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THE USE OF THE MANAGEMENT CONTROL IN ACCOUNTING ON HEALTHCARE: A BIBLIOMETRIC SYSTEMIC ANALYSIS

El control de gestión, la contabilidad y su relación con la asistencia sanitaria: Un análisis bibliométrico y sistémico

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ABSTRACT

The present research aims to corroborate the growing use of management control in the health sector, and the associated research opportunities. To do so, the Knowledge Development Process – Constructivist (ProKnow-C) software was applied, allowing the analysis of different variables around a single topic: "health and its relationship with management control and accounting issues". The result was a Relevant Bibliographic Portfolio (RBP) with the most relevant and high scientific impact publications, which allowed a systemic-bibliometric analysis, evidencing opportunities and possible gaps for future research. The applicability of management control in the health sector is corroborated, as well as the growing interest in its use by health and social science professionals, especially in interdisciplinary matters. The research detected focuses, among others, on financial and statistical studies, cost-benefit analysis in diagnosis, case studies in developing countries, the relationship between opportunity and quality of health service. In general, it was possible to have an overview of the efficiency of health processes tested for their use in prospecting, new bibliometric research and state of the art.

Palabras claves: Management control, healthcare, efficiency, investment, bibliometrics, economic indicators.

RESUMEN

La presente investigación tiene como objetivo corroborar el creciente uso del control de gestión en el sector sanitario, y las oportunidades de investigación asociables. Para ello se aplicó el software Knowledge Development Process – Constructivist (ProKnow-C), permitiendo el análisis de diferentes variables alrededor de un solo tema: "la sanidad y su relación con asuntos de control de gestión y contabilidad". El resultado fue un Portafolio Bibliográfico Relevante (RBP) con las publicaciones más relevantes y de alto impacto científico, que permitió hacer un análisis sistémico-bibliométrico, evidenciando oportunidades y posibles sesgos (gaps) para futuras investigaciones. Se corrobora la aplicabilidad del control de gestión en el sector sanitario y el creciente interés de su uso por parte de los profesionales de la salud y de las ciencias sociales, sobre todo en materia interdisciplinaria. Las investigaciones detectadas, se centran, entre otros, en estudios financieros y estadísticos, análisis del coste beneficio en diagnóstico, estudios de caso en países en desarrollo, la relación oportunidad y calidad del servicio sanitario. En general, fue posible tener una visión de la eficiencia de procesos sanitarios experimentados para su uso prospección, nuevas investigaciones bibliométricas y estados del arte.

Keywords: Control de gestión, healthcare, eficiencia, inversión, bibliométrico, Indicadores económicos.

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INTRODUCTION

The use of management control systems in accounting, finance, and administration is widely recognized. These methods have also been applied in both public and private organizations in the health sector, indicating a growing interest among health professionals, including those who do and do not have managerial or coordinating roles, in expanding their knowledge of these issues. According to Kuhlmann et al. (2013), information focused on health management control is increasingly directed toward the physician's world via integrated, partially integrated, and/or fragmented patterns.

This article contributes to the literature on management, accounting, and financial control in the health sector. The pointed subject is of great importance, given that the healthcare industry is increasingly relevant in the world economy and there is a direct relationship between global health and economic growth. A direct example of this paradigm is the impact of the worldwide SARS-CoV-2 pandemic, which highlighted the importance of management control in the health sector (Burns & Baldvinsdottir, 2005; Indjejikian & Matejka, 2006; Byrne & Pierce, 2007).

Bibliometrics is a field of research that focuses on the analysis of information from bibliographic material using quantitative and statistical methods. The results of bibliometric studies describe and deepen our understanding of different lines of research by identifying "gaps or gaps in knowledge detected through bibliometric and systematic reviews of literature, which can give rise to new research" (Robinson et al., 2011, p. 1325). Similarly, "If the gaps are not identified, it will be difficult to pose a relevant research problem" (Arias-Odón & Artigas 2022, p. 76). These gaps are identified in research trends that are identified via the analysis of bibliometric indicators, including citations, journals, and publications, among others (Merigó et al., 2015; Huynh et al., 2021).

Sharma et al., (2018) confirmed that evidence provided by bibliometric studies can be used as an instrument for formulating public policies which suggested that interdisciplinary, networked, and funded collaborative research should be encouraged. Likewise, Gupta et al., (2022) agreed that improving the quality of health services reduces costs, limits waste, improves efficiency and patient satisfaction as well as medical treatments, and thus can reduce patient morbidity and mortality.

In this study, we identified the relevance of management control and accounting to the health sector, including its applicability to different processes and activities from the most basic operational and technical concerns, as well as patient care, essential medical services, and highly complex surgery. These methods are equally relevant to the strategic organizational aspects and senior management of large healthcare facilities. Collectively, these findings permit us to visualize a promising research horizon that includes a large number of new and important opportunities. Scientific research must incorporate these results and contribute to organizations, their workers, and users of their services by generating strategies and tools for continuous improvement and projection.

