

Strategic Management of Research and Innovation Projects: A Systematic Literature Survey

Thais de Figueiredo Oliveira¹, Alessandra Cananéa², Giselle Vasconcellos³,
Mirian Miranda Cohen⁴

¹Faculty of Nursing, Federal University of Rio de Janeiro, Rio de Janeiro, Brazil

²Faculty of Industrial Pharmaceuticals, Federal University of Rio de Janeiro, Rio de Janeiro, Brazil

³Library Science School, Federal University of the State of Rio de Janeiro, Rio de Janeiro, Brazil

⁴Faculty of Zootechnics, Federal Rural University of Rio de Janeiro, Rio de Janeiro, Brazil

Email address:

cdi@hemorio.rj.gov.br (Thais de Figueiredo Oliveira), alessandra.cananea@ini.fiocruz.br (Alessandra Cananéa),
vasconcellos_giselle@hotmail.com (Giselle Vasconcellos), mirian.cohen@ini.fiocruz.br (Mirian Miranda Cohen)

To cite this article:

Thais de Figueiredo Oliveira, Alessandra Cananéa, Giselle Vasconcellos, Mirian Miranda Cohen. Strategic Management of Research and Innovation Projects: A Systematic Literature Survey. *Journal of Public Policy and Administration*. Vol. 7, No. 1, 2023, pp. 25-35.
doi: 10.11648/j.jppa.20230701.14

Received: March 9, 2023; **Accepted:** March 28, 2023; **Published:** April 11, 2023

Abstract: The informality of Strategic Research Project Management procedures is still a reality in several health science and technology institutions in Brazil, with a recognized negative impact on innovation management. The objective of this work is to verify the scientific and academic production related to the methodologies of strategic management of research projects and innovation in health in the databases of journals in the last 10 years, in the period from 2011 to 2021. The methodology used was the systematic review of literature based on the criteria of Tranfield, Denyer, and Smart (2003) to ensure the scope and impartiality of the research. The question that guided the selection of articles in this study was: “What are the main methodological references for the strategic management of research projects and innovation in health proposed in the scientific literature?” The databases defined for searches were Pubmed, SciELO, and Lilacs. 90 records were screened and reviewed by crossing keywords, descriptors, and eligibility criteria listed in research and innovation. The data collected for screening referred to specific information on the source/article/document (title, authors, journal, year, language) and main characteristics of the study (population profile, research context, objective, methodology used), as well as identification of emerging themes and additional notes. We conclude that, despite the interest in publications on the subject in question, the application of strategic management in research and innovation projects in Health is still emerging not only in Brazil but also in other countries recognized for the development of this area of study. The systematic review made it possible to identify the main practices described in scientific articles, which may help in assessing the implications and benefits generated using these strategies.

Keywords: Strategic Management, Research Portfolio Management, Innovation Projects, Systematic Review

1. Introduction

Studies claim that the modern world has undergone three revolutions: agricultural, industrial, and information. Currently, the world is facing the fourth revolution: the technological one, that is, a revolution founded on innovation. Broadly speaking, this covers not only patents for technological advances such as product invention, but also a simpler and more effective way of providing solutions to problems identified in both production and provision of

service [1].

Globalization has driven organizations to constantly search for innovative solutions to meet the growing expectations and needs of society. In this process, they highlight their competitive differentials, looking to guarantee their sustainability [2].

To corroborate this, Vargas [3] points out that a paradigm shift has occurred in institutions in recent times, marked by the acceleration of flows and increased volumes of information. These are combined with the integration of

markets and production systems, generating even greater global competitiveness for these organizations.

Thus, in the interest of better results and investments, organizations are compelled to compete and become agile by promoting technological innovations in services, processes, and products [2].

Wickramasinghe [4] states that a critical point of knowledge and innovation transformations in healthcare organizations is to openly declare them instead of keeping them hidden. In other words, it is essential to establish a form of knowledge management using strategic management tools and techniques so that the organization can leverage its knowledge and innovation potential.

In this same perspective, it is considered that the management of the Research, Innovation, and Development - PI&D area (Technology Management) must be understood not only as product management but also as process management. This is due to its comprehensiveness in several spheres ranging from basic research to development, design, and technology transfer [5].

The informality of the procedures of Strategic Management of Research Projects causes the disintegration of information and does not generate stimuli for the researcher and his or her team, inhibiting the configuration of an innovation ecosystem that protects the organization and ensures its sustainability [5].

Facing this same conception, Beulke & Bertó [6], and Borba & Kliemann Neto [7] emphasize that it is important to develop management models in the health area that enable adequate returns according to financial results, in addition to the degree of user satisfaction.

In this context, it is evident, by the absence of dissemination, the precariousness of the management of research and innovation portfolios, especially in the Brazilian public network, showing that the increase of knowledge about technology and the space for innovation in the healthcare area has little privilege. The generated knowledge is only expressed in the publication of scientific articles, not in the appropriation and investment for the full development of the technology or product [8].

Therefore, the objective of this paper is to carry out a systematic review of the literature on methodologies for strategic management of research projects and innovation in Health in the databases of journals in the past 10 years (from 2011 to 2021) to have a documentary corpus and thematic grounds to know and apply the knowledge in the professional practices of portfolio management and innovation in Health.

This method of systematic literature review allowed us to learn the guidelines, criteria, and parameters adopted in the management of research and innovation projects, helping us in future application proposals in a Brazilian research center considered to be a reference in infectious diseases.

2. Methodology

According to Higgins & Green [9], the systematic literature review is done through an explicit and reproducible

search, aiming to answer a specific topic of analysis, containing in its first stage the review of the formulation of the research question.

