

# Bibliometric Analysis of Competency Mapping through Web of Science and Scopus

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## Abstract

The objective of this research is to identify works addressing competency mapping that are indexed in the Web of Science and Scopus databases using bibliometric analysis. The publications that featured the phrases "competency" and "competency mapping" and were published between 2001 and 2021 were examined. From 2001 to 2021, a year-by-year comparison of publication and citation patterns was presented. The majority of the publications were from the United States, according to the research. Seven American, one Canadian, and one Australian university produced similar findings among the top ten highest research producing institutions. The analysis also looks at the papers that received the most citations during the chosen years. The paper indicates that the studies undertaken in the domain of competency mapping are not thorough, and that it can be improved further and given more consideration for research by researchers.

**Keywords**— bibliometrics, competency, competency mapping, databases, human resource management

## Introduction

Organizations are rethinking personnel management approaches in order to boost the efficiency and effectiveness of the human resources function, which is already under pressure (Bainbridge, 2015). According to (Guillaume et al., 2014), the proper individual must be assigned to the right task or position inside a business process for efficient human resource management. The changing nature of work and the workplace are reshaping the attitudes, skills, and knowledge required for successful employment and performance (Liebowitz, 2008). (Shih et al., 2010). (Stasz, 2001) has highlighted the changes that occur as a result of different causes such as technology, management innovations, global marketplace competitiveness, and raise questions about the abilities required to succeed at work. In order to survive in today's tough competition, every

industry is attempting to achieve high efficiency and effectiveness. All strategies and tactics for enhancing the performance and efficiency of their operations point to one fundamental factor: "Skill and Competency." As a result, the focus of companies aiming to improve their performance is on 'skills and expertise.' (2019, Bhardwaj et al.)

In the disciplines of education, human resource management, and training and professional development, the concept of competence and competences is gaining importance. (Suhairom et al., 2014). Human resources are the most significant assets of any business. The concept of competency and competency models have been a fundamental aspect of human resource management during the last four decades as a means of increasing organizational efficiency (Chouhan & Srivastava, 2014). Competencies are a set of success traits required to accomplish

substantial outcomes in a specific position or role inside an organization. Employees can agree on a common language and the higher performance expected of them by employing competency models as measuring tools. As a result, competency models aid in aligning the organization's strategic direction with internal behavior and competencies. When competency models are effectively established and implemented, they improve individual and organizational performance. With the increased interest in assessing and predicting workplace performance, the term competence has been ingrained in HR professionals' vocabulary. (Chouhan & Srivastava, 2014)

The term competency was coined by an American psychologist named (White, 1959). In his book 'Motivation reconsidered,' he mentions the term "competence," which refers to "an organism's aptitude to interact effectively with its environment." McLagan, Richard Boyatzis, Signe Spencer, and David Ulrich have done substantial research on the topic of competences and their value in ensuring an organization's long-term survival and competitive advantage. 'Testing for Competence Rather Than Intelligence,' a much discussed study by David McClelland, was published in 1973. Academic aptitude and knowledge content evaluations were once considered good predictors of academic success, but they were poor predictors of on-the-job performance (McClelland, 1973). The research questioned the validity of intelligence testing and their utility in predicting job performance. By proposing the concept of competences - the underlying personal attributes that were essential determinants of on-the-job performance - McClelland created a stir. With the publication of the book *The Competent Manager*, the term competency gained even more traction in the corporate world (Boyatzis, 1982).

The word 'competentia' comes from the Latin word 'competentia,' which means 'is permitted to judge and has the right to speak' (Nikaeen & Ashkezari, 2012) The word "competence" is defined in the English lexicon as "the state of being properly sufficient or fit." It's much more

difficult to establish a clear line between (buzz) terms like proficiency, capability, capacity, competence, competency/ competencies, and competency/ competencies (Chouhan & Srivastava, 2014). According to (Cooper, 2000), there is a lack of uniform definitions, formulations, and techniques in the research on competency, which frequently leads to misinterpretation of the term. Standard dictionaries' definitions of competence are broad, ambiguous, and inferred, resulting in a wide range of interpretations. The term 'competencies' is employed in a variety of ways in the extant literature. Many different definitions of competency can be successfully described as a set of technical and cultural skills (Brockbank, 1997). However, different authors advocate for different approaches to defining competency, as evidenced by the current research.

#### Five Different Types of Competency Qualities

Tucker and Cofsky (1994) established five fundamental competency components (Simons, 2011).

- 1) Knowledge—A person's stored information and learning, such as a surgeon's understanding of human anatomy, is an example of knowledge.
- 2) Skill refers to a person's ability to complete a given task, such as a surgeon's ability to perform surgery.
- 3) Attitudes, Values, and Self Image-This refers to a person's attitudes, values, and self image. Self-confidence, for example, is a person's perception that he or she can succeed in a specific situation, such as a surgeon's confidence in performing a complex surgery.
- 4) Traits—Physical qualities and consistent responses to situations or information are referred to as traits. For surgeons, good eyesight is a must, as is self-control, or the ability to remain calm under pressure.
- 5) Motives- Motives are feelings, wants, physiological needs, or other similar impulses that cause someone to do action. Surgeons who have a strong interpersonal orientation, for example, take personal responsibility for efficiently interacting with other members of the operating team.