METHODOLOGY

The research instrument used in this study was the Knowledge Development Process–Constructivist (ProKnow-C), proposed in 2010 by Ensslin , L., Ensslin, S. R., Lacerda, R., & Tasca, J. E. and colleagues. "it [ProKnow-C] consists of carrying out a series of procedures, until reaching the purification and selection of arti-

cles that are relevant to the research" (Viera, 2019, p. 1262). ProKnow-C is structured in four stages, including "selection of the bibliographic portfolio, bibliometrics, systematic analysis and formulation of questions and research objectives." (Ensslin et al., 2014, p.3). ProKnow-C is a structured, systematic, and constructivist method used by researchers to perform searches, generate choices, and subsequently analyze the scientific literature, with important publications by authors such as Jaqueline Iaksch, Ederson Fernandes, Milton Borsato, Ramírez-Gutiérrez, Z., Barrachina-Palanca, M., Ripoll-Feliu, V., Valmorbida, Ensslin, Dutra, Ripoll-Feliu, Fillol, Azevedo, de Oliveira Lacerda, Silva da Rosa, Rolim Joao Lunkes, Tasca, Alves, Lacerda, Rogério T de O, Tasca, Naranjo Tuesta Y, and Crespo Soler C.

Among its various features, ProKnow-C facilitates the identification, analysis and evaluation of:

Authors with experience in specific areas

Journals, their areas of interest, and impact factor

Scientific articles that have received comparatively greater recognition

Representativeness of the selected keywords

This research includes two approaches. The first is essentially exploratory and focuses on providing knowledge to the scientific community and identifying research opportunities based on the characteristics demarcated in the search and analysis of the selected databases. The second is descriptive, with results that explain the particular features of the repository known as the Bibliographic Portfolio. Specific procedures and search techniques are used to probe the databases, leading to a referenced bibliography which is structured to reveal the contributions of numerous authors. This repository, which is known as the Scientific Portfolio, contains the most relevant academic and scientific findings that emerged from the search. The application of management control from the accounting and financial perspectives permits the dissemination of knowledge from other professions. As applied to health care, this information is in high demand and is constantly evolving (Gosselin, 1997; Krumwiede, 1998). Figure 1, adapted from Tasca, Ensslin, Ensslin, & Alves (2010), shows the application of the ProKnow-C methodology and highlights each of its stages.

Figure 1. Stages of the Knowledge Development Process–Constructivist (ProKnow-C).

Source: *Dutra, et al., (2015).*

The methods used to search and collect information on the state of the art of the central research topic (in this case, health) were developed using the following steps and keywords with search equations, which are detailed in Figure 2. The steps involved are as follows:

Identification of important scientific publications that address the research topic.

Selection of the Articles Bank (316 articles) in Web of Science as a source for bibliometric analysis in the period between 1990 and 2023, applying search operators associated with keywords:

TS= ("healthcare" AND "efficiency" AND "investment") OR

TS= ("healthcare" AND "efficiency" AND "management control") OR

TS= ("healthcare" AND "management control") OR TS=("healthcare" AND "economic indicators")

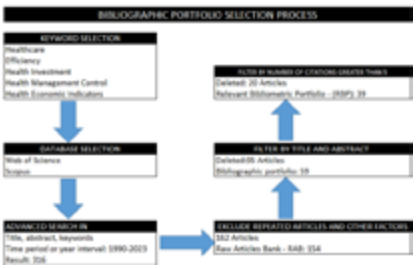
Raw Articles Bank - RAB filtering: Elimination of 162 repeated and other factors of the Articles Bank. After based on the publication of Ramirez-Gutierrez et al., (2019), an adherence test was applied; the number of samples necessary for said test was calculated by applying the equation:

Where *n* is the size of the RAB sample, Z is the confidence level (1.96 for a confidence level of 95%), E is the permissible error (10%), *p* and *q* are 50% each, and N = 154, with *n* equal to the 39 elements of the RAB (25%). The results of this test confirmed that the search keywords selected were suitable for the creation of a Relevant Bibliographic Portfolio (RBP)

Two more filters are applied. A review of the titles and abstracts led to the elimination of 95 articles because they move away from the central topic of the investigation.

The methodology of Kuo and Yang (2014) is used to determine the number of citations, and a significance test is applied to the Authors' Bank - BA (i.e., only articles with five or more citations). They are useful to obtain the RBP (de Oliveira L. et al., 2012; Silva da Rosa et al., 2012) and, because of them, 20 articles were removed.

Figure 2. The process used to generate the Relevant Bibliographic Portfolio (RBP).



Source: *Design based on criteria obtained from Oliveira Lacerda et al., (2012).*

Another tool used in the analysis of the information obtained was "the impact factor", also known as the *h*-index, proposed by Hirsch (2005). The *h*-index is generated by decreasingly ordering the works of an author by virtue of the citations received by each work; once the rank (i.e., the position in the list) exceeds or equals the value of the citation, the *h*-index can be identified. In other words, this value means that a given author has published "*h*" articles with at least "*h*" citations (Grupo SCImago 2016, p. 47).

The *h*-index is a very important parameter, because it includes articles that may or may not be related to a central research topic and, for so, it is a measure of the professional and scientific impact of the authors. This characteristic has been used to evaluate the authors included in the RBP. Figure 3, below, illustrates the 20 authors included in the RBP with the highest *h*-indexes and their respective citation numbers.

Figure 3. Number and scientific impact of publications of the authors included in the RBP.

