







Total Quality Management in Higher Education: A Bibliometric Overview

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Abstract. This study aims to contribute to the growth of knowledge and the dissemination of research in the field of Total Quality Management (TQM) in Higher Education. To achieve this goal, the researchers conducted a bibliometric analysis, which involved examining trends, identifying major contributors, determining the most-published journals, and assessing the impact of research in this area. To conduct their analysis, the researchers used Biblioshiny and VOSviewer, two tools commonly employed for bibliometric research. They collected data from the Scopus database, focusing on articles related to TQM in higher education. To refine their search and exclude irrelevant information, they used the keywords "Total Quality Management OR TQM AND University". The data analyzed in this study spanned a period of 24 years, from 1989 to May 2023. A total of 692 articles were included in the bibliometric analysis, which was carried out meticulously using the selected tools. The researchers performed a comprehensive assessment of these articles, including performance evaluation. They utilized science mapping techniques to create network maps for keyword co-occurrence analysis, thematic evolution, and reference citation. The results of this analysis reveal several key findings. First, research on TQM in higher education is on the rise, with a growing number of publications each year. However, there is a notable emphasis on the medical profession within this field, as evidenced by the quantity of TQM-related articles published in medical, surgical education, and healthcare journals. Furthermore, the most prominent keywords identified in the analysis are quite general and focused on education. This suggests that the current research in TQM in higher education primarily revolves around general education-related themes. In conclusion, this study provides valuable insights into the state of research in TQM in higher education, highlighting trends, key contributors, and areas of focus.

Keywords: Bibliometric, Quality Management, Higher Education.

1 INTRODUCTION

Higher education quality and its assurance have garnered significant attention, not only from academia but also from the business community and accreditation bodies [1]. Quality assurance agencies play a pivotal role in promoting quality within higher

education institutions. Their effectiveness is closely associated with improvements in the quality of higher education. Conversely, when quality assurance is perceived as an administrative burden, it may hinder efforts to enhance higher education quality [2]. In the 21st century, the concept of quality in higher education has evolved beyond mere compliance to encompass research and development [1]. From the perspective of higher education, quality now entails a concerted effort by organizational management to align various components, including departments, divisions, faculties, chairs, university and faculty administration, and teaching staff. This alignment is aimed at achieving the organizational missions and goals within the framework of quality assurance in an environment characterized by harmony and a conducive working atmosphere [3]. It is essential to recognize that quality improvement cannot be realized without a robust assurance mechanism [4]. Furthermore, the support of management in higher education institutions and collaboration with other educational entities are prerequisites for enhancing the quality of higher education.

One managerial approach geared towards enhancing and sustaining quality within the education sector is the implementation of Total Quality Management (TQM). TQM is a comprehensive management philosophy equipped with tools that enable institutions to pursue a well-defined concept of quality and the means to achieve it. Quality, in this context, represents an ongoing improvement process driven by ensuring customer satisfaction with the services provided [5]. TQM serves as a vehicle for achieving excellence in institutional reputation, signifying sustainable development within the education system [6]. TQM's fundamental premise is the integration of all organizational functions and processes to continually enhance the quality of products and services [7]. In this framework, educational products are perceived as service industries, particularly in the context of student support services adhering to specific quality standards. Factors such as globalization, advanced high-tech industries, and fluctuating labor markets have heightened the competitive landscape for higher education institutions, necessitating a commitment from stakeholders to enhance the knowledge, skills, competencies, and employability of graduates [8]. This is vital due to the significant role tertiary institutions play in developing human resources for sustainable development. Achieving strategic quality in higher education requires a synergistic relationship between faculty and students, industry and faculty, as well as students and industry across various combinations [9].