(Competencies for HR Professionals: An Interview with Richard E. Boyatzis - ProQuest, n.d., p. 199) supports competency modelling that incorporates multiple areas of skill into groups. Ulrich, on the other hand, conducted a large-scale survey in the United States to develop benchmarking norms for certain HR competencies. The HR business partner model was born, necessitating HR practitioners' professional development as well as the necessity to contribute to the organization's overall competitiveness. To acquire a long-term competitive edge, Ulrich defined competence as the ability to add value to a company. Competence must be focused on the process that comes from changing business conditions. Business knowledge, HR functional expertise, and change management are the three primary areas of the Ulrich et al. (1995) paradigm. According to them, change management is necessary because the organization's external rate of change (e.g., globalization, information flow, consumer expectations, technology, and so on) must be matched by the internal rate of change in order to remain competitive. Regardless of work kind or title, the aspects of competence remain in the same order of importance, with any changes reflected merely in weight. Individuals carrying out various human management models will require varying levels of ability in various areas, as specified in the models' definitions.

A review of the core competency frameworks of 40 organizations indicated a total of 433 capabilities, according to Rankin (2002). According to (Suar & Dan, 2001), there are 47 different work competencies. The nine key categories in which these competencies were found were aptitudes, skills and abilities, communication, leadership, knowledge, physical competency, personality, principles and values, and interests. (Parveen, 2002) established organizations with an expanded role for HR regarded advising on HR issues as the most crucial capability. Fearlessness, care and sensitivity, playing it low-key, and familiarity with problems and ambiguity have all been identified as crucial HR traits for being trustworthy. Richard (2003) associates

networking and internal consulting, interpersonal sensitivity, theoretical background, strategic viewpoint, systems and process orientation, quantitative analysis, and project management with success in the HR function. Since the pioneering work on skills by (Stogdill, 1948), (Katz, 1955), and (Mann, 1965), a burgeoning literature in the 1980s and 1990s found a number of competencies linked to managerial success and effectiveness (e.g., Boyatzis, 1982). (Spencer & Spencer, 1993). Despite the fact that many businesses have commended competency-driven applications, numerous authors have expressed worry about the unbalanced relationship between the range of competency models used in organizational contexts and the scarcity of empirical research studies to back them up. (2000) (O'Connor & Laborer)

Scholars are focusing their efforts on theorizing and empirically researching how competencies may be organized into higher order dimensions, which is seen as crucial in the field for the building of a meaningful work structure (Shipper & Davy, 2002). According to Dave Ulrich's current HR competency model, HR practitioners must master six competencies: Credible activist, Strategic positioner, Capability builder, Change advocate, Human resource innovator and integrator, and Technology proponent. More than 20,000 people (HR professionals and their line and HR workers) from all over the world completed HR competency exams on 140 behavioral and knowledge challenges, resulting in these competencies. Competency models are usually a hodgepodge of work KSAs—ill-defined concepts with no clear value (Sackett & Laczko, 2003) Competency modeling's lack of rigour is not inherent. The majority of the early endeavours, on the other hand, were led by non-researchers who were less methodologically rigorous. They had a lot of important advantages, such as a broader view of management and, as a result, perhaps a stronger relationship with management.

## Competency Mapping

Numerous articles on the subject were consulted in order to obtain a thorough understanding of competency mapping in businesses. Competency mapping is a method for identifying a company's or institution's key competencies, as well as the roles and tasks inside it. Competency mapping determines the extent to which a person possesses the various job-related competencies.

Competency mapping aids in the identification of important traits (knowledge, abilities, and behavior) required to conduct job categorization or any other recognized process efficiently. Competency mapping can be used to better comprehend an individual's SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis in order to boost career advancement. Competency mapping is the process of breaking down a specific role or job into its constituent tasks or activities and establishing the competences (technical, managerial, behavioral, conceptual knowledge, attitudes, talents, and so on) required to complete the work successfully. Competency mapping aids in anticipating competency development and sustainability based on changing organizational requirements. As a result, for an HR professional, the process of competency mapping aids in identifying and describing the competencies that are most important for success in the workplace. In an organization, competency mapping is a precise approach of identifying an individual's work and behavioral competencies. Companies are abandoning their approach of employing multi-skilled people who only know one skill. Companies can use the competency method to focus on connecting company strategies to individual performance initiatives. Employee development thus focuses on improving their competencies rather than preparing them for new roles. They can acquire competencies that will be valuable throughout the organization as it grows and changes (Bhardwaj et al., 2019). Competency mapping, according to (Krishnaveni, 2013), determines an individual's or a group's competency in connection to job needs. In his article "Competency Mapping," (Yuvaraj, 2011) points out that for the best

output of their work, organizations should have roles and responsibilities defined effectively. Knowledge, skill, and attitude, as stated by the author, combined comprise a person's competencies in order to give justice to his work by performing an effective and efficient job since they know how to complete a specific task wonderfully. According to Jain (2013), all businesses should keep a list of competencies on hand as a minimal requirement for doing any task well.