The 39 articles included in the RBP were prepared by 95 authors who have published in management control, accounting, and health, with this information a classification was made by research area as shown in Figure 4, with which it is possible to infer those that have more participation in the

healthcare sector, interdisciplinarity, collaboration and knowledge transfer.

Figure 4. Healthcare Research by Area of Interest in the RBP.

BIBLIOMETRIC ANALYSIS OF THE RBP

This analysis highlights basic elements and variables that, via a systematic review of their references, facilitate decision-making, inference, contextualization, and prospective consideration of scientific research processes (Bortoluzzi & Defaci, 2015). This made it possible to identify the most relevant high-impact scientific academic journals that publish papers on management control and accounting including:

1. Accounting Organizations and Society
2. International Journal of Operations & Production Management
3. Omega-International Journal of Management Science
4. European Accounting Review
5. Accounting Auditing & Accountability Journal
6. Ima Journal of Management Mathematics
7. Operations Management Research
8. Journal of Behavioral and Experimental Finance
9. Industrial Management & Data Systems
10. Critical Perspectives on Accounting
11. Value in Health
12. International Journal of Strategic Property Management
13. Accounting Forum
14. Journal of Nursing Management
15. The European Journal of Health Economics

The search keywords used included management control, healthcare, efficiency, investment, bibliometrics, and economic indicators. Then, following the chronological stages and filters described above, we developed farer the RBP in Figure 2. In this phase, we read each article in its entirety. We created a normative matrix for subsequent analysis, including the journal name, title of the article, author(s), year of publication, list of citations, abstract, methods used, and where the study took place, among other features.

The result was an RBP that included the 39 most relevant scientific articles, published between 1990 and 2023, formatted for bibliometric-systematic analysis which allows, finally, to identify the gaps in our written knowledge. From these gaps we can estimate the avenues for new researching.

As shown in Figure 5, the RBP articles have cited 2067 references.

Figure 5. Network of references cited by articles included in the RBP.

Source: *Citation network generated with VOSViewer software.*

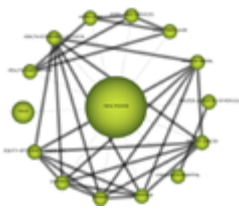
The five most highly-cited papers according to Google Scholar (2023) are listed in Table 1:

Table 1. Top 5 most cited articles

#	Author(s)	Title of article	Year	Citations
1	Kurunmäki L	A hybrid profession–the acquisition of management accounting expertise by medical professionals	2004	592
2	Naranjo-Gil D, Maas VS, Hartmann FGH	How CFOs determine management accounting innovation: an examination of direct and indirect effects	2009	299
3	Moons K, Waeyenbergh G, Pintelon L	Measuring the logistics performance of internal hospital supply chains–a literature study	2019	294
4	Ramanathan R	Operations assessment of hospitals in the Sultanate of Oman	2005	133
5	Kraus K, Kennergren C, von Unge A	The interplay between ideological control and formal management control systems–a case study of a non-governmental organization	2017	116

One of the results of the bibliometric analysis was the variety of healthcare-related studies which, as can be seen in Figure 6, is the core of the research and highlights the most salient aspects, connections and multiple possibilities of making contributions to this sector from different disciplines and professions.

Figure 6. Healthcare-related studies.



Source: *Network generated with Scimat software.*

SYSTEMATIC ANALYSIS OF THE RBP

The content of the articles, type of research, theory, methodology, and results, among other aspects, were analyzed in hopes of establishing research opportunities or gaps based on the information provided by the most highly-cited authors; representative aspects of their articles related to health and its management control, hospitals, public resources, accounting, and medical care are presented in Table 1.

The first publication describes the voluntary use of management control by health professionals in Finland within the framework of the new public management system. The management control system was analyzed based on health training and the results were contrasted with the antagonistic position of the United Kingdom using surveys and meetings. The second publication evaluated the Chief Financial Officer's (CFO's) contributions to Management Accounting System (MAS) innovation and compared strategic effects and historical performance by combining archival data and surveys of public hospitals in Spain that contrasted with interviews with managers. The third publication is a primarily post-2000 bibliographic review that included 56 articles published between 2010 and 2016 that analyzed hospital logistics processes. The fourth publication analyzed the use of public funds in the health sector and focused on the increased cost of medical care and the operational efficiency of hospitals using Data Envelopment Analysis (DEA) and the Malmquist Productivity Index (MPI). The final manuscript features a case study in a health center and highlights organizational ideology as an important factor of the MAS and its impact on organizational visibility and attracting funding and economic resources.

4.1. Keyword analysis of the RBP

In Figure 7, 262 keywords sorted into five groups or communities (differentiated by colors as shown in Figure 6) that interact with one another were examined based on their Strength of Association (S A). The most important (in red) is healthcare (100), its relationship with topics that include management, information, organizations, implementation, participation, control system, and field. The performance group is shown in yellow (68), with themes that include productivity, care, and cost. Hospitals shown in yellow correlated (58), with topics that include quality, DEA, and impact. Incentives are shown in lilac (17) and cover topics such as systems, adoption, and network theory. Public and System are shown in blue and green (48) with topics that include accounting, financial, COVID-19, efficiency analysis, sector, Key Performance Indicators (KPIs), and homecare services.

