



**NATIONAL UNIVERSITY OF POLITICAL STUDIES AND
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**MULTIDISCIPLINARY DOCTORAL SCHOOL
DOMAIN OF MANAGEMENT**

DOCTORAL THESIS

*Open sources information managemet through
the use of OSINT Tools*

ABSTRACT

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II. KEYWORDS

decision support, open science, management, digitization, osint tools, business, education, public administration, open access, open sources

III. SYNTHESIS OF THE DOCTORAL THESIS

GENERAL CONSIDERATIONS

The evolution of the online environment, for many developed countries, can lead to an increase in authority, but for many developing countries the information society has too little relevance for the way they live their lives.

The digital challenge requires a close connection between nations, universities, companies, and civil society to build a strategy for the implementation of various policies. Innovation represents a unique challenge that can be the answer to a mode of interaction between those who have the responsibility to think and those who have the responsibility to produce goods and services.

A digital society is an area of interdisciplinary research that has been formed as a result of the adaptation as well as the integration of advanced technologies in society and culture. The development of an information society is important for economic growth and sustainable development of the country, but also for improving the quality of life of citizens through access to information, services, and opportunities. OSINT tools have become increasingly important in gathering and analyzing information globally. In the context of globalization, the use of OSINT tools can be useful in monitoring and analyzing political, economic, and social developments at the international level.

The motivation for choosing this topic derives from the desire to propose a model for implementing OSINT tools in the digitization process, which is composed of three components: infrastructure, software, and skills. The need for this model can also be seen in the dissemination of research results.

The main objective of the work consists in identifying the degree of knowledge, use, and availability for the use of OSINT tools in 3 fields: public administration, business, and education. It is preceded by the following **secondary objectives**: the review of the tools, the empirical analysis of the perception regarding the degree of knowledge and use of OSINT tools in the 3 fields, and the design of mechanisms for the implementation and management of information with the help of OSINT Tools.

The research **hypotheses** were:

- H1. OSINF are not known in the fields of: business, education and public administration;
- H2. OSINF are used in professional activity;

- H3. The use of tools contributes to the increase of professional/personal performance;
- H4. OSINT tools are known but not used;
- H5. There is interest in knowing and using the tools.

The research methodology assumed a link between quantitative and qualitative methods. The documentation was made by combining *direct research* (analysis of real facts) and *research from secondary sources*, through bibliographic study from open sources (printed and online resources). Following the elaboration of the hypotheses followed the stage of data collection, information processing, and results modeling (statistics and analysis).

The statistical-mathematical analysis of the results led to the *validation/invalidation* of the hypotheses, and by consolidating the results of the empirical research with the research of the specialized literature, the establishment of *scientific conclusions* was reached.

The data collection tool used was the questionnaire, according to data collection methods (survey). The structure of the questionnaire (3 sections) corresponded to the scientific hypotheses. Statistical content analysis was part of the data analysis techniques used. The data were processed through the "Microsoft Office 2010" applications: "Google Forms" and "Excel".

THESIS STRUCTURE

Along the **4 chapters of the paper**, it was considered to cover all levels of research - theoretical and practical, in a logical sequence, which made the presentation of information functional, coherent, and accessible, emphasizing personal observations.

In the **first chapter**, entitled *Information Management*, the fundamental concepts and notions that form the basis of management, as well as the main characteristics of the management of information obtained from open sources, are addressed.

Control of information gave some people power over others and probably helped create most of the hierarchical cultures we know today. Precisely for this reason, we considered it important to emphasize the importance of information as a primary element and to understand it better, it is also necessary to know the types of existing information, as well as their classification.

The use of information technology and computers is becoming increasingly common in information-based decision-making. In computer science, the term information is often associated with data, but the fundamental difference between the two is that information is meant to eliminate uncertainty, while data can be thought of as redundant symbols. Also, information can be transferred both in time, through data storage processes, and in space, through communications and telecommunications.