Assessing the quality of education is a complex undertaking, particularly within the field of higher education [10]. Higher education possesses unique characteristics and an organizational model distinct from the business world, making it challenging to apply traditional quality service frameworks [11]. The implementation of TQM in tertiary institutions has not been universally adopted, and skepticism exists regarding its effectiveness in the realm of education. Some observers question the feasibility and suitability of applying the TQM concept to the distinct characteristics of higher education institutions [12]. While TQM may find suitability in supporting functions, its applicability to teaching and learning functions, which constitute the core of a university, remains a subject of debate [13].

However, an alternate viewpoint posits that TQM should be applied across four main domains in higher education: 1) enhancing administrative and operational functions;

2) integrating TQM principles into the curriculum; 3) utilizing TQM in classroom teaching; and 4) employing TQM to manage university research activities [14]. The implementation of TQM within educational institutions has yielded mixed results [15].

In light of this context, this study endeavors to shed light on the proliferation of knowledge and the dissemination of research within the expansive domain of Total Quality Management (TQM) in Higher Education. The use of bibliometric analysis enables the examination of trends, principal contributors, frequently published journals, and the overall impact of research pertaining to TQM in higher education.

2 METHOD

The analysis of Scopus database data and related research information was conducted using two prominent tools: Biblioshiny and VOSviewer. Scopus, known for its comprehensive coverage and extensive range of journals, stands as one of the world's most exhaustive abstract and citation databases [16]. The keywords "Total Quality Management" OR "TQM" AND "University" were employed to extract pertinent data from the vast realm of TQM research. The data selected for analysis spans a period of 24 years, commencing from 1989 and extending through May 2023. This timeframe aligns with the onset of empirical research that employed the specified keywords. The scope of articles included in this analysis is limited to four primary categories: 1) Social Science, 2) Business, Management, and Accounting, 3) Multidisciplinary, and 4) Economics, Econometrics, and Finance. In total, the analysis encompasses 692 English-language articles.

Regarding this, biblioshiny is a web-based application that provides an accessible interface for Bibliometrix, an open-source R utility renowned for its capabilities in conducting advanced bibliometric analyses [17]. On the other hand, VOSviewer is an application that facilitates the visualization of network maps, rendering extensive bibliometric data in a user-friendly and easily interpretable graphical format [18]. Through the examination of metrics such as publication count, citations, author collaborations, the most frequently cited journals, and research trends, bibliometric analysis serves as a valuable tool for comprehensively assessing scientific publications within a specific field.

3 RESULT AND DISCUSSION

Quality management serves as a means to mitigate and pinpoint organizational risks, making it an increasingly vital component in fulfilling stakeholder expectations. This research delves into the expansion of knowledge and research within the domain of Total Quality Management (TQM) in higher education. Spanning a duration of 34 years, from 1989 to 2023, this study employs Bibliometric analysis. This methodology involves the examination of scientific papers using a predefined set of keywords, ultimately offering a qualitative synthesis of literature pertaining to the adoption of TQM practices in higher education. Figure 1 visually represents the growing interest

in this subject matter, with an evident surge in attention to authors specializing in this field, particularly in recent years.