This analysis facilitates the identification of successful pathways for new research that are interesting for the reader and that promote knowledge transfer. In the absence of this analysis, our documents will not be accessible to those people engaged in bibliographic searches or to all related works; as such, they will not be "visible" to the scientific population that may be interested in the results of this work Following the appraisals of the previous authors, "its importance should not be underestimated, since classification problems can prevent the dissemination of a document and even cause it to fall into oblivion" (de Granda Orive et al., 2005, p. 2).

Figure 7. Keyword analysis

Source: *Network generated with VOSViewer software.*

Keywords related to novel topics include efficiency analysis, economic indicators, quality, and reforms in the healthcare sector.

4.2. Research classes of the RBP

The types of RBP research highlights the forms and methods used by their authors which are typically analytical, retrospective, or prospective in nature. Many are descriptive or comparative, and generally case studies that feature data analysis, statistics, econometrics, surveys, questionnaires, and interviews.

65% are case studies. Among them, 26% are based on interviews or surveys, 21% with statistics, econometrics, and developing analysis of DEA data, and 18% are purely comparative, the remaining 15% are bibliographic reviews. More than 60% are studies related to hospitals or healthcare organizations and cover topics such as management control, accounting, efficiency, performance, costs, public management, disease management, diagnostics, and healthcare services. Figure 8 shows the types of research featured in these studies.

Figure 8. RBP research classes.

* Case studies, in their different modalities or classes

The comparative analysis of RBPs of (1) accounting literature and (2) management literature Review works typically include all relevant publications without division or disaggregation of their contents. However, in this case, we found that dividing RBP into different groups was a useful strategy because separating the contexts that framed the research facilitated the projection of the current state of the subject and highlighted new realities and research needs. In this section, the two main nuclei of this research are analyzed: accounting and management in health. The classification was made using the category of journals in Web of Science, grouping articles published in both accounting (14) and management (25) journals.

For the analysis of the literature and comparison, a bibliometric-systematic analysis was carried out for each nucleus, including (1) analysis of the keywords and their evolution over time; (2) scientific recognition of each bibliometric portfolio via the citations shared between them (i.e., knowledge transfer); (3) topics analyzed and the communities that they integrate, thereby revealing gaps and/or new lines of research; and (4) analysis of the abstract.

LITERATURE ON ACCOUNTING

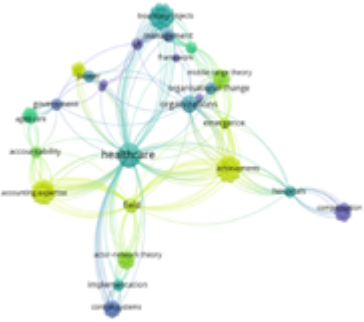
5.1. Analysis of keywords on Accounting

The keywords most frequently detected in the accounting journals were *healthcare* (eight times), *organization(s*) (four times), *-investigative or professional- field* (three times), and *Emergencies* (two times). These journals feature three large communities, including accounting expertise, achievements, and limits in the production or provision of a service. Collectively, these findings confirm the substantial correlation and interest in Accounting and Management research among those in the healthcare sector.

Figure 9 highlights the evolution of the use of keywords over time-related to interests, sectors, and research

trends. Of note, important events, such as the COVID-19 pandemic and others of general interest such as artificial intelligence clearly mark research guidelines.

Figure 9. Analysis of keywords in Accounting.



Source: *Network generated with VOSViewer software.*

5.2. Scientific recognition and knowledge transfer in Accounting

The Accounting publication that was most highly cited by the authors of this nucleus is Kurunmäki (2004) in the Journal Accounting Organizations and Society, who argues that "medical experience in Finland was hybridized because health professionals are interested in management accounting and it was included in their training" (p. 327). Figure 10 summarizes the relationships leading to knowledge transfer.

Figure 10. Transfer of knowledge in Accounting.

Source: *Network generated with VOSViewer software.*

The accounting authors emphasize that health professionals should be trained in management control, finance, accounting, and costs; as a result, they become participants in the process and recognize that their performance contributes to the strategic goals and objectives of healthcare organizations. The importance of Public-Private Association (APP) is presented, not as a solution to the intrinsic problems in the healthcare sector, but as opportunities in which management control can address efficiency, quality, timeline of service, cost control, budgets, economic projections, public policies, and investment in health, among other issues that are very important for appropriate decision-making to support growth and continuous improvement of the sector. In support of this point, Patel et al., (2023) state that the price transparency of a hospital (public or private), matched with geographical region, is associated with the level of care.

5.3. Topics covered in Accounting and future lines of research

Figure 11 summarizes the research works in accounting in four communities identified with colors, (authors and main themes). The most relevant of these communities are identified below.

Figure 11. *Main authors and topics in accounting.*

Source: *Network generated with VOSViewer software.*

The first community (in red, Figure 11) is formed by Kastberg (2016), Kurunmäki (2004), Leotta (2017), Llewellyn (2005), and Nyland (2017), focus on accounting and administrative research and their impact on costs, management control, innovation, performance, and healthcare. Four of the five entries are case studies carried out in hospitals, where the participation of the health professional is relevant.