This information can be used in an information process, which consists of an integrated set of operations of collection, processing, storage, use, and transmission of data and information. By following all these stages, an informational circuit is created.

People responsible for collecting information must adapt to the requirements and needs of the organization. Therefore, they must have the ability to understand development priorities and have the technical knowledge to understand the meaning of the information. If these individuals are unfamiliar with the information already held by the organization, this may result in additional costs for collecting the information already in place.

More and more companies are using specially designed software to process the collected information. Another option is to turn to external providers of such services, although this option can be much more expensive. In the process of processing information, it is crucial to establish its veracity. The analyst responsible for processing the information must have the ability to determine whether the information is real, although this process can sometimes be very difficult. For example, information available on the Internet cannot always be verified because there is nobody to verify it. Thus, information that is useful and of good quality is preserved and capitalized to transmit it.

For information to be valuable and serve its purpose, it must be delivered by the right person at the right time. Otherwise, the information can become useless, which can lead to negative consequences for the company and prevent management from making important decisions promptly. During the submission process, errors in previous steps may be highlighted if they were not completed properly. After validating the information, it is delivered to the recipient according to his requirements. In the economy, the information system has the role of connecting the decision-making system with the operational one. In IT, the system must be very flexible to adapt to the volume of transactions and changes that may occur within the organization.

In the field of communications and information management, information flow can be described as a set of information necessary to carry out an activity, transmitted between a sender and a receiver. The information flow can be characterized by different aspects, such as the content, volume, frequency, or quality of the information transmitted. In the organizational context, the information circuit represents the route that information takes, from the time of its generation to the time when it is stored or archived. This circuit can be seen as a series of steps and activities involving the transmission, processing, and use of information, as well as the verification and assurance of its quality. Information circuits and flows are extremely important for the proper functioning of the information system, which they shape.

A knowledge-based society promotes informational values and can capitalize on information regardless of its field of origin. As information becomes a dominant trend driving the world, socio-economic processes are influenced by information management and the generation of new knowledge, to which state-of-the-art technologies contribute. Thus, the way we behave and make decisions is increasingly influenced by information and theoretical knowledge.

A major problem of the information society is that information is easily reproduced, which can lead to intellectual property problems. Even though business people produce and sell information and knowledge, proper control is necessary for it to serve as an effective basis of the information economy. In practice, information control can be challenging both from a technical perspective (eg protection against unauthorized use can often be avoided) and from a social perspective (users and citizens of the information society may refuse to accept the trading of information). In the transition to an information society, the increase in the demand for credible information and the speed with which it is processed and transferred show that the processing of such a large volume of information cannot be done without the involvement of a large number of people and specialized equipment.

In the field of information, violations of ethical principles are often encountered through the spread of misinformation, known as fake news. This disinformation can be intentional or involuntary, and non-compliance with moral principles by spreading fake news can be based on various reasons, such as political, economic, or social interests, by manipulating public opinion.

Decision-makers can obtain critical information from a variety of sources, such as raw data, documents, personal knowledge, or business models, to identify problems and make decisions through

interactive software. In this process, the Decision Support System plays an important role, helping to facilitate the decision-making process.

Access to information could be defined as the ability to identify, retrieve and use information effectively, being vital to social, political, and economic progress. Traditionally, information was disseminated in a variety of formats that were widely accessible, often through public libraries. For a long time, many individuals have relied on information provided by other people and the media to obtain data. The Internet has reconfigured how the population is informed, shifting the emphasis from traditional methods (based on printed sources) to modern ones (in the online environment). In addition, information sources are no longer limited by linear organizational structures and the conventions that surround them, so authors have begun to experiment with non-linear forms, commonly called hypertexts, which allow information to be organized as non-linear associations and have led to the emergence to new genres, tools, and conventions for writing and reading.

