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A Bibliometric analysis for enhancing University collaboration with the Cultural and Creative Industries through Knowledge Management

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Abstract: *Universities were the cradle of Musicology. Although collaboration between universities and industry has driven innovation and economic growth, Cultural and Creative Industries have received less attention in these studies. While research on implementing Knowledge Management Models in Higher Education Institutions has grown, its impact on the collaboration between universities and the Cultural and Creative Industries has been less explored. This study uses Bibliometric Analysis to understand scientific productivity in this field, aiming to provide valuable insights for the stakeholders.*

Key-words: *Musicology, Cultural and Creative Industries, University-Industry Collaboration, Higher Education Institutions, Knowledge Management Models*

1. Introduction

Universities were the cradle of Musicology, a field that in the nineteenth century took over the techniques and methods of academic research from fields such as law and philology; as well as acoustic, physiological, and psychological discoveries (Lang 1941) (Rodríguez Legendre 2002). From that date to the present day, great transformations have been experienced (including the effects of the COVID-19 pandemic), which have led to the awareness that these are the times of the fourth industrial revolution (Schwab 2016) and the knowledge society (Drucker 2017).

It poses many challenges to Musicology as a science, and to universities as institutions. In the case of Musicology, the presence of music in almost every branch of the Cultural and Creative Industries (CCI) is highly defying, since it demands to remain updated in a very dynamic and diverse environment, described in detail by (Daniel 2023).

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For universities, several authors have proven that collaboration with industry, or University-Industry Collaboration (UIC) is a crucial booster for innovation and economic expansion. It allows academic knowledge to be applied to society's most pressing problems, generating advanced solutions and new technologies. Studies have addressed this collaboration from multiple perspectives, recognizing the importance of integrating research and development efforts between both sectors. Rossoni et al. (2023) asserted that UIC concerning Research, Development, and Innovation (RD&I) is vital for achieving progress, and benefits both parties. However, according to Wang et al. (2022), the CCI sector has received less attention from studies of this kind.

Knowledge Management (KM) is one of the approaches used to address these UIC. Rodríguez Andino et al. (2009) depict KM as a catalyst for development and change, as well as a facilitator of access to the knowledge and information needed in an organization. In addition, it is considered to enhance intellectual capital and innovation, providing significant elements for decision-making and ensuring that the organization's objectives are fulfilled efficiently. It is not surprising, then, that Rossoni et al. (2023) include KM among the aspects of UIC that should be considered in future research.

Experiences such as those collected by Ceballos et al. (2017) and Stemberkova et al. (2021) illustrate the benefits derived from the implementation of KM models in Higher Education Institutions (HEI) located in contexts as geographically and culturally distant as the Czech Republic and Mexico, respectively. This leads us to question how the scientific production about KMM in universities has evolved and how much attention has been paid to the collaboration of HEI with the CCI in this production.

2. Objectives

This paper aims to address the development of KMM in universities and HEI through a bibliometric analysis to understand the scientific productivity in the field, its trends, established collaborations, as well as the quality and impact of existing literature.

3. Material and methods

As Donthu et al. explained:

> "bibliometric analysis is useful for deciphering and mapping the cumulative scientific knowledge and evolutionary nuances of well-established fields by

> making sense of large volumes of unstructured data in rigorous ways. Therefore, bibliometric studies that are well done can build firm foundations for advancing a field in novel and meaningful ways—it enables and empowers scholars to (1) gain a one-stop overview, (2) identify knowledge gaps, (3) derive novel ideas for investigation, and (4) position their intended contributions to the field" (Donthu et al. 2021, 285).

Conducting studies of this kind requires techniques such as performance analysis, science mapping, and social network analysis. Aria and Cucurullo stated that «The *bibliometrix* R-package […] provides a set of tools for quantitative research in bibliometrics and scientometrics» (2017, 963). Therefore, it was used for the processing and visualization of the data extracted from Scopus, although this database facilitates a first level of statistical analysis.

Being a generalist database, Scopus compiles reputed journals from several scientific domains. The search strategy consisted of looking for the keywords: Knowledge Management Model, Higher Education Institution, Higher Music Education Institution, Institution of Higher Education, Institution of Higher Learning, University, Conservatory of Music, Music Conservatory, Faculty of Music, Music Faculty on the fields: TITLE-ABSTRACT-KEYWORDS; using the truncator asterisk (*) and the Boolean operators: AND – OR. Articles in their final stage were included in the selection, while those published in 2024 were excluded. As a result of that search, 42 papers signed by authors from 30 countries were obtained. Their geographical distribution is shown in different shades of blue in Figure 1.