The goal of this work, in connection to competency mapping, is to characterize papers that address the issue of competency mapping that are indexed in the Web of Science and Scopus databases. Both Web of Science and Scopus were chosen since they are the most commonly utilized databases in metric analysis.

The following are the specific goals of this paper:

- (i) determine the research on competency mapping that are included in the databases, Web of Science and Scopus databases.
- (ii) identify the leading countries, organizations, and authors conducting competency mapping research.
- (iii) determine the keywords and concepts that have been used in the literature on competency mapping.
- (iii) identify the top countries that conduct competency mapping research.
- (v) in competency mapping, study research patterns and citations of research work over time.
- (vi) locate the most prestigious publications that have published research on competency mapping.

## Bibliometrics and Bibliometric Indicators

Bibliometrics (the statistical study of publications) has been employed since the 1920s (Archambault et al., 2009)(2019, Cox et al.) However, with the emergence of new citation mapping techniques in the 1960s, such as the ISI's citation indices, new citation mapping methods were available, and bibliometric activity rose substantially (Thelwall, 2008). Bibliometrics, according to

(Spinak, 1998), is a technique for describing the features of document use and development.

In his study, (Garca-Lillo et al., 2019) highlighted how bibliometric studies can be used to analyze changes in scientific disciplines or domains over time by arranging social patterns of explicit acknowledgment among individual texts. Furthermore, bibliometric methodological indicators can assist researchers in understanding their position in terms of influence and specialization, as well as scientific trends and knowledge transmission processes in the context of worldwide research (van Raan, 1996).

There are numerous software programmes available to analyze data for bibliometric study. We can investigate the statistical analysis of citations, abstracts, and their influence using bibliometric analysis. Bibliometric analysis, as stated by (Van Eck & Waltman, 2010), is useful in assessing research output, patterns connected to the performance of articles, authors, journals, and related interdisciplinary study areas.

## METHODOLOGY

Web of Science information regarding publications and citations has typically been used in bibliometric analysis, according to Web of Science (Archambault et al., 2009). However, since the debut of Elsevier's Scopus database in 2004, there has been an alternative that has subsequently competed with Web of Science's monopoly capability. (Torres-Salinas et al., 2009). As a result, the Web of Science and Scopus databases are now routinely used in reference databases to assess the productivity and citations obtained by journals (Abrizah et al., 2013).

The bibliographic search results on competency mapping obtained from the databases of Web of Science and Scopus were grouped in this study. This is justified because combining the Scopus database's citations with the Web of Science database's results might drastically modify factors such as the ranking of the most productive authors (Meho & Yang, 2007)

## Inclusion/Exclusion Criteria

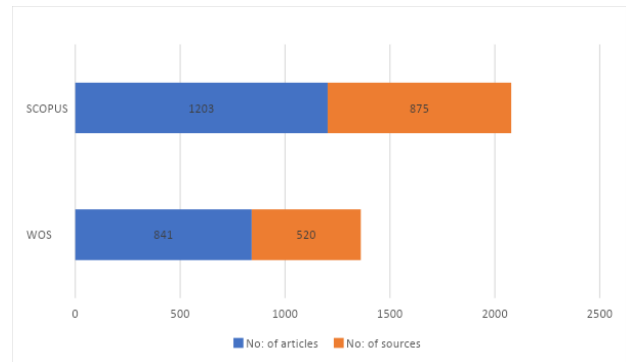


Figure 1: A graphical representation of the database, based on Web of Science and Scopus.

The creation of an appropriate search strategy to acquire records regarding the publication of related research is the foundation of bibliometric study (Huang et al., 2015). As a result, a search technique was devised that takes into account the terminological variances for the terms "competency" and "competency mapping."

The title, abstract, and keyword fields were obtained using the search approach specified. As shown in Figure.1, from the beginning of 2001 to 2021, the inclusion and exclusion criteria helped to filter publications on the issue of competency mapping that were published in journals in the two databases. The below mentioned Table 1 presents the databases in which the terms were searched, the type of research that was conducted in each database and the fields and search phrase used.

## BIBLIOMETRIC INDICATORS

As indicated in Table 2, several studies were carried out to characterize the production, collaboration, and impact of scientific production in competency mapping, which were indexed in the Web of Science and Scopus databases. The table also displays the connections between the analysis techniques and the paper's objectives, as well as the various types of indicators identified.

Table 1: Strategies for identifying publications about competency mapping.

Database	Types of Research	Fields	Phrase	Stipulated Period	Type of Document
Web of Science	Basic Search	TS = Topic (title, summary, author's keywords and keyword plus)	“competency” OR “competency mapping”	2001- 2021	Article OR Conference Paper
Scopus	Basic Search	TITLE-ABS-KEY (Article title, Abstract, Keywords)	“competency” OR “competency mapping”	2001 - 2021	Article OR Conference Paper

Table 2 shows the specific goals, database fields, and analysis performed.