The security of data from open sources is a particularly important issue in the field of information technology. This is because much of the data made publicly available can be used in unintended or even illegal ways. It is essential to take steps to protect this data by implementing well-defined security policies and procedures that include strict authentication and authorization of data access, as well as close monitoring of this access to prevent unauthorized use of the data.

After the data is transformed into digital format, it can be used through the digitization process, to be adapted for the benefit of customers and generating digital flows through the implemented digital technologies. Through digitization, internal processes can be optimized to reduce costs, while digitization represents a strategy that revolutionizes the entire development and business strategy, once implemented. In this digital transformation process, digitization is the second step, after which the value of data increases and the process and workflow become more efficient.

Information management is a complex process that involves collecting and organizing data from various sources, followed by its transmission to one or more users. The digital transformation of open sources is a valuable opportunity, especially for the economic field. This transformation can bring significant benefits not only to companies but also to their employees and the community of open-source users, thus accelerating the digital transformation process for most companies.

Obtaining a complete and real-time picture of information is a major challenge for its management, and the goal is to create an accessible and easy-to-use system that enables optimal decision-making. Thus, effective information management is an important priority in any field and an essential component of modern technology. To highlight the progress and development of an organization, information management must include all sources of information, and by integrating them into organizational processes, the culture, structure, and way of working of the organization are influenced. Information management unites data, information, technology, information systems, business processes, and, perhaps most importantly, people.

Information is a strategic resource for any organization because it enables personnel to make strategic decisions based on the organization's specific resources. Poor information management can be a threat to that business. Technology has an important role in this process, given the significant increase in the volume of information from year to year. The efficiency of the information management process within an organization depends on its correct management and compliance with legal norms and regulations. By implementing such a system, the organization can reduce operational costs, increase productivity, and the ability to make strategic decisions effectively.

As information is vital to any business or organization and plays a critical role in business growth, significant efforts and resources are spent to develop effective information management systems. However, access to enormous amounts of information comes with great responsibility, in that organizations must manage information responsibly, ethically, and following legal regulations. Violation of these regulations can attract significant fines and other measures that can seriously affect a company's business. For this reason, information management is treated seriously and rigorously. In the past, the traditional knowledge management model focused on achieving pre-established organizational goals.

Information management involves the activities of planning, organizing, structuring, processing, controlling, evaluating, and reporting information necessary to meet the needs and requirements of organizations. These activities are critical to making informed decisions and ensuring the long-term success of the organization. Information management is also closely related to the management of data, systems, technology, processes, and strategy. To successfully manage information, specific operations, organizational capabilities, and standards are required to treat information as a valuable product or service.

One of the main challenges in information management is represented by a series of problems such as: the existence of a large number of different information management systems; lack of coordination between these systems; the use of old systems that require modernization or replacement with newer ones; direct competition between information management systems; the lack of a clear strategic direction for the general technological environment; limited and inadequate adoption of existing information systems by staff; poor quality of information; lack of motivation and management support for information management; limited resources available to implement, administer or improve information systems; lack of organization-wide definitions for information types and values; a large number of business needs and problems; lack of clarity in organizational strategies and directions; difficulties in changing staff work practices and processes; and internal politics that may affect the ability to coordinate activities across the organization.

In **the second chapter**, *OPEN SCIENCE AND OSINT TOOLS*, we aimed to present in detail (definitions, importance, and functions) aspects related to open science, open access, and OSINT Tools.

Open Science represents an approach that promotes practices and a philosophy that encourages transparent, accessible, and collaborative research. This approach involves publishing research data and methods before publishing results, using open-source software, and involving the community in the research process. The aim is to support the growth of research quality by facilitating the replicability and validation of results, as well as by promoting research collaboration and innovation. In addition, Open Science can help improve research efficiency by reducing duplication of effort and providing access to data and methods.

To build an information management framework through OSINT tools, it is necessary to establish objectives, identify and evaluate information sources, and implement a process of information collection, analysis, and use. Using a diverse set of information-gathering tools and techniques is another important aspect of building such a framework. These tools may include search engines, sentiment analysis, social media monitoring, and data analysis, for example.