To corroborate, Moher [10] emphasizes that the systematic review should have a clear research question as its starting point. Systematic and explicit methods, with eligibility criteria, should be used to identify, select, and critically evaluate relevant research.

According to Paul & Criado [11], a systematic review is a method for reviewing the literature and understanding the relations of the publications listed within a given area of knowledge or theme.

For Tranfield, Denyer, and Smart [12], systematic literature reviews have three stages: 1- Planning the review; 2- Conducting the review; 3- Reporting and dissemination of the review. The authors also describe that there are nine phases for conducting the review inserted in these three phases, as shown in the table below:

Table 1. Stages and phases of the systematic literature review.

Stage 1 - Planning the review
Phase 0 - Identifying the need for review
Phase 1 - Preparation of the review proposal
Phase 2 - Development of the review protocol
Stage 2 - Conducting the review
Phase 3 - Identification of the research
Phase 4 - Selection of studies
Phase 5 - Quality assessment of studies
Phase 6 - Data Extraction and Process Monitoring
Phase 7 - Data Synthesis
Stage 3 - Report and dissemination of the review
Phase 8 - Report and recommendations
Phase 9 - Searching for evidence in practice

Stage one is the moment of defining what is to be studied, i.e., verifying the scope, evaluating the relevance of the theme, and delimiting the subject. The volume of information is considerable. Also, it is necessary to develop a protocol that will guide the researcher on the specific questions to be addressed in the study, that is, the problem, the research question, needs to be specified and defined.

The aim is to produce a protocol that does not compromise the researcher's ability to be creative in the literature review process, while also ensuring that the assessments are less open to researcher bias when compared to more traditional narrative reviews.

In Stage Two, when the systematic review is conducted, one must weigh the articles and documentation to be analyzed to avoid errors and misconduct in the research. For this, a data extraction form needs to exist to get a more detailed view of the article.

Relevant information that should be entered in the data extraction form: source/article/document details (title, authors, journal, year, and publication details) and study characteristics, such as population profile, research context, and an assessment of the methodological quality of the study, as well as identification of emerging themes and additional notes. In the data synthesis phase, it is important to consider the important similarities and differences in language,

concepts, and other ideas surrounding the practice specified in the articles and documents analyzed.

Lastly, in Stage three, the final phase of the systematic review is done by preparing the report and/or article, identifying the relations between what was initially synthesized and what is perceived in practice, including the possibility of proposing new research on the subject and disseminating the knowledge learned [12].

Thus, it is evident in the study by Tranfield, Denyer, and Smart [12] that comprehensiveness and impartiality in research are essential characteristics that differentiate the traditional narrative review from a systematic literature review. The systematic review, therefore, aims to provide collective conceptions through a field synthesis in areas and subareas.

A systematic literature review assumes a series of methods for searching and analyzing literature sources that must be followed faithfully. The researcher needs to reproduce the research in the article, rather than developing it randomly. To do so, it is necessary to have well-established criteria, such as inclusion and exclusion criteria, keywords and descriptors used, bibliographic sources, and the databases where they were collected. These are paramount in the conduct of the research.

Comprehensiveness and fairness in research are essential features that differentiate a traditional narrative review from a systematic literature review. The systematic review, therefore, aims to provide collective conceptions through a field synthesis in areas and subareas [12].

A systematic literature review, therefore, assumes a series of methods for searching and analyzing literature sources that must be followed faithfully, as proposed. The researcher needs to reproduce the research in the article, rather than developing it randomly. To do so, it is necessary to have well-established criteria, such as inclusion and exclusion criteria, keywords and descriptors used, bibliographic sources, and the databases where they were collected. These are paramount in the conduct of the research.

Based on the above, it opted for a systematic literature review based on the criteria defined by Tranfield, Denyer, and Smart [12], which establish three phases for conducting the study.

To select the bibliography, we started with the following guiding question: *what main methodological references for strategic management of research and innovation projects in Health are proposed in the scientific literature?*

The selection process was applied to the Pubmed, SciELO, Lilacs, and Google Scholar journals since these are freely accessible databases that can provide a wider reach to the

scientific community. In addition, the introduction of Google Scholar allows access to relevant theses, dissertations, and archives that have not been published in journals yet, as Tranfield, Denyer, and Smart [12] state: "Research should not be conducted only by querying bibliographic databases, but should also include unpublished studies, conference proceedings, industry trials, the Internet, and even personal requests to known researchers. The output of the information search should be a whole list of articles and papers (core contributions) on which the review will be based."

Using Google Scholar has also provided access to more in-depth and detailed scientific works related to the proposed study object. The doctoral theses and masters' dissertations have a higher level of detail and depth on the subject studied, which helps us to grasp the theme more comprehensively.

The database search was conducted from March 31 to June 30, 2021. The articles and academic documents retrieved were selected according to title, abstract, keywords, and descriptors. The exclusion criteria were: repeated mentions in previous queries and lack of relation to the theme studied. Several of the retrieved articles focused on management themes but did not focus on healthcare and/or clinical research and innovation.

It considered texts in Portuguese, English, and Spanish from the last ten years to appropriate contemporary discussion from the academic and professional literature. The expectation of including Spanish was to retrieve theses and dissertations in Spanish-speaking countries that had not yet been published in indexed sources. In addition, the filter was applied in knowledge areas related to the study objective, i.e., the following keywords and descriptors: strategic management, research portfolio management, clinical research, innovation projects, and management to further summarize the articles listed. Also, the relevance of the abstracts and the full textual analysis of the topic at hand will be taken into consideration regarding the literature review.