Specific Objectives	Necessary Information	Conducted Analysis	Types of Indicators
To identify the profile of the research addressing competency mapping and that are indexed in the Web of Science and Scopus databases, in relation to the document type, year of publication, language and journal or conference proceedings in which the studies were published.	Document type	Amount of papers per document type	Production Indicators
	Publication Year	Amount of paper per publication year	
	Languages of the Journals	Amount of papers per language	
	Journals or conferences	Amount of papers per source type	
To indicate the countries, the institutions, and the authors that are most productive in competence mapping	Addresses	Amount of papers per country	
	Authors	Amount of papers per institution	
To indicate the main topics in the scope of competency mapping	Keywords	Most used keywords to represent the papers	

To identify collaborations in the papers indexed in the databases selected to the analysis.

Addresses

Authors

Collaboration

between countries

Collaboration

between institutions

Indicators  
of  
collaborati  
on

Collaborations between  
authors

### Paper Methodology Characterization

Various methodologies were employed to achieve all the aims put forth in this study. In the initial step, data was gathered from papers related to competency mapping that were indexed in the two databases Web of Science and Scopus. On December 4, 2021, this procedure was completed. The number of papers used in each database is shown in Figure 2.

After loading the dataset, a total of 2044 items dating back to 2001 was discovered. The database produced approximately 1649 documents from 1098 sources between the years 2001 and 2021 on the 4th of December 2021, after combining both Web of Science and Scopus using R programming. After integrating the database, 395 duplicate documents were deleted.

Duplication of records were checked in the downloaded data by filtering the database again in Biblioshiny. Abstract reports, book chapters, early access articles, proceedings papers, retracted publishing books, conference papers, conference reviews, editorials, letters, notes, reviews, and brief surveys were all omitted from the scorching process.

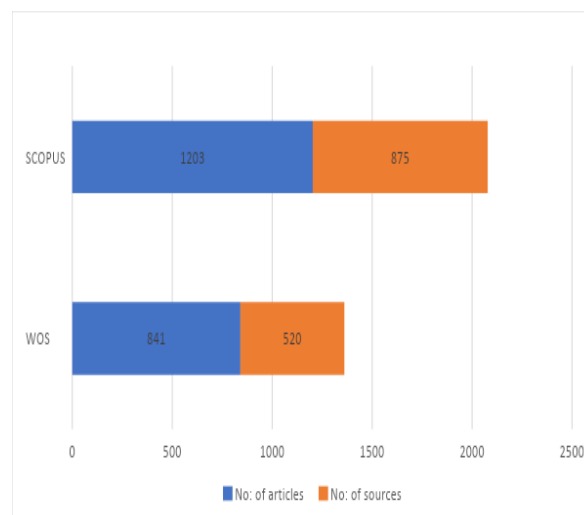


Figure 2 shows the number of papers in Web of Science and Scopus

As demonstrated in Figure 2, the Scopus database has a higher number of works on competency mapping than the Web of Science database. When comparing the Scopus and WoS databases, (Bartol et al., 2014) found that the Scopus database has a better coverage of journals.

The many documents that featured the expressions "competency" and "competency mapping" in their titles, summaries, or keywords were removed after the data collection was completed. By doing so, it was possible to avoid analyzing articles that did not represent the exact expressions of research. The duplicate papers were then detected. There were 1162 papers in the study's corpus. When the corpus of the research article was determined, the data was cleaned even more. This is significant since the data from the two databases frequently contains inaccuracies in author names, journal titles, and reference lists, making accurate mapping of scientific production to bibliographic sources difficult. Furthermore, the two databases' bibliographic

records differ in format, which had to be considered.

In two steps, the information acquired from the two databases was cleansed. In the first step of data treatment, the fields that identified the information provided by the databases were standardized. As a result, records received in Web of Science with the field document type "DT" were replaced with "M3," which Scopus uses to describe the identical data. In the second round of data treatment, information relating to journals, conferences, nations, institutions, and authors was manually standardized.

Duplication of records were checked in the downloaded data by filtering the database again in Biblioshiny. Abstract reports, book chapters, early access articles, proceedings papers, retracted publishing books, conference papers, conference reviews, editorials, letters, notes, reviews, and brief surveys were all omitted from the scorching process. The data records in this study were examined using Microsoft Excel, VOSviewer, R software, and Biblioshiny. Many researchers utilise VOSviewer ((Kawuki et al., 2020) ; (Martynov et al., 2020) ; (Merigó et al., 2018) (Xie et al., 2020) and Biblioshiny (Homolak et al., 2020) (Janik et al., 2020) as bibliometric analysis software.

Finally, the findings of the data analysis were interpreted. The publication trends on the issue of competency mapping were detected using this interpretation. This stage aided in the presentation of an overview of the scientific production of papers indexed in the two databases on competency mapping, hence assisting in the achievement of the paper's overall goal.