It is also crucial to implement a process to analyze and interpret the information collected and use this information in the decision-making process.

In the process of building the information management framework through OSINT Tools, an adaptable and flexible approach is important, because information sources and technologies can change

rapidly. It is crucial to continuously monitor the sources of information and update the processes and tools used so that we can obtain relevant and valuable information. Another important aspect is collaboration and communication, more precisely collaboration with other departments or organizations that can provide valuable information, as well as communication of research results to people who can benefit from them.

There are some common categories in open science, such as open access to scientific publications (instead of being restricted by financial barriers), sharing of scientific datasets for research replication, availability of software sources and tools to be used, modified and freely distributed, online publishing of research notes, data, and analysis scripts in real-time to increase transparency and collaboration, allowing public comments and contributions to scientific articles before publication, creating and sustaining communities that promote Open Science practices and policies, using of alternative metrics to assess research performance and impact, promoting research integrity through Open Science practices, incorporating Open Science principles into educational programs and science policies, such as research funding and data access.

The term *open access* has generated many debates. The fact that information is openly available does not mean that its beneficiaries can process the data without complying with legal and ethical standards. Therefore, open availability does not completely remove restrictions but only provides access to part of the information without cost, provided that the distribution of the data is done according to the needs and preferences of those accessing the information.

In addition, the posting of personal data does not confer the right to be used for purposes other than those for which they were originally published. The owner of the data must give consent to allow its use. However, there are situations where data available in open sources may be published by third parties, not by their owners. In such cases, violation of ethical norms may lead to violation of rights such as the right to privacy, intellectual property right, copyright, and so on.

Information knowledge comes largely from public sources, demonstrating that we can generate useful knowledge from information available to the general public. This allows us to assess how much we can use open-source information and how it can contribute to the decision-making process. In addition, more and more companies and organizations offer specialization courses in obtaining data

online through specific tools, most of them organized online. These courses are taught by IT specialists, software developers, and graduates of these courses.

Depending on the needs of the user, there are a variety of tools available to obtain a wide range of information such as email addresses, social media accounts, forums, geolocation and metadata, and documents. In general, most tools require a subscription to be used. However, there are also free or partially free variants, but they may be more limited in terms of the diversity of information obtained.

Business OSINT tools are software suites and platforms designed to help companies and organizations collect and analyze information from public sources. These tools can be used for a wide range of purposes, including market research, competitive analysis, and due diligence.

International access to information includes the ability of individuals, organizations, and governments to access and use information produced and shared globally. But several challenges can make it difficult to access such information, such as language barriers, cultural differences, legal obstacles, and different regulations from one country to another. The need for improved access to the online environment has led to the development and refinement of applications.

Companies' performance can be improved by applying different techniques, such as supply chain risk management and Open-Source Intelligence (OSINT) techniques; planning CEO meetings; protection of assets; access to information at an international level; customer satisfaction analysis.

Communication and information flow has undergone a significant change with the advent of asynchronous applications such as e-mail and synchronous applications such as instant messaging, chat rooms, and video conferencing. With the continued development of applications, the web has become crucial to the flow of information. However, copyright law, developed for earlier publishing media, has been difficult to adapt to electronic publishing, and intellectual property rights have been jeopardized by the cut-and-paste functions of word processors.

In the technology industry, there is a wide variety of software published by tech giants or small startups that many organizations are interested in using. However, there are operational hurdles that prevent companies from reaping the full benefits of open source.

The third chapter, *ANALYSIS OF THE PERCEPTION ABOUT THE KNOWLEDGE AND USE OF OSINT TOOLS*, is dedicated to the empirical study carried out to validate the 5 established

research hypotheses. The first part of the chapter is dedicated to the presentation of the research method - the focus group and the methodology by which it was carried out.