The inclusion criteria used in this search were: Articles/dissertations/theses/texts with the following keywords and/or descriptors: strategic management, portfolio management, clinical research, innovation projects, management; articles/dissertations/theses/texts describing strategic management research methodologies and innovation projects in healthcare; Articles/dissertations/theses/texts published in Pubmed, SciELO, Lilacs, Google academic databases; articles/dissertations/theses/texts on the theme published between 2011 and 2021; articles/dissertations/theses/texts published in the following languages: Portuguese, English, and Spanish. In summary, the listed eligibility criteria are presented in Table 1.

Table 2. Eligibility Criteria.

Topic	Inclusion Criteria	Exclusion Criteria
Research strategy	Articles/dissertations/theses/texts meet the established definitions of the following keywords and/or descriptors: strategic management, portfolio management, clinical research, innovation projects, and management. Articles/dissertations/theses/texts that describe strategic management research methodologies and innovation projects in the healthcare area.	Articles/dissertations/theses/texts with no relation to the theme studied, even if they quote some of the predefined keywords and/or descriptors along the text. Articles/dissertations/theses/texts that describe strategic management research methodologies and innovation projects in other areas.

Topic	Inclusion Criteria	Exclusion Criteria
	Articles/dissertations/theses/texts published in Pubmed, SciELO, Lilacs, and Google academic databases.	Articles/dissertations/theses/texts repeated in the defined databases.
Period	Articles/dissertations/theses/texts on the topic published between 2011 and 2021.	Articles/dissertations/theses/texts on the subject were published outside the established period from March 31, 2011, to June 30, 2021.
Language	Articles/dissertations/theses/texts published in the following languages: Portuguese, English, and Spanish.	Articles/dissertations/theses/texts published in the other official languages.

3. Analysis and Discussion

This chapter presents the results of the review regarding the main aspects that guide the themes of strategic management and research and innovation projects.

3.1. Literature Query

The literature query retrieved a total of 527 quotations within the established eligibility criteria for the items' title, abstract, and keywords, in addition to the cross-referencing of the descriptors. After the articles/dissertations/theses/texts were screened, a total of 90 reviews dealing with the theme in research and innovation were selected (Figure 1).

A form for collecting relevant information from the documents was created for data extraction with general data of the source/article/document (title, authors, journal, year, language) and main characteristics of the study (population profile, research context, objective, methodology used) and assessment of the methodological quality of the study, as well as identification of emerging themes and additional notes.

3.1.1. Lilacs Database Screening

Table 2 shows the summary of the Lilacs database screening, using the keywords and descriptors and their

cross-references: strategic management, portfolio management, clinical research, innovation projects, and management.

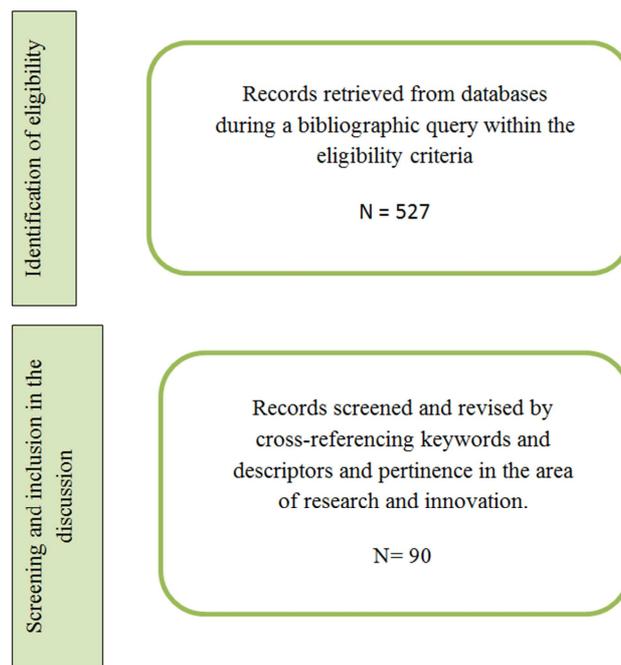


Figure 1. Screening and eligibility of articles/documents.

Table 3. Lilacs database screening.

Keywords/descriptors	Retrieved articles	Screened Articles
strategic management AND portfolio management AND clinical research AND innovation projects	0	0
portfolio management	0	0
strategic management AND clinical research	2	1
management AND clinical research	0	0
innovation projects AND clinical research	0	0

3.1.2. Scielo Database Screening

Table 3 shows the summary of the screening in the Scielo database using the keywords and descriptors and their cross-references: strategic management, portfolio management, clinical research, innovation projects, and management.

Table 4. Scielo database screening.

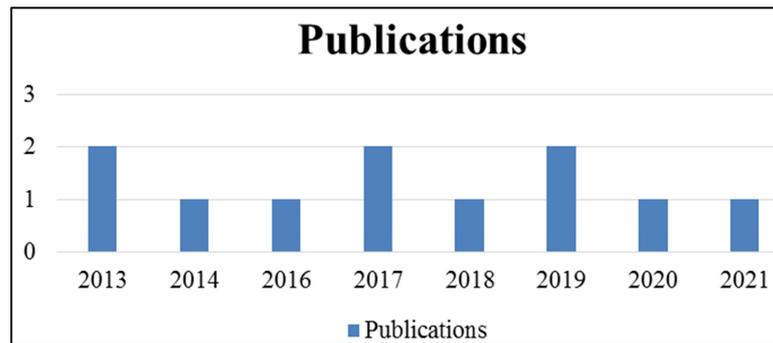
Keywords/descriptors	Retrieved articles	Screened Articles
strategic management AND portfolio management AND clinical research AND innovation projects	0	0
portfolio management	38	3
strategic management AND clinical research	2	1
innovation project AND clinical research	0	0
management AND clinical research	78	7

Therefore, 11 full articles were selected for analysis in Scielo. Table 4 shows the number of articles, the years when they were published, and the journals.

