-structured literature review in different domains, such as:

- Covidence, it is an online platform, the core component of the Cochrane toolkit, which supports parts of the systematic review process, including title/abstract and full-text screening, documentation, and reporting. Also, It is suitable for researchers and students at all levels of experience.[17]
- EPPI-Reviewer, is a web-based software developed by the Evidence for Policy and Practice Information and Coordinating Centre (EPPI) at the UCL Institute for Education, London. It provides comprehensive functionalities for different levels of coding and screening. It stores, references, identifies and removes duplicates automatically. EPPI-Reviewer allows full-text screening, text mining, meta-analysis and the export of data into different types of reports.[18]

- CADIMA, is a free, online, open access review management tool, developed to facilitate research synthesis and structure documentation of the outcomes. It was developed by the Julius Institute and Collaboration for Environmental Records to establish a software program to support and guide users through the entire systematic review process, including protocol development, literature search, study selection, critical evaluation, and results documentation. It allows for systematic mapping and quick reviews. [19]

5. CONCLUSIONS

A literature review can help identify areas where research is insufficient or contradictory. It is also a great way to summarize the results of existing research to identify their limitations and to discover areas where further research and development is needed.

In recent decades, as a result of the rapid evolution of information technology and its widespread use, new human needs have been identified and implicitly new objects or fields of study (as cognitive task analysis which has been developed to study human-machine interaction or as software in the field of artificial

intelligence), but the literature review in the field of study is still necessary, because it can map the field of study, can provide both input for extensive studies and new ideas and perspectives when it is done rigorously or can create guidelines for policies and practices.

The field of defense resources management is a complex and extensive field of research that can be understood and explained by rigorous studies conducted from the definition of the object of study and working hypotheses to the formulation of conclusions and evaluation of research quality.

Therefore, in order to have an effective start, it is necessary to carry out a well-organized and structured literature review, and in this article the essential information were presented in order to be able to do this.

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