Three fields of activity were analyzed: education, business, and public administration. The instrument used was the questionnaire, and the results obtained were analyzed and interpreted using Excel 2010 and Statistical Package for the Social Sciences. The questionnaire, made through the Google Forms program, was distributed online through social networks and chat applications, and 410 persons responded.

Respondents completed the questions themselves, unassisted, with explanations for each question at their disposal. They were also assured of data confidentiality and the purpose of their processing. The sampling method chosen is non-random. A confidence level of 95% and a margin of error of $\pm 5\%$ were considered for sample validation. Its representativeness was determined starting from the theory of the statistical significance of the differences between the weights of the different strata at the level of the researched population and the same weights obtained at the sample level. The statistical significance of the respective differences was determined by applying a statistical test based on the distribution of t-respondents.

Structured by category, among the respondents who answered, 162 (39.5%) belong to the field of public administration, 144 (35.1%) from business, and 104 (25.4%) from education. The online distribution of the questionnaire made it also reach rural respondents (6%).

Following the research, we could observe that business respondents are the ones who rely on and use information from the online environment to a greater extent, compared to respondents from education and public administration. Also, all respondents are convinced, but not entirely, of the evolution of information and technology, as well as the continuous change of networks.

Thus, from the point of view of information management, the objectives considered to be important, by all categories of respondents, are: ensuring the circulation of information in the internal environment; creating new information by processing and interpreting existing information; the creation of efficient information collectors, both internal and external; identification of entrepreneurial opportunities; the use of information as a lever for actions on the environment; creating regular information exchange circuits; anticipating and countering possible problems.

The conclusions of the empirical research revealed that the respondents believe that:

- threats generated by new technologies can affect society;
- for any organization, information has become a strategic resource;
- the virtual space continuously expands and takes over parts of people's activities and requires appropriate technology and skills;
- respondents from business are the least familiar with OSINT Tools, but they represent the largest number of respondents who participated in training courses to use these tools;
- for participants in the field of education, information from open sources is indifferent, and less important than responses from other fields;
- among all 3 categories, the respondents from the public administration represent the highest percentage of people familiar with OSINT Tools, in terms of current activity. However, it represents the lowest percentage of the participating categories, who followed a specialized course to use these tools.

The results of the studies validate 3 of the 5 hypotheses, as follows:

- H2. OSINF are used in professional activity

The majority of respondents declared that they use OSINT Tools in their professional activity, the ranking is led by people from public administration. More and more companies/institutions are interested in OSINT tools and their utility. This fact is also reinforced by the willingness of employers to invest in the training of employees by sending them to courses, as well as by purchasing licensed software, which offers a higher performance of the tools and obtaining more complex results. The majority of respondents who use tools have attended training courses, mostly paid for by employers. We can say that, in confirmation of the hypothesis, the answers of the respondents regarding their confidence in using the tools in future activity at the level of their organization also came.

- H3. Use of tools contributes to the increase of professional/personal performance

The use of tools, both personally and professionally, can lead to increased performance if used properly. We could observe, following the research, that respondents from the business field use the tools more within the organization in which they work, and those from the fields of education and

public administration also use them for personal activities. The questions related to this hypothesis were answered only by respondents who use OSINT Tools.

➤ H5. There is interest in knowing and using the tools

A major interest in the promotion of OSINT tools could be observed. Documentation of the advantages of the tools and their use in future activity by the respondents are signals that these tools represent interest.

The **2 refuted hypotheses** are:

➤ H1. OSINT are not known in the fields of: business, education and public administration

We could see that out of the total number of respondents, 65.6% are familiar with OSINT Tools, which means that solutions are being sought to make certain responsibilities more efficient in all areas. The lack of knowledge by the other respondents can be due to several causes: the lack of necessary knowledge, the low budget, the lack of a clear strategy of use and the lack of digital culture.