Table 5. Listing of the number of selected records X Year of Publication X Journal after correlations - Scielo base.

Number of publications	Year of publication	Journal
2	2013	Health Research Policy and Systems; Ciência & Saúde Coletiva
1	2014	Production
1	2016	Journal of Biomedical Informatics
2	2017	GMS Journal for Medical Education; Gestão & Produção
1	2018	Journal of Clinical and Translational Science
2	2019	BMJ Open
1	2020	Clin Trials HHS - Public Access
1	2021	Gestão & Produção

In Figure 1, below, it can see that there is an oscillation of publications according to our criteria over the years.

**Figure 2.** Publications X Year.

3.1.3. Pubmed Database Screening

Table 5 shows the summary of the Pubmed database screening using the keywords and descriptors and their cross-references: strategic management, portfolio management, clinical research, innovation projects, and management.

Table 6. Pubmed database screening.

Keywords/descriptors	Retrieved articles	Screened Articles
strategic management AND portfolio management AND clinical research AND innovation projects	3	1
strategic management AND clinical research	2	2
portfolio management	33	4
strategic management AND clinical research AND innovation projects	86	17
innovation project AND clinical research	91	15

Table 7 shows the number of publications, year of publication, and published journals selected from the Pubmed database. There were 32 full articles for analysis and discussion since seven articles found in this database were repeated in the Scielo database and were therefore discarded.

Table 7. Listing of the number of selected records X Year of Publication X Journal after correlations - Pubmed database.

Number of publications	Year of publication	Journal
2	2011	Health Research Policy and Systems; Journal of Evidence-Based Medicine
3	2012	BMC Health Services Research; Journal of Evaluation in Clinical Practice; Medical Teacher
2	2013	Evidence and the Executive - JONA; Immunol Rev
3	2014	Arab Journal of Gastroenterology; NATURE REVIEWS; Drug Design, Development, and Therapy
4	2015	Health Policy; BMC Health Services Research; Professional Case Management; Expert Review of Vaccines
0	2016	-
2	2017	Therapie; PLOS ONE
4	2018	BMC Health Services Research; BMC Health Services Research; Acad Med; Frontiers in Oncology
5	2019	Arch Dis Child; BMJ Glob Health; PLOS ONE; J Adv Nurs; Mayo Clin Proc.
7	2020	Life Sciences, Society and Policy; Health Research Policy and Systems; Journal of Parkinson's Disease; Amia Annual Symposium Proceedings Archive; PLOS ONE; Research Involvement and Engagement; MABS
0	2021	-

In figure 3 below it can see that there is an increasing publication of articles on the theme studied in this database.

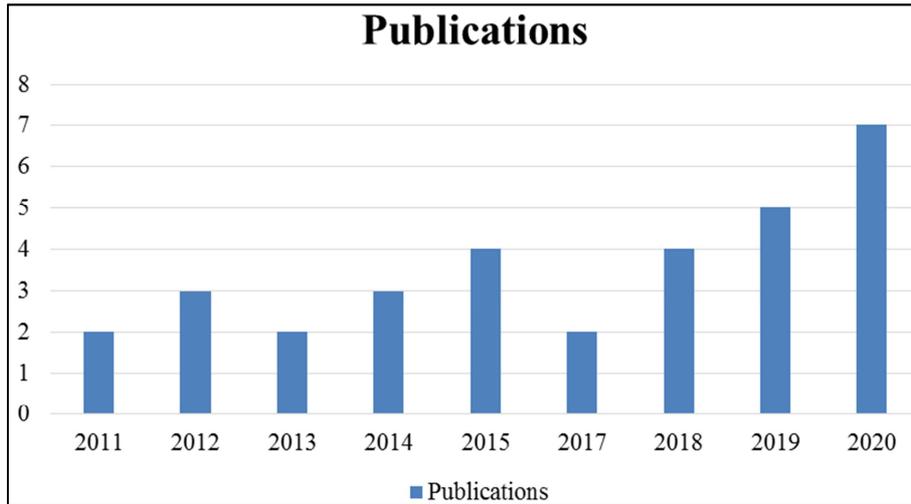


Figure 3. Publications X Year.

3.1.4. Google Scholar Database Screening

Table 8 shows the summary of the screening in Google Scholar with the understanding that these academic contributions cooperate to better scientific knowledge and go

beyond publications in indexed journals.

It used the following keywords and descriptors: strategic management, portfolio management, clinical research, innovation projects, and management.

Table 8. Google Scholar Screening.

Keywords/descriptors	Retrieved articles	Screened Articles
Strategic management AND research portfolio management AND clinical research AND innovation projects	100	35
Strategic management AND research portfolio management AND clinical research AND innovation projects	57	2
research portfolio management	3	1
innovation project AND clinical research	34	1

Below, in Figure 4, it present the number of dissertations/theses/texts and their respective years of publication by Google Scholar. There were 39 full texts for analysis and discussion. It can observe that in the year 2013, there was more emphasized academic attention than in other periods.

documents published in 2013, there were four master's dissertations, one doctoral thesis, and one document used in a presentation in an internal seminar of a renowned institution in science and technology in Brazil and abroad. The other three were publications in Brazilian journals focused on project management.