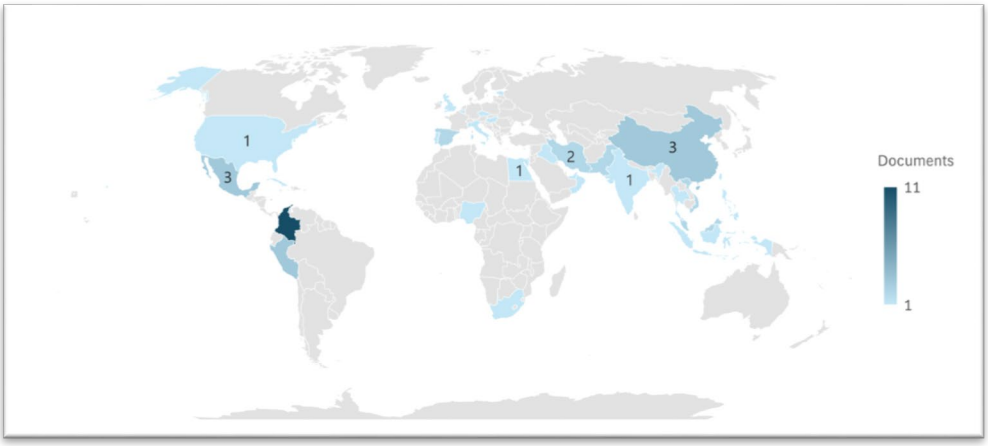

Fig. 1. *Documents by Country*

Source: Own elaboration based on Scopus data

The journals publishing them belong to multiple fields of knowledge from Mathematics; Chemistry; Engineering; Business, Management and Accounting; Social Sciences; to Arts and Humanities. A database containing all the metadata was exported and further analyzed with *bibliometrix.*

4. Results of the Bibliometric analysis

This section presents the results of the bibliometric analysis of the sample, including the graphics generated by the software.

4.1. Sample description

The analyzed sample covers two decades, from 2003 to 2023, and includes a total of 42 articles from various sources, such as journals and other academic documents. With a rate of 2.05% annual growth, there is evidence of a gradual but constant development in the production of knowledge in the area studied. The documents have an average age of 6.81 years, indicating a relatively up-to-date collection of research. In addition, each paper has an average of 11.05 citations, underscoring its relevance in the academic literature and its active referencing.

In terms of authors and their collaboration, 124 authors were identified, of which 4 have published papers as single authors. Collaboration among authors is remarkable, with 3.24 points of co-authorships per paper and 19.05% of international cooperation, suggesting a significant integration of diverse perspectives and expertise.

4.2. About the content generators

The sample comes from a wide variety of sources, including “Espacios”, “Revista Interamericana de Bibliotecología” and “Universidad y Sociedad”, each with 2 articles. Other publications contributed only one article, highlighting the thematic dispersion and the diversity of collaboration typical of research on this topic. Figure 2 comprises the most prominent sources.

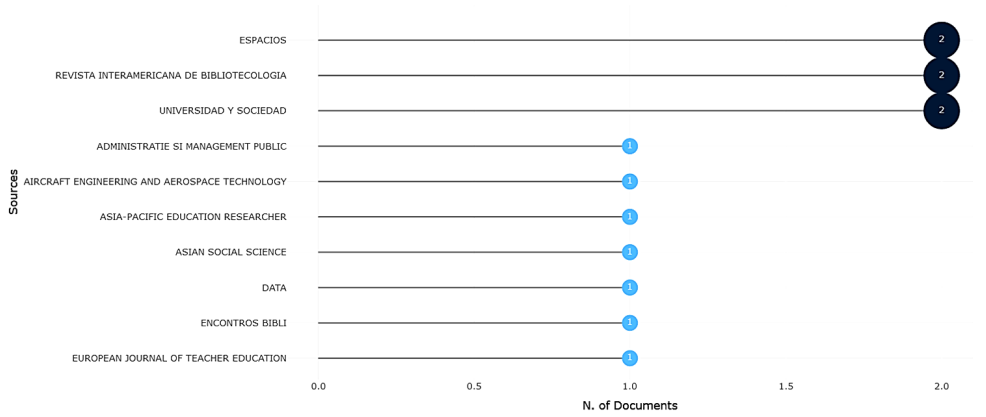

Fig. 2. *Documents by Sources*

The analysis of the ten most relevant authors shows a varied distribution in their contribution to research. VALENCIA-ARIAS A leads with three articles and a fractionalized value of 0.65, suggesting active participation in co-authorship. RAFI M, with two articles and a fractionalized value of 0.67, indicates a more marked leadership in their publications. Authors such as DAO TTB, HA DL and others have a fraction of 0.31, indicating a more shared participation. AHMAD K, with two articles and a fraction of 0.67, probably had a prominent role in their research. This edge reveals important nuances in the depth, and individual influence of each author.