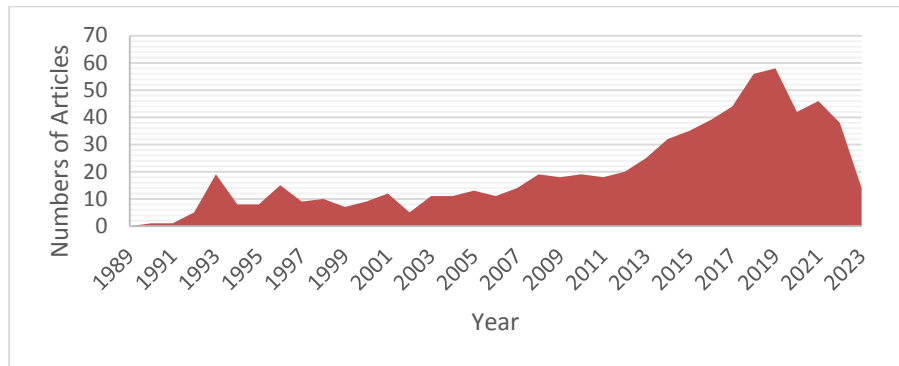


Fig. 1. Annual Scientific Production

The figure presented above illustrates a notable trend in the annual scientific production analysis of the 692 documents utilized in this study. Prior to the year 2012, the number of published articles was relatively low, with an annual average of fewer than 20 articles. However, a significant upswing in publications is observed in 2014, with an average of approximately 30 articles per year. The peak in the number of papers published occurred in 2018, with a total of 59 articles, indicating a substantial increase in research output during that year. The list of publications which have the highest number of citations is presented in the Table 1 below:

Table 1. Documents Having Maximum Citations

Document	Year	Local Citations	Global Citations
Coate E, 1993, High Educ	1993	5	26
Butler Jm, 2017, Acad Med	2017	4	48
Goldman J, 2020, Acad Med	2020	2	12
Faherty Lj, 2016, Acad Med	2016	2	13
Ali F, 2016, Qual Assur Educ	2016	2	171
Pronovost Pj, 2015, Acad Med	2015	2	27
Hall Barber K, 2015, Acad Med	2015	2	32
Zafar Ma, 2014, Acad Med	2014	2	21
Vidyarthi Ar, 2014, Acad Med	2014	2	27
Asif M, 2013, Qual Quant	2013	2	59

The article authored by [19] titled "The Introduction of Total Quality Management at Oregon State University" has garnered the highest number of citations both locally and internationally. In this scholarly work, the authors meticulously elucidate the intricacies of Oregon State University's adoption of Total Quality Management (TQM), expounding upon the comprehensive implementation strategy employed. Furthermore, the article offers insightful accounts of the outcomes realized through this endeavor, with a pronounced emphasis on the multifaceted challenges and impediments encountered within the unique milieu of a university setting. A thorough ex-

amination of the prevailing themes within the globally cited articles, as delineated in Table 3, underscores a predominant focus on the assimilation of TQM principles into the administrative framework of Oregon State University. Additionally, these seminal works delve into the intricacies of evaluating and quantifying the quality of the university's managerial practices. Table 2 provides a comprehensive listing of the top 10 most prolific authors within the domain of TQM in higher education. It furnishes pertinent details encompassing their local citation counts and underscores their scholarly impact, as delineated by the H-index. Table 2 shows top 10 author production, author impact by h index, and the number of citations.

Table 2. Top 10 Author Production, Author Impact by H Index, and the Number of Citations.

Author	h_index	Author	Local Citations
Demski R	4	Johansen Tt	5
Thor J	4	Kousholt Bs	5
Brommels M	3	Præstegaard Kf	5
François P	3	Ritskes-Hoitinga M	5
Kim Ym	3	Stone Jc	5
Pronovost Pj	3	Thomsen Af	5
Antony J	2	Wegener G	5
Armstrong Cm	2	Haraldsen G	4
Austin Jm	2	Jones J	4
Baron Rb	2	Snijkers G	4

Table 2 provides an illuminating glimpse into the h-indexes of authors specializing in Total Quality Management (TQM). It is noteworthy that even among the top 10 authors in the field of TQM, the h-indexes are predominantly at or below the modest threshold of 4. This observation alludes to the fact that research in the domain of TQM has yet to captivate the sustained interest of scholars with more elevated h-index scores, signifying that it may not have garnered widespread attention within the academic community. Moreover, the category of "local citations" pertains to citations originating from sources within a specific geographic region or locality. In the realm of bibliometrics or citation analysis, local citations are indicative of references made by researchers or authors hailing from the same geographical area or institution. It is discernible that several studies within this context have been utilized as references, underscoring their significance in the local research landscape.