It is important to note that, of the nine Google Scholar

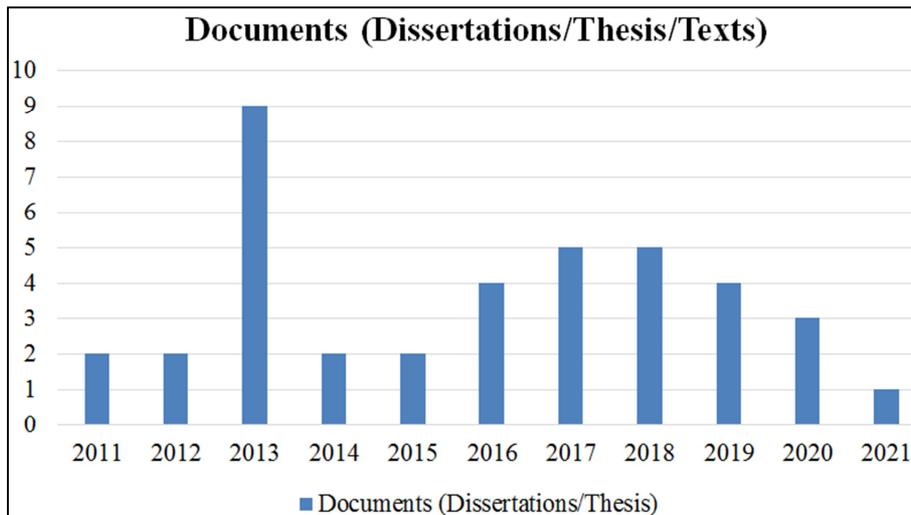


Figure 4. List of selected records after correlations - Google Scholar base.

3.2. Results of the Consolidated Databases Lilacs, Scielo, Pubmed, and Google Acadêmico

Finally, Chart 9 presents the consolidated queries in the Lilacs, Scielo, Pubmed, and Google academic databases.

Table 9. Consolidated Databases.

Bases	Retrieved articles	Screened Articles
Lilacs	2	1
Scielo	118	11
Pubmed	215	32
Google Scholar	194	39
Total	529	83

Figure 5 shows the number of articles and/or academic papers that address the topic of strategic management, portfolio management, clinical research, and innovation projects worldwide.

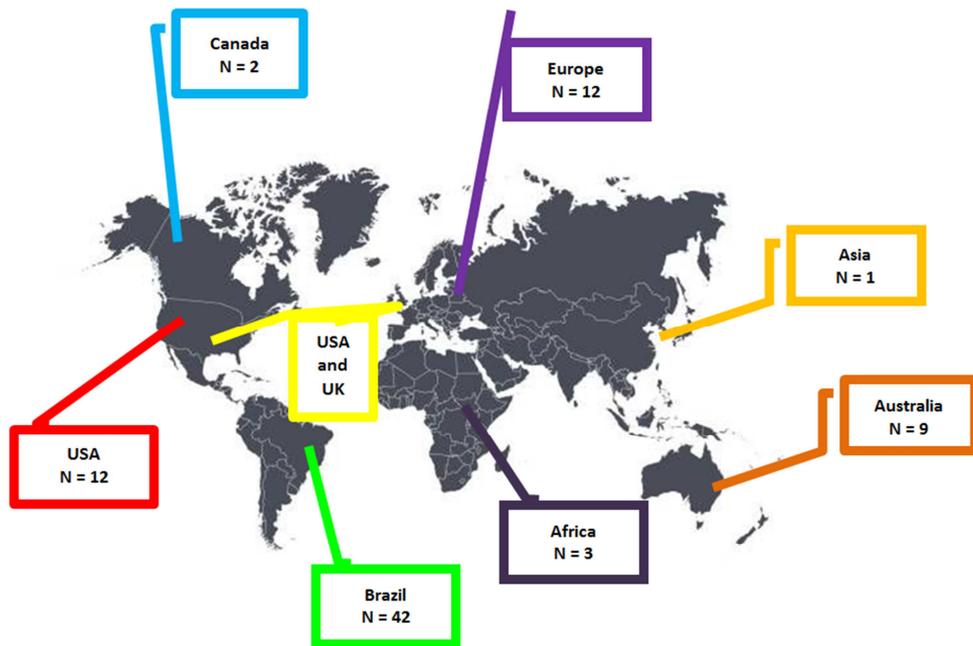


Figure 5. Academic articles/documents on the research topics in the world.

Below in Figure 6, it highlight the languages found in the writing of the articles. It found that English is the most common language, but it is important to note that Portuguese maintains a similarity in the choice of languages for publication. Unfortunately, no article in Spanish was retrieved due to the theme, keywords, and/or descriptors already mentioned.

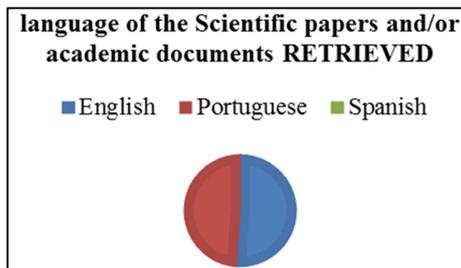


Figure 6. Languages of the retrieved articles and/or documents.

In the chart below, it present the correlation of publications in articles or scientific documents by year defined for this study, from 2011 to 2021.