The impact of authors within the sample varies, with some authors showing an h-index and g-index of 2, such as ACEVEDO-CORREA Y and RAFI M. VALENCIA-ARIAS A stands out with a g-index of 3, reflecting considerable impact. Authors such as CHEN Y-H, with 59 citations, show a notable influence. This data underscores the diversity and depth of the authors' academic impact.

4.3. Institutions and countries

Zhejiang Guangsha Vocational and Technical University of Construction, China, and Hanoi University, Vietnam, led the production with 7 and 6 articles, respectively. Other notable institutions include the Northern Catholic University Foundation and the Iran University of Science and Technology, with 4 articles each. This diversity indicates active collaborative networks and a shared interest in global knowledge production.

As it is represented in Figure 3, China is at the forefront in terms of citations with 88 in total and an average of 22 per article, followed by Mexico with 38 and an

average of 19. Italy and the USA share third place with 33 citations each. These countries stand out for their high global academic influence.

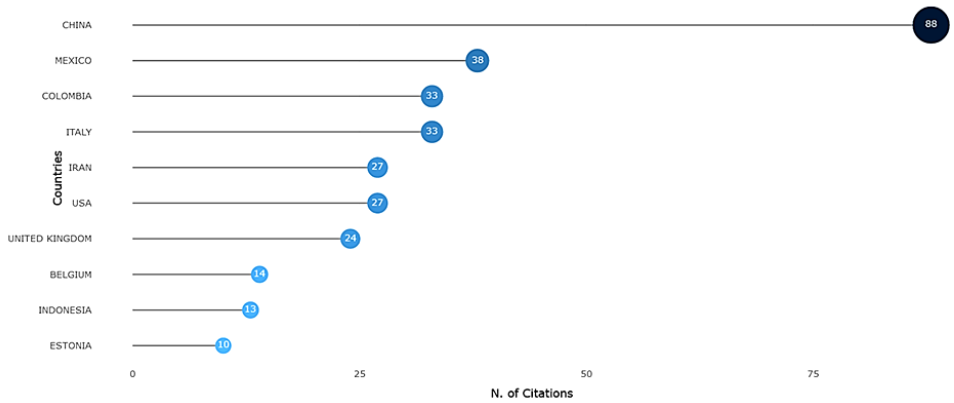

Fig. 3. *Most cited Countries*

4.4. Paths of scientific production

In the word cloud of Figure 4, the frequency with which terms are used helps to identify the main and secondary themes in research. "Knowledge management" and "knowledge management model" stand out as the central themes, while other terms such as "higher education institutions" and "research" are also significant, although to a lesser degree. Analytic methods such as the "analytic hierarchy process" are also prominent, indicating an interest in systematic approaches. The diversity of less frequent terms shows the breadth of applications and contexts in which these concepts are discussed, from aerospace to geotechnical engineering to industrial management.

Fig. 4. *Word Cloud*

However, when the time perspective is added, like in Figure 5, a growing interest in “knowledge management” can be seen, which is the most frequently mentioned and constantly evolving topic from 2016 to 2022. Words like “Higher education institutions” and “knowledge management model” also show significant interest, especially during the most recent years.

Figure 6 exhibits that “knowledge management” is the most prominent cluster, with 27 occurrences and a high betweenness centrality (615,933) and closeness (0.0185), reflecting its central importance and connections in the network. “Academic libraries” and “Hanoi” are associated with this cluster but have lower centrality. The cluster "knowledge management model" includes terms such as "organizational learning" and shows moderate betweenness centrality (22.292), indicating a specialization with relevant connections. "Higher education" and "higher education institutions" are also important, although less central, with a high centrality of intermediation for "knowledge transfer" (70,333). The "innovation" cluster encompasses terms such as "intellectual capital" and "research", with moderate centrality of intermediation and closeness, showing its relevance in publications. "Model" is less central but significant.