➤ H4. OSINT Tools are known but not used

By knowing the tools, respondents have a frequency of using them at least once a day (for respondents from business - 29.9%), respectively at least once a week (respondents from education - 28.8% and public administration – 31.5%). We can deduce that the tools are more useful in the business field, and in the fields of education and administration, they are either not used as often, or are not adapted to the field of activity.

Through the **fourth chapter**, *OSINT TOOLS IMPLEMENTATION MECHANISMS*, we presented our proposal, which represents a model for implementing OSINT tools in the digitization process, which is composed of three components: infrastructure, software, and skills.

It is important to recognize OSINT Tools as components and promote them to be used both professionally and personally. For this, a solid infrastructure, high-performance, and updated software, as well as skills that can be accumulated by following specialized courses are necessary.

In the case of respondents from the public administration, the application of our proposal involves two circuits. The first corresponds to the existing human resource, which through an advanced training program, public administration employees who are familiar with and use (both generally and

professionally) OSINT tools, could benefit from improved knowledge, use, and performance. The second circuit addresses the newly hired human resource who could benefit from a basic training program (for beginners), getting to know, use and increase professional performance through the use of tools. Once we reach this level, we can say that for added value, the first circuit can be integrated.

And in the case of human resources in the fields of business and education, there are two circuits. As a result of the answers received following the application of the questionnaire, it could be observed that respondents from these two fields use OSINT tools to a greater extent in general, compared to those who use them professionally. That is why it is recommended that existing human resources follow a basic training program to increase performance and to reduce/eliminate the number of those who do not use the tools for professional purposes.

Regarding the newly hired human resource, we can say that the first circuit applied to the human resource in public administration is repeated. Thus, following some courses at an advanced level would bring, and in the case of human resources from business and education, it would lead to improvement from all points of view (knowledge, use, increase in professional performance).

Our proposal can be implemented through the Triple Helix model, which involves a series of interactions between academia, industry, and government/public authorities to promote economic and social development. This approach is based on concepts such as the knowledge economy and the knowledge society.

The Triple Helix model is based on the interactions between the three fields, each with a specific *initial role*: universities focus on basic research, industries producing commercial goods turn their attention to innovative products and services, and governments regulate markets. In this model, there are a series of bilateral interactions between the university, industry, and government, resulting in the evolution of each component to adopt some characteristics of the other institutions. As a result, hybrid institutions with characteristics from all three fields can be formed.

As a result of applying the model, you encounter three types of bilateral interactions:

- The interaction between education and business, where universities provide research and education leading to the development of commercial products;

- The interaction between education and public administration largely depends on the policy of public institutions toward education. Where higher education is largely funded by the state, the public administration has a greater influence on the educational system and the research carried out;
- The interaction between the public administration and business, can be strongly influenced by the attitude of the public administration towards the economy and the role of some public administration institutions in regulating the industry.

We believe that it is essential to develop a promotion strategy for the implementation of OSINT tools. This strategy can be promoted through the Ministry of Research, Innovation, and Digitization, the Ministry of Economy, Entrepreneurship, and Tourism, as well as through the Ministry of Education. Thus, the public administration can provide funding lines and support schemes for the SME sector, while the educational environment can develop programs to stimulate institutional development. Business representatives can also contribute with partial financing and the provision of infrastructure, including hardware and software. Regulations applied by the public administration can provide the necessary support to facilitate these interactions and to further develop this strategy.

At the end of the paper, the general **conclusions** obtained based on the bibliographic materials studied and the results of the conducted research are presented. In addition, personal contributions, validity, and limitations of the research as well as possible future research directions are highlighted.

The approach to the objectives consisted of the creation of empirical research, following which we observed the need and desire of the respondents to use OSINT Tools to facilitate the professional environment. We also proposed mechanisms that facilitate the use of OSINT tools now and in the future for the beneficiaries of the three fields involved in our research.