The country collaboration world map is shown in Figure 2 and Figure 3:



Figure 2. Countries Collaboration



Figure 3. Keyword Co-occurrence

World Map

A network illustrating collaborations between countries provides valuable insights into the distribution of research within a specific field, helping determine whether the research focus is concentrated in certain nations or more widely distributed across the globe [21]. In the analysis grid, the United States emerges as the dominant contributor, displaying the highest link strength, with more than three substantial and prominent links.

Network of Author's Keywords

In addition to Total Quality Management (TQM), a review of the most frequently appearing keywords reveals a strong emphasis on terms such as "human," "education," "humans," "female," "male," "curriculum," "article," "adult," and "medical." Thematic evolution has been elucidated through thematic maps, with the keyword co-occurrence network generated using VOS Viewer and thematic development depicted through Biblioshiny [22]. The study has leveraged the keywords extracted from 692 publications, yielding a total of 2498 keywords. These differ from author keywords, as they are derived from the titles of referenced works mentioned by authors [23].

The keyword co-occurrence network of author keywords, as depicted in Figure 3, unveils the formation of 11 distinct clusters. This form of bibliometric analysis focuses on exploring the patterns of co-occurrence among keywords within the corpus of scholarly publications. Within this network, nodes represent individual keywords, with node size indicating the frequency of occurrence. Connecting lines between nodes denote co-occurrence relationships among keywords. The thickness of these lines signifies the frequency of co-occurrence. Furthermore, each cluster is distinguished by a specific color, signifying thematic groupings and the relationships that define them.

4 CONCLUSION

The adoption of Total Quality Management (TQM) in universities has garnered increased attention from researchers, particularly in recent years. Despite a significant number of studies conducted, the focus of these publications has shifted away from the United States to other countries. This comprehensive bibliometric analysis draws from a dataset of 692 articles and employs Biblioshiny and VOSviewer for analysis. It encompasses science mapping techniques, including network maps for keyword co-occurrence analysis, thematic evolution, and reference co-citation, to provide insights into research performance. While decades of research have delved into TQM implementation in universities, the upward trajectory of publications suggests that this topic remains a subject of interest among researchers. A notable observation is that the majority of TQM-related articles are published in medical, surgical education, and healthcare journals. Among these journals, "Academic Medicine" stands out as the most influential, as indicated by its H index and total number of publications. Furthermore, the highest number of citations is attributed to review articles and seminal research papers focused on TQM implementation in universities.

The United States emerges as the most prolific country in terms of publication output, with twice as many articles as the second-ranked country, Canada. The University of

California in the USA boasts the highest number of affiliations. International collaboration is also evident, with the United States displaying strong ties to other nations. Keyword co-occurrence analysis reveals that, in addition to the primary search terms, research within the domain of TQM in universities has encompassed themes such as "human" and "teaching." Notable keywords include "total quality management," "standard," "female," and "societies and institutions." A thematic evolution analysis, organized into five time slices, demonstrates the development of key themes over time, including "Education," "Quality Assurance," "Quality Control," and "Organization and Management." Reference co-citation analysis uncovers three broad clusters related to "total quality management," "human," "female," and "standard," providing insights into the intellectual landscape of the field.

In conclusion, research on TQM in higher education exhibits growth in terms of annual publications, with a notable focus on the medical field. This concentration is reflected in the prevalence of TQM-related articles in medical, surgical education, and healthcare journals. Additionally, the prominence of broad keywords highlights a need for more specialized classifications related to TQM implementation in higher education. Thematic evolution underscores the pursuit of quality improvement and cross-sectional studies, driving higher education institutions to reevaluate their policies and implement effective quality management practices. The extensive literature review underscores the limited exploration of the TQM approach from an institutionalist perspective in the context of educational quality management. The findings prompt the formulation of new theoretical and empirical research questions, as the available literature demonstrates a significant presence across all Scopus database categories, but only a fraction of TQM studies specifically address higher education. In conclusion, this research paper equips researchers, academics, and PhD candidates with valuable insights for assessing the utilization of the TQM concept in higher education through an analysis of the existing literature.

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