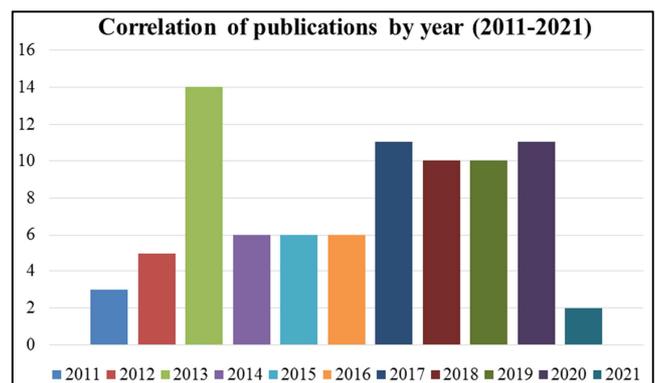


Figure 7. Correlation publications X years (2011-2021).

Figure 8 illustrates the number of articles and/or scientific documents screened and analyzed correlated to their central axis of discussion, which comprises: health management, project management, clinical research, and strategic management of clinical research projects and innovation.

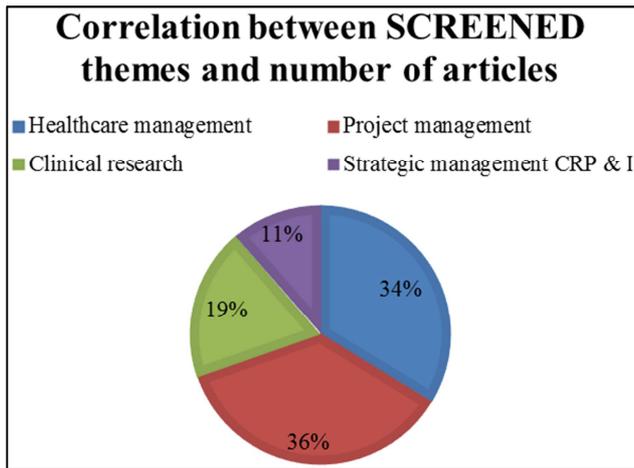


Figure 8. Correlation between the central axis of the articles.

The consolidation of table 8 shows us that the number of articles and academic documents retrieved with the keywords and descriptors used, as well as with their cross-referencing, is expressive, but when it perform the selection and filter for the area of interest research and innovation, the expression of the theme is 16%.

It also observe, as highlighted in figure 2, that the theme of strategic management and research projects, and innovation permeates the entire world, but there is a greater interest in the Brazilian scientific community. This may be an indication that it still need to appropriate the management tools in clinical research and innovation in the country. The lack of a methodology and strategic management can lead to important scientific losses, besides the financial ones. It is also worth mentioning that, in the competitive world, delays and the celerity of innovation projects denote our fragility in this field.

It also notice in figure 5 that United States is the second place in the world showing interest in strategic management in research and innovation projects, presenting itself as a potential partner to exchange the experiences presented, because they highlight network management and co-creation processes in their articles.

Analyzing Figure 4, it can see that, in scientific literature, there is indeed an inclination to publish in the English language. It is interesting to remember that, within the inclusion criteria listed in this research, it decided on the three main languages used when writing articles and scientific documents (English, Portuguese, and Spanish), appropriating the premise identified by Bonilla [13]: “Of the total number of articles published in scientific journals in 2020, 95% were written in English and only 1% in Spanish and Portuguese”. Despite the small percentage indicated by Bonilha, it decided to include the other languages already mentioned in addition to English so that it would not lose any information and scientific and/or academic experience on the studied theme.

Furthermore, it is evidenced that in the 10 years of the bibliography studied, there is a constancy of publications on the theme from 2017 to 2020. However, it is revealed that

this frequency of publications on the theme was not observed in 2021.

4. Regarding Methodologies for Strategic Management of Research and Innovation Projects

It can verify that many of the articles and documents analyzed had keywords defined by this research, in the title, abstract, or in descriptors, but their relation with the Health area, clinical research, and innovation projects were not emphasized.

Many of them share common characteristics such as the use of the expressions 'strategic management' and 'project management in health', but broadly, meaning that they were not focused on the theme that most interested us: management methodologies in clinical research and innovation projects in Health. According to the method established in these papers, articles and documents referring to the aforementioned terms were analyzed so that we could check the attention given by the scientific community to strategic management applied to clinical research and innovation. And it found that the interest in projects in this area is still incipient.

Articles related to project management certainly help us when they establish considerations that can be adapted in clinical research and innovation as indicators and criteria to be evaluated more broadly in projects. However, something pertaining entirely to the strategic management of research and innovation projects in Healthcare is still primary [14].

It verified, as explained in graphic 6, that among the 83 texts screened and analyzed, most have project management and health management as their study focus. Only 11% of the documents reviewed were in any way related to strategic management in clinical research and health innovation projects.

As for the methodologies, of the 11 articles screened in the Scielo database, it is worth noting that three of them referred specifically to methods for managing a portfolio of projects in Health.

The first one mentioned portfolio management and project management in a more general way, but not specifically related to research and innovation [15]. The paper presented the most frequent criteria used in the literature for portfolio monitoring, such as defining resource allocation, categorizing projects, evaluating and selecting projects, and controlling the portfolio. However, it did not describe the tools, but rather made a situational diagnosis of how the researched institutions are doing in terms of portfolio management.

The second article also presented portfolio management information, but not specifically in the area of clinical research and innovation in healthcare [16]. Nevertheless, it caught our attention as it discussed the portfolio management cycle of the studied company that was carried out through seven consecutive processes: 1) definition of projects according to sales proposals and their alignment with

organizational strategic planning; 2) alignment of projects with corporate strategy, classifying them according to the amount of investment required; 3) once classified, projects are individually evaluated through a business case study; 4) if the study results in a reasonable financial cost, the projects are forwarded to the board to be selected and prioritized, according to the organization's strategic planning; 5) the necessary resources for the selected projects are defined; 6) resources are allocated only when projects are started, becoming active projects; 7) the last step is the portfolio monitoring, which is performed continuously. Successful portfolio management was based on Cooper, Edgett, and Kleinschmidt's four dimensions: average project success, synergy in resource use, portfolio balancing, and alignment with strategic goals.