According to this, new studies and research would include: dynamics and interactions of managerial and non-managerial controls in different sectors; influential agents; Accounting and relations with the health professional; innovation; recognition and evaluation of change in processes; analysis of roles and responsibilities; incentives and their relationship with public and private health care; new trends in public administration in the health sector; and management control and accounting systems.

The second community (in green, Figure 11) includes Andon (2012), Fiondella (2016), Kraus (2017), and Malmmose (2015). The authors analyzed management control in public-private partnerships and found that, in most cases, these alliances derive from organizational restructuring. While this can be an excellent tool for controlling resource management, it needs to have a clear and effective delimitation of responsibilities to evaluate and provide feedback on processes in search of continuous improvement. Other authors include an important study of the state of the art of research in Accounting; characteristics and identities of Chief Executive Officers (CEOs) and organizations; changes in management and organizational culture; healthcare quality, efficiency, and control of medical-administrative management in the political and governmental context.

New studies and research would include: an analysis of the operation and evaluation of public-private partnerships (PPPs) after their implementation; organizational culture and management changes; social and cultural background, age, education, and gender and their influence on change management; how accounting through management control brings social responsibility; organizational pride and identity; the influence of the World Health Organization (WHO) on countries' public budgets; and efficiency and economic and financial indicators in health.

The third community (in blue, Figure 11) includes Borner (2013), Jarvinen (2006), and Mutiganda (2014). These authors analyze management control from the perspective of a healthcare professional and focus on patient diagnoses such as planning and use of resources, quality of care, timely diagnosis, and effective treatment as planning tools with budgetary and cost impact. They argue that the non-alignment between government management and the strategies of healthcare organizations can affect the improvement of processes, with a loss of cash flow and quality that will have an impact on health. Similarly, they note that management control can maximize transparency and accountability and create synergies between the government and healthcare organizations and their users, thereby improving the relationship between stakeholders.

New studies and research would include: assessment of organizational change and strategies that minimize its impact that are measurable and improvable; creation of theories based on learning and feedback, determining whether they positively or negatively affect healthcare; accounting and management control for accountability; planning of social and economic impact scenarios such as financial crises and control of responsibility and budget.

The fourth community (in yellow, Figure 11) is formed by Eldenburg

(2007) and Naranjo-Gil (2009). The first of these studies emphasizes the economics of production costs, agency theory, and industrial economics. The findings allow us to see how these three aspects have a direct impact on healthcare costs via an efficiency analysis with statistical tests. The second study shows how some organizations adopt a Management Accounting System (MAS) as an innovation and control strategy that is related to particular, personal and training characteristics of CFOs, demonstrating the progress of management control in the public sector, particularly in hospitals.

New studies and research would include: to explore models designed to explain temporal changes in cost behaviors and the effects of exogenous factors such as regulation and competition on decision-making; the understanding of other factors that influence costs, including patient mix, governance, disease severity and complexity, and technology used in treatments; the role of technology in altering production functions and access to information; subcontracting of hospital services and changes in public health policies; and innovation in management control by measuring variables other than Management Accounting System (MAS), particular characteristics of financial managers, in both the public and private sectors.

5.4. Analysis of abstracts in Accounting

The abstracts associated with these publications have 499 words. The most often repeated words are Accounting (seven times), organization (four times), case (of) study (four times), healthcare organization (four times), and cost (three times). Figure 12 highlights the connections between the words included in these abstracts.

Figure 12. Analysis of the words in the abstracts of accounting publications

Source: *Network generated with VOSViewer software.*

Figure 12 illustrates four communities (one color each) and shows very similar results to those emerged from the previous analysis of themes. The number of words repeated in the abstracts from each community includes are in red (15), green (13), blue (10), and yellow (9). This confirms the results obtained from the analysis of topics (Figure 11): There are four main themes in the accounting journals.

5.5. Literature on management–analysis of keywords and their evolution over time

The publications in Management Control journals featured 204 keywords. The most recurrent are healthcare (58); performance (45); optimization, integration, implementation associated to Management (17), hospitals (18) management by itself, and performance, productivity, and management control associated to Accounting (16). This provides us the research and interest lines on the healthcare sector. Figure 13 presents the interaction between the keywords and the related communities.

Figure 13. Analysis of keywords in management.

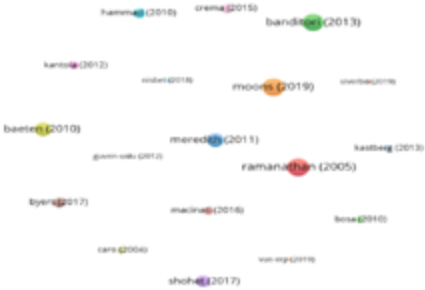
Source: *Network generated with VOSViewer software.*

The researchers' interests center on topics that include performance measurement, efficiency, optimization, and good governance, while initially focusing on costs and strategies. These interests are related to externalities and changes in research guidelines, because, as mentioned before, in addition to the tastes and preferences of the author, new trends are appearing such as political, social, and healthcare news, among others of the kind. For this reason, researchers need to become more receptive to new topics, including interdisciplinarity and collaborative work.