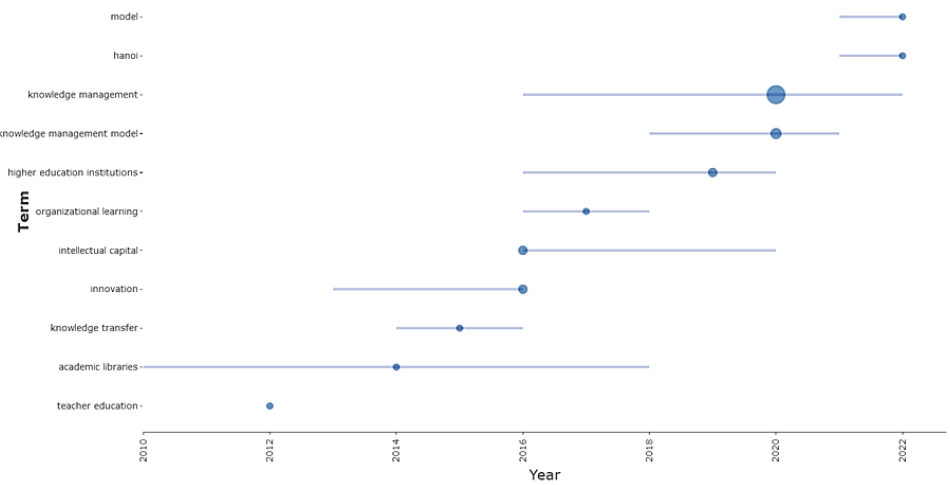

Fig.5. *Trend Topics*

Fig. 6. *Thematic Map*

4.5. Multilevel interactions

Figures 7 and 8 represent the relationships among sources, references, authors and keywords, for a comprehensive picture of the development of the research field.