Although the article highlighted above does not refer specifically to the areas of health and innovation, it points out that the tools mentioned can be used as a foundation in science and technology institutions to foster strategic management of clinical research and innovation projects in health.

Besides these two articles mentioned, it emphasized one more that dealt with the management of research and innovation projects in the health area, specifically in infectious diseases [17]. The study established specific criteria and indicators for project management in the area of clinical research in Leishmaniasis in a reference study site in Brazil, interfacing with the management method - the *Démarche Strategy* - used in a Regional University Hospital Center (CHRU) in Lille/France. This method proposes a process of progressive cultural transformation, pointing to a greater communication of research projects between strategic management and care centers, promoting an articulation of the care network with scientific research and innovation.

Exploring the Google Scholar database, it identified that, of the 39 screened documents, 18 were related to strategies in clinical research and innovation, presenting models for evaluating projects in the health area regarding the level of maturity, applicability in clinical research of project management offices, quality management criteria in clinical research centers, categorizations for portfolio management and on the implementation and performance of Technological Innovation Centers in Brazilian science and technology institutions.

It has also come across two studies in this database that were directly related to the purpose of this research: articles and/or documents referring to strategic management methodologies for research and innovation projects.

The first is a master's thesis that applied the internationally recognized method for project management in general, the PMBOK® (Project Management Body of Knowledge) in the studies of 57 research centers in Brazil [18]. The instrument used in the study evaluated the practical application of the ten areas of knowledge (integration management, scope, time, cost, quality, human resources, communications, risk, acquisition, and stakeholders) of PMBOK® regarding the daily practice of clinical research in the research centers of

the country. Therefore, there was no innovation in methodology, but the adaptation and application of an existing one in the health area.

The second study, on the other hand, is also a master's thesis, but it presented a wealth of information, methods, and guidelines that helped us learn about applied methodologies for the strategic management of research and innovation projects [19]. This study aimed to define guidelines for the construction of a project management methodology focused on the execution in a Research, Development & Technological Innovation environment, assisting researchers in conducting projects belonging to the Brazilian Research and Technological Innovation Company (Empresa Brasileira de Pesquisa e Inovação Tecnológica — EMBRAPPII) program.

For this study, 11 characteristics of the EMBRAPPII business model were selected and confronted with the characteristics of the Research, Development, and Innovation (RD&I) projects to verify the alignment of the EMBRAPPII business model with the nature of RD&I. In parallel, the standard PMBOK® project management forms, the Scrum and Front End Loading (FEL) product development methodologies, and the PRINCE2™ project management methodology were analyzed so that it could extract elements that may contribute to the construction of the project management methodology of the Scientific and Technological Institutions (ICTs) accredited at EMBRAPPII. Therefore, five management methods were used in the construction and implementation of the project management methodology at the National Technology Institute (Instituto Nacional de Tecnologia), a body linked to the Ministry of Science, Technology, Innovation, and Communications (Ministério da Ciência, Tecnologia, Inovações e Comunicações — MCTIC), which provided us with deeper and more detailed information on the theme analyzed in this systematic review [19].

It is worth noting that these two most expressive studies concerning the object in the question of this research are Brazilian, linked to reference institutions in research, technology development, and innovation. They were published in 2017 and 2016, respectively, which may indicate that the demand for the subject in recent years in the country is high.

On the other hand, analyzing the other two databases listed in this review, little was found with the requested focus in the Lilacs database. The selected articles were broadly about strategic management and regulatory frameworks for scientific research, but without information on planning and evaluation criteria for strategic management focused on clinical research and innovation projects.

Analogous to Lilacs, most of the articles in the Pubmed database presented information on governance, management, and consortia of research centers, management in health, and quality management, but no specific approach to research projects.

Despite this finding, the relevant quality of the material, based on our initial question, especially in Scielo and Google

Scholar, shows that these articles and/or documents have promising approaches to detailing and correlation between them in science, technology, and innovation organizations.

5. Conclusion

It can see from this review that, although it verified interest in publications in project management and health management, the use of strategic management applied to research and health innovation projects is still emerging - not only in Brazil but in other top countries performing clinical research. However, by enhancing the discussions presented in this study, it was possible to identify some practices used that may help us assess the implications and managerial benefits created by these strategies.

Thus, this study allowed the aggregation of information that made it possible to verify the researched theme in the scientific literature, showing that there is a large field of opportunities to be explored and future research to be stimulated regarding the theme "strategic management of clinical research and innovation projects". In the opposite direction, the themes of project management and portfolio management are exposed in a larger number of publications and allowed us to find articles that could contribute as a basis for the study presented here.

It can also see that, depending on the theme to be studied, the Google Scholar database is a good tool to be used and should not be discarded out of hand, because it helps to locate and identify information about the theme and further related information.

Moreover, it realize that researchers in Brazil do not always publish their findings obtained from master's theses and doctoral dissertations in indexed journals, hindering the exchange of data and knowledge generated. This hinders the exchange of data and knowledge generated and does not collaborate to strengthen the network of science and technology institutions that develop clinical research and innovation in the country.

In addition to the proposed objective, it showed that there is a need for master's and doctorate courses that emphasize the relevance and provide the publication of scientific production in indexed journals, in addition to defending research conducted in overly specific panels and reduced audience, since dissertations and theses were found only on Google Scholar, and not on journal bases.