5.6. Scientific recognition to knowledge transfer in management.

The 25 publications belonging to this group exhibit different features compared to those identified in accounting journals. From the findings presented in Figure 14, we can infer that there were no shared citations among members of this group, i.e., there was no transfer of knowledge among the authors who investigated topics related to healthcare and management control. This result is logical and understandable, because, although they were published in management control journals, they focus primarily on different areas of knowledge, including finance, service management, industry, quality, strategy, medicine, nursing, public management, and others.

Figure 14. Knowledge transfer in management



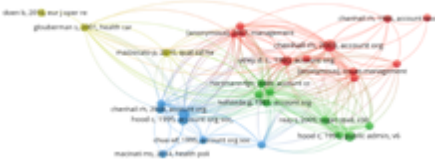
Source: *Network generated with VOSViewer software.*

As initially there is no visible evidence of a transfer of knowledge between the 25 publications, one might presume that they are not related to one another and/or that they did not build their knowledge with the same scientific basis (i.e., references cited by each of the 25 publications). For this reason, at this point, it is considered that, although an adhesion test and verification of the articles was carried out using the ProKnow-C process, it will also be necessary to carry out the analysis detailed in the following section.

5.7. Scientific recognition to knowledge transfer in the cited management references

Although this set of publications do not share citations among themselves, and Figure 14 initially seems to show that there is no knowledge transfer, this idea is not correct. As shown in Figure 15, they share an origin and cite the same works from their research basis in their references, thereby demonstrating the interrelation of the references used to carry out their research work. This finding suggests the existence of knowledge transfer from the outset of this process.

Figure 15. Transfer of knowledge in the references cited in management.



Source: *Network generated with VOSViewer software.*

This result shows knowledge transfer, because it provides continuity to the initial research and the basis of the construct of the current and future research of this group. Research needs to broaden its horizon and include some kind of knowledge about the state of the art, as well. It is suggested also to add different combinations from the basis of its initial process. Further characterization of this new gap in the transfer of knowledge between the initial researches works and used as references, maybe an interesting focus for a new line of research.

5.8. Topics covered in management and future lines of research

As shown in Figure 16, the publications in management control can be divided into six communities (one color each) based on authors and main themes; the most relevant among these are identified below.

Figure 16. Main authors and topics in management.

Source: *Network generated with VOSViewer software.*

The first community (shown in green) includes publications authored by Banditori (2013), Meredith (2011), Moons (2019), and Shohet (2017). As a group, these studies emphasize results in management indicators, time, efficiency, and physical and financial resources. The most recent paper in this set is a literature review focusing on the measurement of performance in hospitals, efficient use of assets, and the supply chain. The other three publications describe case of studies in hospital management control, with close links to healthcare, patients, and senior management.

According to his, new studies and research directions would include: combinations of clinical, administrative, cost, financial, and economic aspects; analysis of variability and waste, reprocesses, and times; standardization of processes (before, during, and after); and KPIs for the financial and operational viability of hospitals.

The second community (shown in dark blue) includes publications authored by Byers (2017) and Guven-uslu (2012) that discuss the empowerment of healthcare professionals, patient participation in the efficiency of health organizations, and national health policies, as well as the use of management accounting information in healthcare services.

In this sense, new studies and research directions would include: Leadership provided by healthcare professionals; valuation of public and private healthcare services; demographic, social, and cultural aspects of the healthcare service; assessment of the needs of the environment and future patients; patient satisfaction; efficiency; managerial performance; and new approaches to the MAS from research and literature in developing countries.

The third community (shown in red) includes publications authored by Bosa (2010), Nisbet (2018), and

Siverbo (2019). These studies focus on performance measurements in public hospitals, effective bureaucratic control, process improvements, home health care, new public management, transparency, responsibility of public management in the health sector, medical professional practice versus quality, effective use of resources, and change management, and harmonization of new practices.

In this sense, new studies and research directions would include: Evaluation and monitoring of public health budgets; efficiency and patient satisfaction and changes in the culture of spending; austerity and good practices, discrimination in patient care, rigid versus flexible budget control, and evaluation of changes in public health policies.

The fourth community (shown in yellow) includes publications authored by Hammad (2010) and Kantola (2012). These studies discuss management accounting and healthcare based on Diagnosis-Related Groups (DRGs) as a means to minimize costs, and the contextual relationship between management accounting specifically on MAS and managerial performance in healthcare organizations based on national statistics.

New studies and research directions would include: The institutional environment and its relationship with institutional pressures of control, the contrasts of institutional theory in different sectors, and participation/evaluation of the performance of healthcare professionals in managerial areas and their relationship with financial efficiency.

The fifth community (shown in light blue) includes publications authored by Crema (2015) and Kastberg (2013). These studies consider efficient management of healthcare and clinical risk management, design and implementation of MAS and how they interact within the processes used by healthcare organizations, targeting of specific groups of patients and diagnoses, and its use in organizations that feature horizontal versus vertical MAS control (HMAS and VMAS, respectively).

On this respect, new studies and research directions would include: Protocols, procedures, and different healthcare and administrative control schemes applicable to patient safety that might be used to prevent medical errors, quality and other management indicators, organization of resources based on HMAS and VMAS protocols, and an understanding the impact of a MAS on the organizers of the resources and the executors of these processes.