## Results and Discussion

### Production Indicators

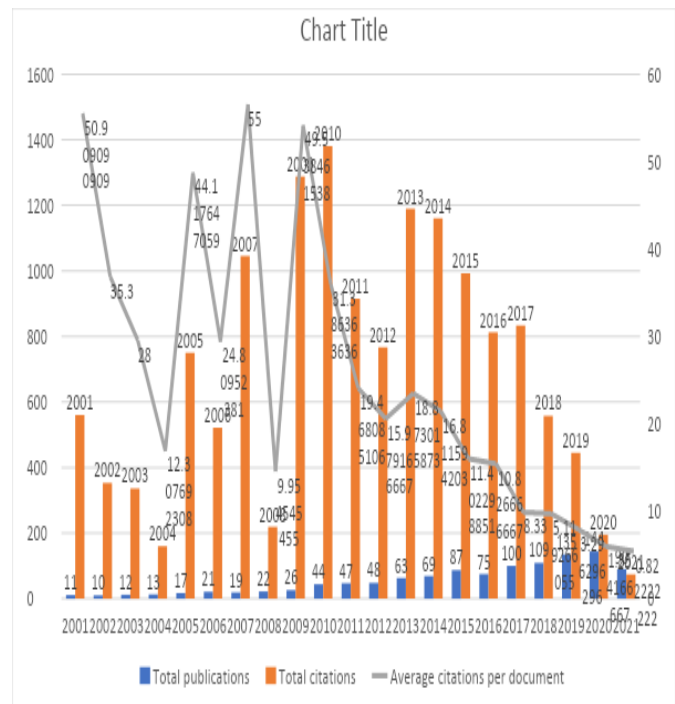


Figure 3 shows the total publications and citations of competency mapping

The first factor examined was document typology using files collected from the Web of Science and Scopus databases. As shown in Figure 3, the analysis showed that 70.4% from the 1649 records retrieved were analyzed from both the databases. From 2001 to 2021, a total of 1162 papers were extracted from 793 sources, with 3326 author keywords totaled. The first year that a document on competency was published was in 1956, when there was only one document on the subject.

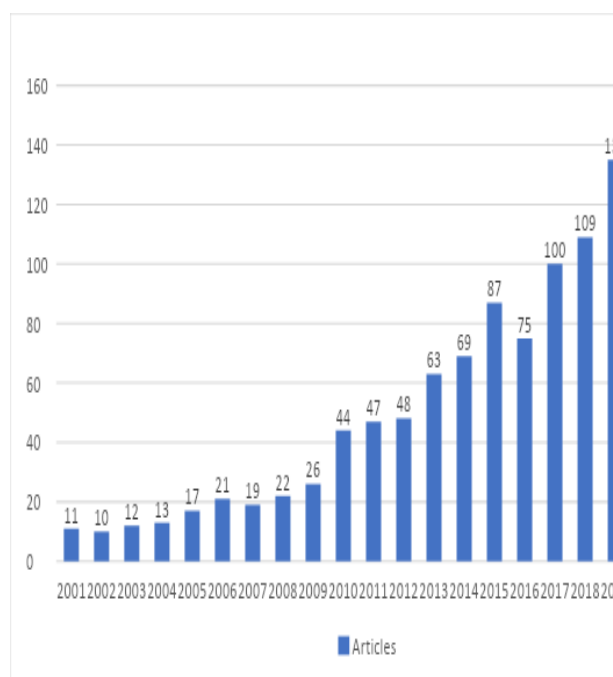


Figure 4 depicts the articles on competency mapping that have been published

As illustrated in Figure 4, since 2001, the number of publications has been steadily increasing. The number of research papers on competency mapping increased dramatically in 2010, with over 44 publications published in a single year. Over the last decade, the number of publications on competency mapping has steadily increased. The year 2020 saw the most publications on the topic of competency mapping, with 144 papers being published. From 2001 onwards, the graph indicates an increasing trend in the number of articles and total citations. The average number of years after publication is 6.77, and the average number of citations per document is 12.52, with an average of 1.304 citations each year. Majority of publications on competency mapping were published between the years of 2019 and 2020. Competencies have become a frequent issue in the literature to a large level since 2017.

Table 3 presents the publisher, analysis that was carried out of top journals that published the articles on competency mapping

SOURCES	T P	TC	CPP
ACADEMIC MEDICINE	18	351	19.50
MEDICAL TEACHER	17	581	34.18
BMC MEDICAL EDUCATION	16	90	5.63
AMERICAN JOURNAL OF PHARMACEUTICAL EDUCATION	14	90	6.43
NURSE EDUCATION TODAY	12	202	16.83
JOURNAL OF VETERINARY MEDICAL EDUCATION	10	29	2.90
PLOS ONE	10	42	4.20
INTERNATIONAL JOURNAL OF ENGINEERING EDUCATION	8	42	5.25
JOURNAL OF SURGICAL EDUCATION	8	49	6.13
FRONTIERS IN PUBLIC HEALTH	7	21	3.00
JOURNAL OF NURSING EDUCATION	7	46	6.57
MEDICAL EDUCATION	7	222	31.71
SUSTAINABILITY	7	18	2.57
IEEE ACCESS	6	22	3.67
TEACHING AND LEARNING IN MEDICINE	6	26	4.33

Table 3 shows the publisher, as well as an analysis of the top journals that published the papers based on the search query. The total publications (TP) of the journals on the list are ranked by the source. The Journal of Medical Teacher received more citations than the first-placed journal (Journal of Academic Medicine), despite having one fewer publication. The maximum number of citations per publication (CPP=34.18) is also higher than the total

number of publications (TP=17) in the Journal of Medical Teacher.