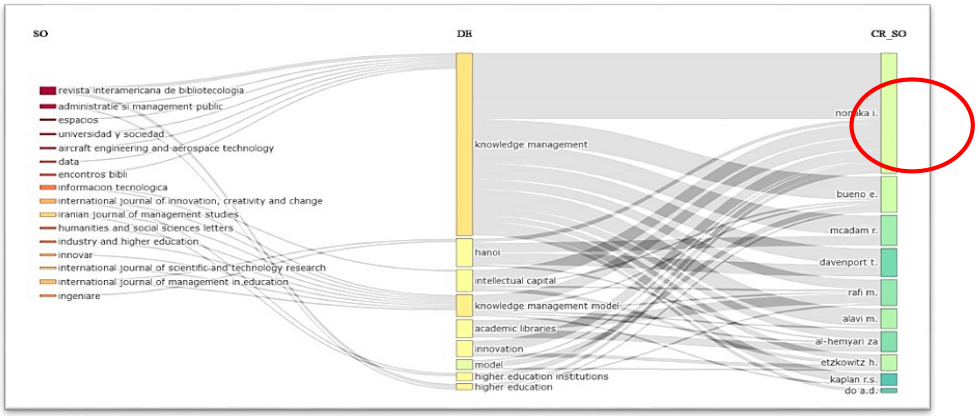

Fig. 7. *Three Field Plot 1*

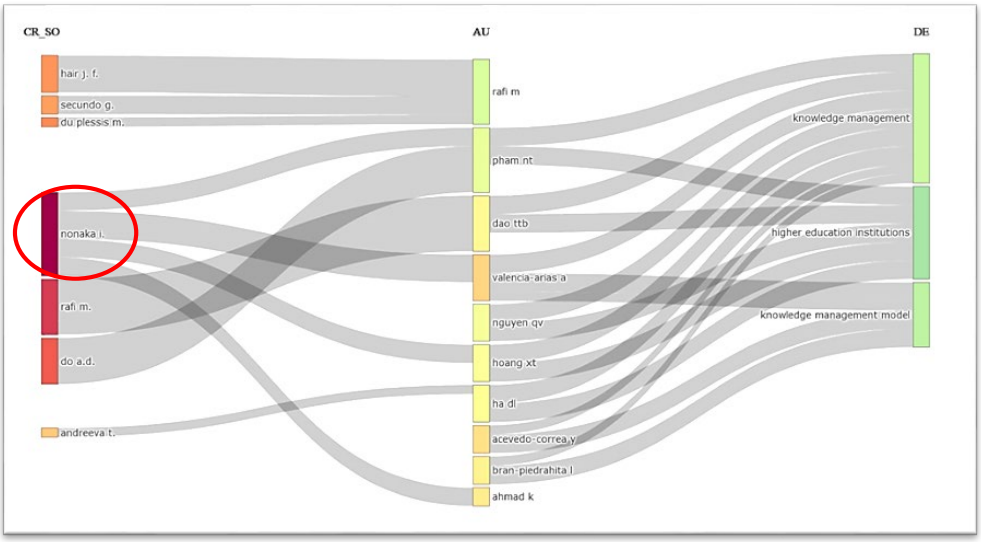

Fig. 8. *Three Field Plot 2*

In Figure 7, 7 sources (left column) published articles concerning the keywords (middle column) “Knowledge Management”, and 8 about “Knowledge Management Model”. NONAKA I. is the most referenced author (right column), who stands out for the impact of its work in all of those sources.

As shown in Figure 8, he is also confirmed as the most influential reference (left column) for authors (middle column) researching about those keywords (right column) on HEI in recent years.

For the Historiograph in Figure 9, the articles are grouped into different clusters representing similar topics or areas of research. For example, cluster 1, in red, includes articles on knowledge management models (e.g., Rivera 2016; Pham 2021). On the other hand, cluster 2, colored blue, focuses on higher education institutions and knowledge management (e.g., Acevedo-Correa 2019; Escorcia Guzmán 2020). The rest of the clusters (which are not reflected in the image because they are isolated) gather specific topics and methodologies applied to knowledge management in universities.

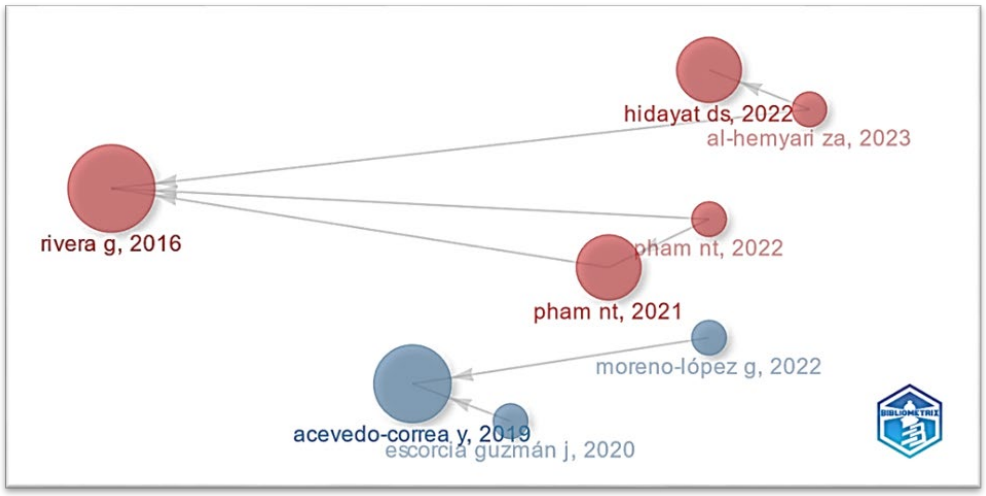

Fig. 9. *Historiograph*

The last graph, Figure 10, illustrates the map of collaboration between countries, manifested at regional and transcontinental levels. China is a key country in this instance and has articles with Malaysia, Pakistan, and the Philippines, with Pakistan being the most frequent partner (2 collaborations). Colombia has established significant connections with Spain, also with 2 collaborations. The Czech Republic shows diverse collaboration, partnering with Nigeria and South Africa, while Egypt collaborates with the United Arab Emirates. In addition, Italy works jointly with India, and Malaysia with the Philippines. Nigeria and South Africa have also published joint results.