Considering the relevant quality of the analyzed material, based on our initial question, we realize that this research may provide future proposals for strategic management methodologies applied to institutions that develop clinical research and innovation in health. In any case, they are promising articles after analysis, detailing, and correlation in the scenario of science, technology, and innovation organizations.

Therefore, this study is a contribution to the construction of knowledge on the project management theme, where there is a broad challenge of expanding the extension of strategic management methodologies in health research and

innovation projects in a more effective way, meeting In an increasingly contemporary demand for the development of new processes, services, and products.

References

- [1] Mirian Miranda Cohen, Chayana Leocádio da Silva, Marcelino José Jorge. (2018). Cocriação em saúde: um levantamento sistemático da literatura. *Revista Pensamento Contemporâneo em Administração* (12). doi: <http://dx.doi.org/10.12712/rpca.v12i3.13186>.
- [2] Nicolau Pestana, Elizabeth Bethencourt, José León Ramentol, Cira Galdós Sánchez, María del Carmen, Fernández Torrez, Sandra Brunet Bernal, Gerardo Ruiz Hunt Zaddys. (2018). Strategic changes of the center of immunology and biological products towards professional training, research, and technical scientific services. *Humanidad. med* (18).
- [3] Eduardo Raupp de Vargas. (2007). Relação entre estratégia e inovação em serviços: análise de casos no setor hospitalar. *Organizações & Sociedade* (14). doi: 10.1590/S1984-92302007000100001.
- [4] Nilmini S Wickramasinghe, Adam M A Fadlalla, Elie Geisler, Jonathan L Schaffer. (2005). A framework for assessing e-health preparedness. *Int J Electron Healthc* (3). doi: 10.1504/IJEH.2005.006478.
- [5] Wagner Cardoso Padua Filho, Claudio Augusto Junqueira Carvalho, Betania Maria Meira. (2014). Inovação como um desafio para as empresas de saúde: a experiência em hospital privado. *RAHIS* (11). doi: <https://doi.org/10.21450/rahis.v11i2.2008>.
- [6] Rolando Beulke & Dalvio José Bertó. *Gestão de custos e resultado na saúde*. São Paulo: Saraiva; 2000.
- [7] Gustavo Severo de Borba Francisco & José Kliemann Neto. (2008). Gestão hospitalar: identificação das práticas de aprendizagem existentes em hospitais. *Saúde Soc. São Paulo* (17). doi: <https://doi.org/10.1590/S0104-12902008000100005>.
- [8] Carolina Santos, Vitor Santos, António Tavares, João Varajão. (2020). Project Management in Public Health: a systematic literature review on success criteria and factors. *Portuguese Journal of Public Health* (38). doi: <https://doi.org/10.1159/000509531>.
- [9] Julian Higgins & Sally Green. *Cochrane Handbook of Systematic Reviews of Intervention*. London: The Cochrane Collaboration; 2011.
- [10] David Moher, Larissa Shamseer, Mike Clarke, Davina Ghera, Alessandro Liberati, Mark Petticrew, Paul Shekelle, Lesley A Stewart, PRISMA-P Group. (2015). Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. *Systematic Reviews* (4). doi: 10.1186/2046-4053-4-1.
- [11] Justin Paul & Alex Rialp Criado. (2020). The art of writing literature review: what do we know and what do we need to know? *International Business Review* (18). doi: <https://doi.org/10.1016/j.ibusrev.2020.101717>.
- [12] David Tranfield, David Denyer, Palminder Smart. (2003). Towards a methodology for developing evidence-informed management knowledge through a systematic review. *British Journal of Management* (14).

- [13] Juan Miguel Hernández Bonilla. Em 95% dos artigos científicos, inglês cria 'ditadura da língua': apenas 1% está em português e espanhol [acesso em 15 jan 2023]. Disponível em: <https://brasil.elpais.com/ciencia/2021-07-28/em-95-dos-artigos-cientificos-ingles-cria-ditadura-da-lingua-apenas-1-esta-em-portugues-e-espanhol.html>.
- [14] Robert G. Cooper, Scott J. Edgett, Elko J. Kleinschmidt. (2002). Optimizing the stage-gate process: What best-practice companies do-I. *Research Technology Management* (45).
- [15] Marly Monteiro de Carvalho, Paula Vilas Boas Viveiros Lopes, Daniela Santana Lambert Marzagão. (2017). Gestão de portfólio de projetos: contribuições e tendências da literatura. *Gest Prod.* (20).
- [16] Henrique Gonçalves de Castro, Marly Monteiro de Carvalho. (2010). Gerenciamento do portfólio de projetos (PPM): estudos de caso. *Produção* (20). doi: 10.1590/S0103-65132010005000044.
- [17] Elizabeth Artmann, Maria Angélica Carvalho Andrade, Francisco Javier Uribe Rivera. (2013). Desafios para a discussão de missão institucional complexa: o caso de um Instituto de Pesquisa em Saúde. *Ciênc. saúde coletiva* (18). doi: <https://doi.org/10.1590/S1413-81232013000100020>.
- [18] Leonardo S. L. Passeri Mangelli. Gestão de projetos e o guia PMBOK: um estudo sobre o nível de uso do guia pmbok nas empresas brasileiras. Rio de Janeiro: FGV; 2013.
- [19] Gabriela de Fernandez Rezende. Diretrizes para construção de uma metodologia de gerenciamento de projetos de pesquisa, desenvolvimento e inovação tecnológica – caso do escritório de gerenciamento de projetos do INT na EMBRAPPII. Niterói, RJ: Universidade Federal Fluminense; 2016.