As demonstrated in Figure 5, the most productive countries in the competency mapping analysis took the authors' institutional address into account. The United States is the country that has published the most articles on the subject, with about 988. Canada comes in second with 219 research works, followed by the United Kingdom with 214 research works. Competency-related research has been undertaken in a total of 82 countries.

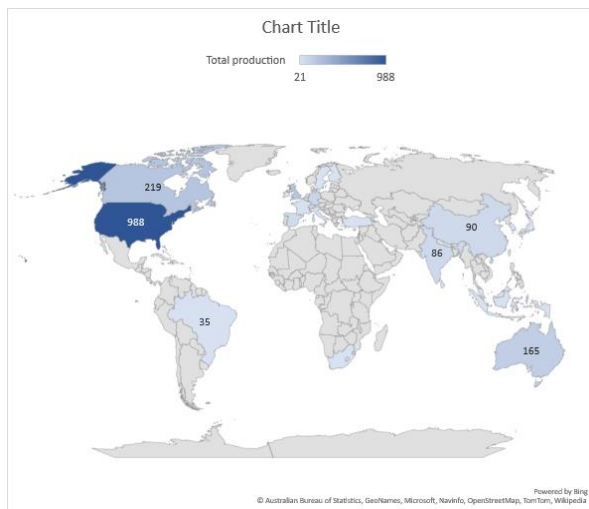


Figure 5 illustrates the most productive countries for competency mapping research topic.

Figure 6 shows the country wise data on competency mapping research. USA leads the research undertaken on competency mapping followed by Canada and UK. Australia, Germany, China, India, Spain, Netherlands, and Italy are other countries where the research on competency mapping has been undertaken.

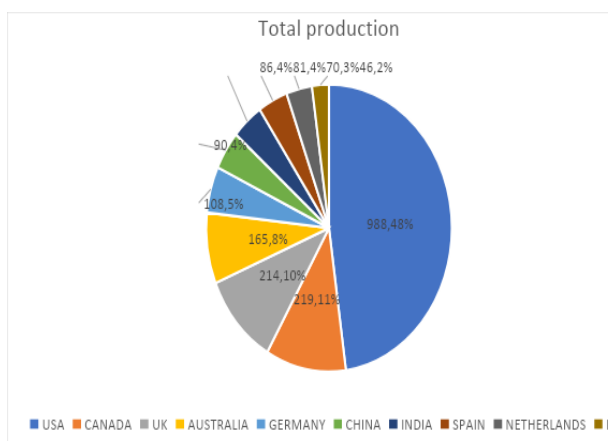


Figure 6 shows a country map based on the top countries with the most competency mapping publications.

According to the findings as stated in Table 4, there is no single university is leading the study in the area of competency mapping. Nonetheless, North America is the continent with the most institutions publishing about competence-based management, with seven of the nine most productive institutions based there. The results of the institution analysis connected with these papers are presented in Table 4.

AFFILIATIONS AND COUNTRIES	T P	T C	CITATIONS IMPACT
UNIVERSITY OF TORONTO, CANADA	37	403	10.89
UNIVERSITY OF ILLINOIS, USA	14	588	42.00
OHIO STATE UNIVERSITY, USA	12	213	17.75
UNIVERSITY OF N CAROLINA, USA	10	98	9.80
UNIVERSITY OF CINCINNATI, USA	9	146	16.22
UNIVERSITY OF MINNESOTA, USA	15	136	9.07
UNIVERSITY OF CALIFORNIA, USA	8	174	21.75
UNIVERSITY OF MICHIGAN, USA	20	149	7.45
UNIVERSITY OF QUEENSLAND, AUSTRALIA	21	174	8.29

Table 4 shows the results of the analysis of institutions associated with competency mapping research

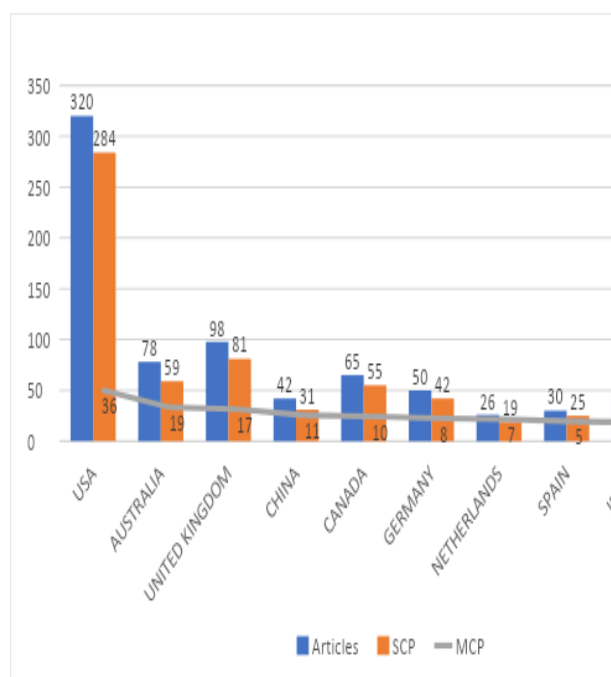


Figure 7 depicts the international publications.