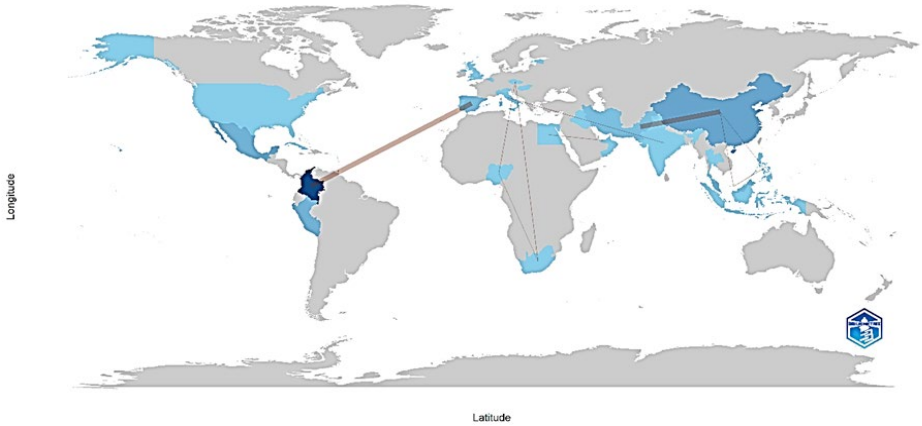

Fig.10. *Collaboration Map*

5. Discussion: Knowledge Management basics and its potential inputs to Musicology

Nonaka and Takeuchi's theory of organizational knowledge creation (1995) is widely recognized and used. Originating from the Japanese business environment, where innovation is crucial, they sought to tackle the lack of attention management sciences had given to the process of knowledge generation. They explored the nature of knowledge, its four modes of conversion (Socialization, Externalization, Combination, Internalization —SECI—), the requirements for its generation within organizations, and presented a five-phase model for the process of organizational knowledge creation.

Acevedo Correa et al. (2019; 2020), Escorcia Guzmán and Barros Arrieta (2020) and Moreno Lopez et al. (2022) agree in the weight of SECI model in HEI, either because it has been taken as a reference for the implementation of KM systems, or due to its use as a starting point for the creation of new models.

About KM, Quintas et al. explained that it "is the process of continually managing knowledge of all kinds to meet existing and emerging needs, to identify and exploit existing and acquired knowledge assets and to develop new opportunities" (1997, 387). These authors describe the different dimensions of the organization that have an impact on KM:

- organizational structure and culture: including the development of structures that facilitate the growth of communities of practice (groups of professionals informally bound to each other through exposure to a common class of problems, with common pur-suit of solutions, who thereby themselves embody a store of knowledge);
- people aspects: training, development, recruit-ment, motivation, retention, organization, job design, cultural change and the encouragement of thinking, participation and creativity, and the man-agement of all types of employment contracts;
- process aspects: process innovation, re-engineering; both for radical and continuous improvement;
- technology aspects: concept maps, hypermedia and object-oriented databases, artificial intelligence approaches to knowledge acquisition, representation and discovery, decision support, data mining and knowledge dissemination. (Quintas, Lefrere, and Jones 1997, 387–88).

On the other hand, Hosein Rezazadeh Mehrizi and Bontis (2009) expressed that the key activities of KM include evaluation, acquisition, creation, storage, sharing, application, and forgetting of knowledge, along with other related administrative processes.

KM's influence has extended beyond the business world to affect fields such as Information, Communication, Educational Sciences, and Culture. De Yzaguirre García (2014), who analyzed how KM perspectives are applied to cultural organizations, considering the difference between the origin of these approaches and the specific characteristics of this sector, stressed that KM is in these institutions, besides an administrative tool, an essential part of their mission.

The interest aroused by this subject at the international level prompted the launching of the technical standard ISO 30401, which establishes the requirements for KM systems to support organizations in developing their mission efficiently and generating value through knowledge for all stakeholders (Rodríguez Rojas 2019) (Carlucci et al. 2022). As Fidel Rodríguez Legendre claimed:

> *Ultimately, the production of knowledge, the construction of new objects of study or the expansion of existing ones, as well as their validation, is not only framed within the boundaries of research, but is also inscribed in certain academic power networks that legitimize the relevance or not of renewed processes and unexplored spaces for knowledge. And in this sense, scientific communities, circles of experts, research institutes and university environments, condition the deployment and development of these cognitive spaces, or their stagnation*. (Rodríguez Legendre 2002, 39).

The above gives us an idea of why and how KM and KMM may be relevant to Musicology, enriching its impact in the academic field by nurturing the collaboration between universities and CCI.

6. Conclusions

Universities and other HEI face the challenge of meeting society's needs in these complex times. Musicology must continue to be receptive to theoretical and methodological perspectives that allow it to deepen its impact on the CCI. As this paper demonstrated, there is evidence of KM as a thriving field of study that has aroused the growing interest of the international academic community. This has led to a sustained increase in scientific production over two decades. It is worth mentioning the proliferation of journals dedicated to the field as a decisive factor in the visibility of the results achieved in this area. Nevertheless, the existence of a niche concerning the intersection between universities' KMM and CCI was corroborated using the bibliometric method. Addressing this gap from and for Musicology will bring benefits and important arguments to university managers, academics, musicologists, musicians, and participants in the CCI sector, to benefit society in general.

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