It is anticipated that the Internet and open-source information will continue to evolve and adapt to user demands and changing technologies in the future. In the context of the evolution of the online environment, a trend towards easier and more accessible access to information can be observed, which will allow users to gain more knowledge and make better-informed decisions. Also, in the future, artificial intelligence and machine learning will continue to play an important role in how information from open sources is collected, analyzed, and presented, leading to access to relevant and personalized information in a fast and efficient way. In the context of a continuous increase in the volume of

information shared online, increased attention will be paid to its safety and confidentiality, and the development of encryption and data protection technologies will play an important role in protecting personal information. Thus, we believe it is important to continue investing in research and development to ensure that developments will be accessible and relevant to everyone in the future.

In all analyzed areas, there was an increased demand for OSINT tools, as respondents want to develop their professional skills through them, either by attending training courses or through specialized documentation. This interest in the ever-evolving field is evidenced by the large number of respondents who believe that OSINT tools should be promoted and who wish to use them in their future professional activities. In the business field, where financial power is greater than in the other two fields, it was observed that the number of people informed about these instruments is lower.

Since OSINT tools can be used across a wide spectrum of domains and by all three categories of responders, cooperation among these domains is needed to promote the use of these tools. In this direction, it is proposed to develop sustainable projects in the stock exchange system, financed by the European Union, in which both the business environment and the public administration, and the educational system are involved. Thus, through inter-institutional collaboration, projects can be developed that offer training courses and training for teaching staff, with the involvement of the business environment, which can benefit from the training of future managers and certain tax deductions. Also, a collaboration bridge can be created between institutions, by organizing inter-ship sessions and inter-institutional training teams, to get to know each institution's fields of activity better and maximize joint activities. This approach could bring significant benefits to all three areas included in the research and contribute to the development of a digital culture and a strategy for the use of OSINT tools.

The use of online investigative methods can be accompanied by certain challenges, such as protecting personal data, respecting the right to privacy, as well as the possibility of obtaining information that is difficult to verify due to easy manipulation or falsification of digital information and data. Therefore, it is crucial that such investigations are conducted following ethical and legal norms and that users use appropriate techniques to verify the authenticity of the information and data obtained.

In the future, emerging technologies such as artificial intelligence and blockchain could be used to improve the accuracy and security of data obtained through online investigations. These technologies could help increase the reliability of data and protect its privacy and security more effectively than classical methods.

This research has **limitations** imposed by the ever-changing nature of the online environment and tools, as well as managers' perceptions of adapting to these changes. However, the purpose of the paper, to propose a new perspective on the management of information from open sources, supports the need to promote the tools through various online marketing methods, participation in conferences, advertising, and the creation of educational content. Also, another limitation is the high cost of the instruments, the available variants making the research difficult. The research identified, defined, and argued the concept from a theoretical perspective, and, from a practical perspective, it aimed to understand the level of familiarization and use of information obtained from open sources through the use of OSINT tools.

Personal contributions consisted of:

- creating a coherent and precise conceptual framework for the field addressed, by systematizing and highlighting certain theories, concepts, techniques and methods presented in specialized literature;
- carrying out an empirical research of the perception regarding the degree of knowledge and use of OSINT tools that resulted:
 - determining the respondents' position towards information management;
 - establishing the level of knowledge and use of OSINT tools among respondents from the three participating fields;
 - necessity of using OSINT tools, especially in the professional environment;
 - validation/invalidation of the research hypotheses on which the scientific approach was based;
 - collecting, analyzing and interpreting data and information resulting from empirical research;

- designing a mechanism for implementing OSINT Tools.

Future research directions

We believe that there are **unlimited opportunities** for future research in this area, given that the online environment is constantly evolving and new investigative methods will be constantly developed, so that classic technologies will be less and less used or even replaced over time. . Online investigative methods are a valuable tool, but it is important to use them with caution. As technology evolves, these methods become more and more accurate and effective. In this context, we believe that the management of information from open sources using OSINT tools requires continuous research and **constant updating of knowledge**, because information from open sources is constantly changing, and new tools and technologies are constantly being developed.

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