Figure 7 shows that the United States has the most total publications, as well as the most intercountry publications, the highest ratio of inter-country collaboration (MCP) calculated on total publications, and the highest ratio of single country publication (SCP), followed by the United Kingdom and Australia. China has the largest number of publications, MCP ratio, and SCP ratio of any Asian country. And India comes in ninth place, with the most publications, MCP ratio, and SCP ratio.

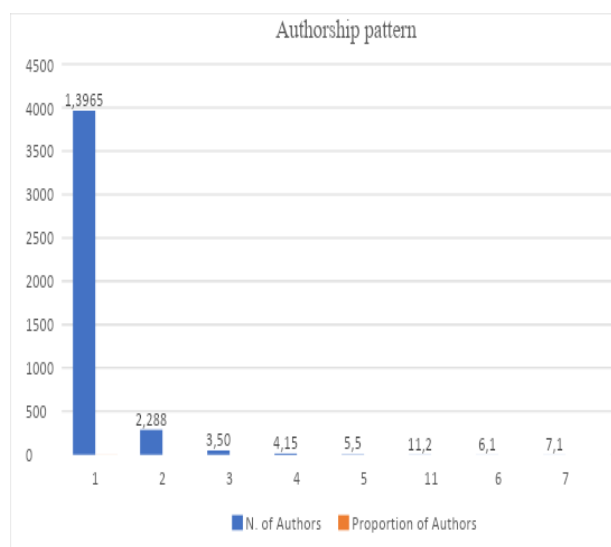


Figure 8 shows the authorship pattern

It was necessary to manually normalize the data to identify the most productive writers in

competency mapping because the information related to authorship was shown in various forms in the two databases. On Web of Science, for example, Marinita Schumacher is identified as "Schumacher M," yet on Scopus, the author is listed as "Schumacher, M." The graph above depicts the authorship pattern for the publications examined in the study. As illustrated in Figure 8, during this time, 3965 authors submitted a single piece, 288 individuals contributed to two articles, and 50 authors contributed to three papers. The subjects that are primarily addressed in the publications that make up this research corpus were identified using the keywords that the authors have assigned to the papers, as well as the keywords that the databases have assigned to the articles.

As shown in Figure 9, the keywords related to research in competency mapping include competency, curriculum, assessment, education, and competency-based education. Competency is the term in the diagram that has a stronger relationship with the other terms, and it, together with competencies and competency mapping, forms the basis of this research topic. Additionally, the connections that competency mapping makes with education, curriculum mapping, leadership, and competency-based education can be highlighted, as these connections highlight many situations in which this management strategy is used.



Figure 9 key words of competency mapping

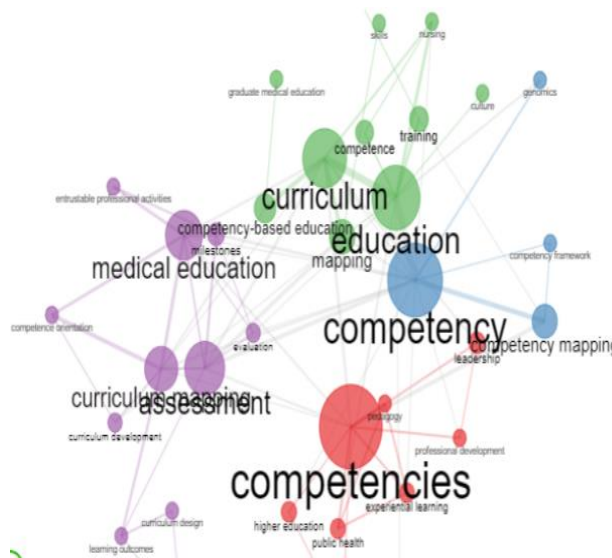


Figure 10 shows bibliometric mapping of keywords

Figure 10 shows two large clusters surround the nodes, and the size of the nodes represents the number of times the keywords appear in the publications, i.e., 'competencies', 'competency', 'education' 'curriculum' 'assessment,' and the former has a strong relationship with most of the keywords in the visualization map. The relationship on the 'curriculum,' which exists in the space between all these nodes, is shown by all these clusters being positioned at a distance from each other. The overall themes related with competency mapping literature are depicted in this visualization map. The most used term to characterize the papers is competencies. Based on the bibliometric mapping of keywords that appeared 20 times or more in the corpus, a network of 28 terms was formed. The intensity of the relationship between the words is represented by the thickness of the lines in this network. Figure 10 depicts the network that was developed.

Figure 11 shows the frequency of common keywords and their percentage of appearance in relation to the total number of papers. After 2006, the term "competency" was most frequently related with computer sciences and informational systems terms like ontology, semantic web, e-learning, and knowledge-based systems, as shown in Table 5. This strengthens the link that has been created between these academic areas and the technological

advancements that have permitted the use of these applications.