The sixth community (shown in lilac) includes publications authored by Macinati (2016) and Van Erp (2019). These publications examine how the performance of a management accounting and control system (MAC) goes beyond its functionality. The first work highlights the link between budget participation and performance through the indirect effects of work-based psychological ownership, role clarity, and effective commitment of clinical managers to managerial roles. The second manuscript discusses the performance of these systems by exploring the unexpected consequences of a MAC designed for use in a large public organization.

The gaps enable new studies and research directions that would include: Methods for mediating the dynamics of MAC to improve learning processes, the quality and efficiency of healthcare practices, psychology roles in management control, administrative decisions, and financial and managerial performance.

5.9. Analysis of abstracts in Management

The abstracts in management publications included 681 words. Based on this analysis, the literature published in management journals can be

divided into four communities. This result is more accurate and representative because the abstract includes more words compared to keywords, which are typically limited to four, five or six words. However, a strong analysis of keywords facilitates a better choice for new research work and permits researchers to know whether their findings correlate with specific and high-impact aspects of previous publications. Nonetheless, abstracts contain scientific information that is relevant to the research process and include limitations and conclusions that facilitate prospecting for new research based on lessons learned from others. The results of this analysis Figure 17 revealed that the following words were found most frequently in the abstracts: efficiency, control, performance, practices, change, processes, and cost.

Figure 17. Analysis of the words in the abstracts in management publications

Source: *Network generated with VOSViewer software.*

The repeated words are: Efficiency, control, and cost are represented by the color green community. In general, these terms relate to organizational efficiency. Besides, the words performance, practices, change, and processes blue community are used mainly for issues related to performance measurement and indicators. The words represented by the red community, including management accounting, APP, healthcare, knowledge, and research, are directed at patient care and hospital processes. Finally, processes, quality, information, implementation, and commitment terms represented by yellow community relate primarily to administrative techniques and process improvement.

DISCUSSION

A comparison of findings between accounting versus management journals, in general terms, show that publications in management control and accounting have a similar average in keywords (9 and 8, respectively). With respect to the institutions mutual collaboration, the result is similar: In management control 1.5, and in accounting 1.7. The first topic analyzed in this section was the evolution of keywords in accounting and management journals over 33 years of publication. The current accounting literature focuses on issues related to implementation, budgeting, organizational change, accountability, organizational identity, and non-administrative controls. In management journals, current research focuses on topics related to organizational performance, efficiency, governance, optimization, and engagement. In both cases, the study populations featured in both accounting and management control papers included direct relationships with several aspects of the Sustainable Development Goals (SDGs).

On the other hand, specific topics of interest are featured in each group. Accounting and management control journals have different points of emphasis; this is reflected in emerging topics that demonstrate their dynamic nature and the importance of these two areas of research with respect to healthcare issues.

The second topic analyzed in both the accounting and management control literature was the transfer of knowledge between researchers. Using co-citations as a specific measure, the transfer of knowledge was evident in the accounting publications. By contrast, our initial findings suggested that there was no transfer of knowledge

among the researchers publishing in management journals. For this case, an additional test provided affirmative and conclusive confirmation of the existence of shared investigative origins of the researchers in this group and, for that reason, of knowledge transfer.

This result was previously analyzed by other authors to determine whether the references cited by the publications of the studied groups were affected between them, and to infer whether this kind of knowledge transfer could be revealed or not. Cobo et al., (2015) described this process as scientific or bibliometric mapping in a publication in which they also used the Science Mapping Analysis Software Tool (SciMAT) to identify hidden research elements. More recently, Briatore et al., (2023) published a literature review on artificial intelligence and its use in public administration, thus presenting new lines of research.

In this study, there were identified 25 articles, classified on management control, having common work. This important indicator highlights the need of improving knowledge transfer in future research work. It should be noted that the particular characteristics of each journal, and the filtering methods commonly used by researchers who need new information, are often very limited and do not include other fields of knowledge. Many researchers mistakenly consider findings from other fields to be of little interest and do not consider the possibility of interdisciplinary research, collaborations with other authors and institutions, or the correlation of their research programs with important economic sectors and interprofessional impact. This misunderstanding significantly reduces the transfer of knowledge in scientific research and thus its applicability to the business world and society in general.

The third analysis focused on general research topics featured in accounting (organizational efficiency, performance measurement, and indicators, patient care, and hospital processes as well as administrative and process improvement techniques) and management (performance, efficiency, governance, optimization, and commitment of the organization) journals. However, it is crucial to recognize that each analysis includes a distinct set of comparisons and variables. This is why the groups and communities that result may depend more or less on the specific case in question, although, in general, the average is maintained.

The overall paucity of topics, during the 33 years of publication, analyze the need to broaden the research vision in these fields. This may be why there is significant recent interest in the healthcare sector. This interest is increasing due to scientific, technological, and ontrend advances based on artificial intelligence applied to healthcare, which are undoubtedly important and among the highest impact of all social and economic advances worldwide.

Regarding the fourth topic, our findings confirmed the results obtained by abstract and keyword analyses and provided more pertinent information for future research and greater robustness to current research endeavors.