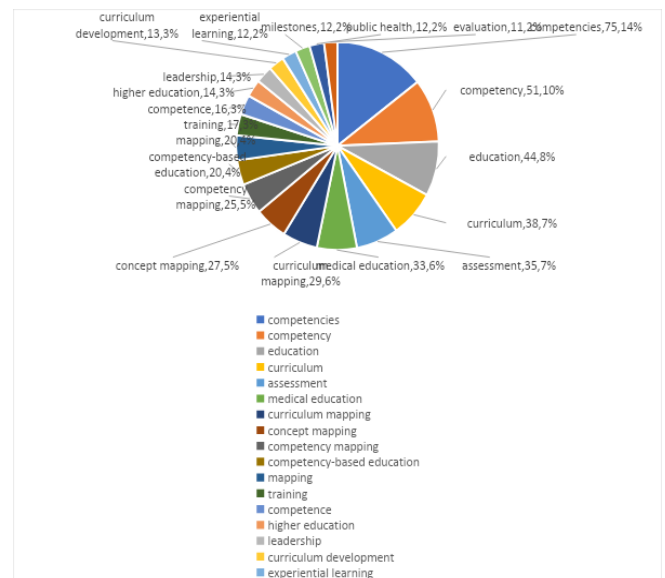
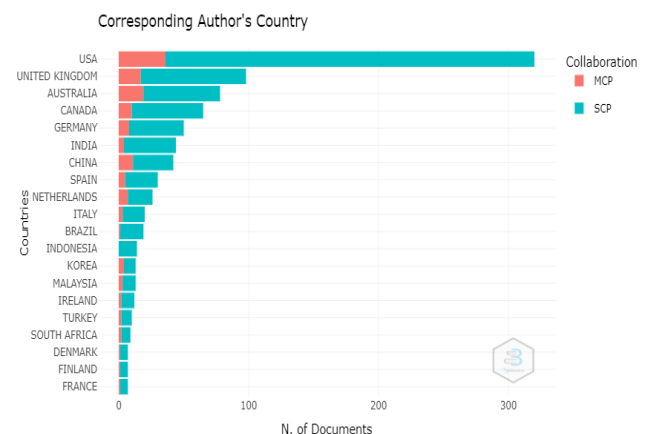


Figure 11 shows the occurrences of frequent keywords and the percentage of its presence in relation to the total amount of papers



Collaboration Indicators are depicted in Figure 12

To detect collaboration between countries, the professional addresses of the authors of each work under international co-authorship were employed. The main author of the publication is the corresponding author, who talks with the journal's publisher about submitting the article, responding to changes, and so on. Figure 12 shows the international collaboration of the related author, with single country publications (SCP) denoting intra-country collaboration and multiple country publications (MCP) denoting inter-country collaboration.

Figure 13 depicts the association between countries, authors, and keywords. Top authors

in the figure had a strong association with practically all author-keywords such as curriculum mapping, competency, and others, as well as a strong relationship with the top country, the United States of America.

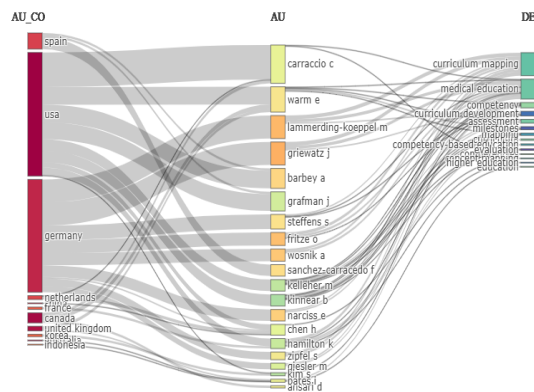


Figure 13 shows the factor analysis

### Limitations of the study

To begin with, the topic of competency mapping has not been substantially investigated by researchers. The data was explored from the core collection of the Web Of Science and Scopus databases, even though a specified time constraint was given to the analysis.

Other documents with research connected to the current issue, in addition to the Web of Science and Scopus databases, might be analyzed for extra data and information related to the current research. Bibliography, book reviews, software reviews, communications, and notes documents. Other databases, such as Google Scholar, might be used to go deeper into the research on this subject.

### Conclusion

The purpose of this study was to gain an overview of the research that has been done in the topic of competency mapping. Between 2001 and 2021, bibliometric analysis was done to analyze the study using two commonly used databases: Web Of Science and Scopus. Between 2001 and 2021, a total of 1162 papers were extracted from 793 sources, with a total of 3326 author's keywords recorded.

The number of research papers on competency mapping increased dramatically in 2010, with

over 44 publications published in a single year. Over the last decade, the number of publications on competency mapping has steadily increased. With over 988 papers, the United States was the country with the most research on competency mapping. It is followed by Canada, which has 219 research works, and the United Kingdom, which has 214 research works. There are a total of 82 nations where competency-related research has been conducted.

In this study, the terms competency mapping was searched on Web of Science, and 841 papers from 520 sources were analyzed. Similarly, Scopus was used to search for the keyword competency mapping, and over 1203 documents from 875 sources were analyzed from 2001 to 2021. After filtering, bibliometric analysis was used to analyze 1162 papers published in Scopus and Web of Science between 2001 and 2021.

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