Finally, we recommend the use of science mapping methods for the review and analysis of the literature. This is a powerful tool that can be used to provide a graphical understanding of the evolution of the state of the art and detect research gaps. From this bibliometric-systematic review, we conclude that dividing the literature into subgroups may be useful for creating a better understanding of the evolution of the topics investigated.

CONCLUSIONS

The results obtained in this study have contributed to current knowledge in Management Control, Accounting, and healthcare. Our findings highlight a promising future that includes many new research opportunities. Collectively, the results demonstrate that the application of Management

Control and Accounting in health issues and organizations is one of the new and growing fields in scientific research, notably given the need to respond to global events such as the COVID-19 pandemic.

It will also be necessary to carry out studies in developing countries by replicating models that have been already tested and applied in countries with consolidated and strong international economies. This will establish opportunities for improvement based on the lessons learned and the experiences of the more developed nations in which accounting and management guidelines and applications contribute to the results obtained. Goodman et al., (2018) suggested that low- and middle-income countries might carry out studies that include racial and ethnic minorities, among others.

Several countries have opted for APP to improve the efficiency of their healthcare systems and for the creation of new hospitals, leading to changes in their management control (WHO, 2021) while also seeking to meet SDGs.

Researchers must broaden their vision and include professionals from other areas of knowledge. Research programs that feature multi-professional and interdisciplinary research are in a better position to increase overall knowledge from numerous perspectives and to perform effective scientific and professional projection. Results of research performed by an interdisciplinary team will by definition be more visible and applicable to a wider group of readers focused on different areas of knowledge, and of greater interest to society in general. This will contrast to publications that are typically read by members of a single sector or a small group of colleagues over time. It is time to make research a powerful tool to promote research interdisciplinarity.

The results revealed that case studies predominate in the healthcare sector, not only because they feature new and/or innovative topics, but because they facilitate professional and interdisciplinary relationships while carrying out studies with real implications, which is the overall duty of scientific-academic research. While case studies require significant effort, their results are typically overwhelming, with immense gratification, are palpable and completely achievable.

Among most important results, we found that a large percentage of the relevant high-impact publications are not in accounting, management control, or financial journals, but in scientific-medical journals. This suggests that medical researchers and those employed in the healthcare sector, in general, are interested in topics related to management control, accounting, finance, and administration. Related to the above, two recent studies corroborate this, one on the short- and long-term financial well-being of healthcare remains a challenge for managers, as wages and inflation exacerbate the cost of care for patients with specific diseases (Ford, 2022) and the other confirms that this has a negative impact, with "financial toxicity" for patients diagnosed with chronic diseases, particularly if their salary or income decreases due to absenteeism and/or the need for ongoing medical treatment (Pavela et al., 2021).

Health and healthcare sector in general, have a significant impact on all other economic and social sectors. One example of this phenomenon is the change in the value of assets held on the international stock market during the COVID-19 pandemic. However, a good healthcare system with a strong infrastructure and a well-defined health policy can minimize the economic impact of the market. An appropriate level of technological and scientific development, efficient and solid economic policy, and effective investment in healthcare, will permit countries to cope with national and

global health emergencies with fewer negative impacts, as was the case during the COVID-19 pandemic (Huynh, et al., 2021).

Technological updating, proper management of financial resources, optimization of installed capacity in correlation with human resources, adequate territorial planning, and investment in education are all factors that determine the efficiency and productivity of healthcare entities (Chai, et al., 2021). Thus, investments in technology and innovation made by healthcare organizations can have a direct impact on the quality of healthcare providers and services, which must be regulated by control entities (Ghandour et al., 2022). This was confirmed by Jakovljevic et al., (2021) who noted that the quality of healthcare technology is directly related to its financing; and that the planning and management of the costs of health personnel must be managed from a healthcare policy perspective (Correia et al., 2015). Similarly, Ma et al., (2017) concluded that the doctor-patient relationship would improve among other aspects, in the success of treatment, patient well-being and cost components, since it has intrinsic and extrinsic impacts on healthcare professionals.

In developing countries, decreasing budgets and increasing costs affect the provision of health services and the subsidization of the healthcare system. One alternative that might mitigate this problem is the outsourcing of medical services in small hospitals and administrative services in large hospitals via the use of APP, mainly with the goal of cost reduction. This sacrifices control of important organizational processes and measurements as well as quality control (Barik & Rout, 2021).

Recent recommendations from different authors frame two important aspects of the research: knowledge transfer and professional interdisciplinarity. For the present study, these two characteristics proved to be of great importance, as they maximize the relevance and impact of the results and facilitate the projection of the authors' future research work.

7.1 Academic contribution

The findings presented in this manuscript demonstrate that management control and financial information are effective tools that can be used to achieve healthcare efficiency and lead to better decisions for the fulfillment of government plans (Emmanuel et al., 1990). Management control, cost efficiency, and strategic alliances could help strengthen the core business of healthcare systems (Martínez-Baz et al., 2018).

This critical review of the literature is timely and important to demonstrate the applicability and growth of research in management control, accounting, and finance in the health area. The most recent research in these three areas applied to different sciences and professions is increasingly notable and the field of health has a very important participation as evidenced in the bibliometric review work of Malmmose (2019), in which 317 articles related to these lines of research and medical care were reviewed.

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