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Integration Management: A Bibliometric Study of Research Trends

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Abstract: Integration management has always been a topic of interest for researchers. It plays a significant role in the success of the projects. Integration management effectively incorporates all the aspects of projects and provides a roadmap towards their success. Based on the significance of the term, this paper assesses the research output of integration management since 1970 in different fields of the application using the Scopus database. The data was collected and analyzed through Microsoft Excel to analyze the research publications trend line, publication types and their access to the audience, organizations and countries involved, languages of publications, authors participating, and their respective field of research in relation to integration management. This paper will assist the researcher of this area to observe the research trends on the integration management topic as per the Scopus database until 2021.

Keyword: Integration Management, Research Trends, Research Output, Bibliometric Assessment

1. Introduction

The construction industry positively impacts the human quality of life by undertaking projects to construct buildings and infrastructure, constituting the built environment that meets the socio-economic needs of individuals, society and nations [1]. It is also one of the most accident-prone industries, accounting for almost half of all occupational accidents globally [2]. Construction projects usually undergo various complex problems, including conflicts amongst the players of the project team, including consultants, clients and contractors [3] and the objections from external parties [4][5]. Integration management with a framework in organizations and projects has been established to decline impartial legal conflicts, accomplish more and well-organized resource allocation, grow mutual management effectiveness, and develop new standpoints for managerial

practices, sustainable developments, regulated health and safety, etc. [6][7]. The project management body of knowledge contains ten core knowledge categories. Project integration management has been listed as one of the categories of knowledge that comprises amalgamation, coordination, and unification of procedures for managing a project [8].

Project Integration Management is an extensively used knowledge area for project managers. It is well known that project managers are the integrators. The incorporation of projects includes tasks that are ideal to define, understand, merge, unite, and synchronize the various processes, activities and technologies of project management. This includes convergence, merging, declaration of characteristics, and incorporation of behaviors, all of which are vital to successfully completing the projects [9][10]. The term "integration" refers to the proper coordination between project's various processes. One of the important fundamentals of project management is integration management, which incorporates all project aspects. Project integration management ensures effective collaboration among the project stakeholders. Integration is a deliberate process of creating a dominance mechanism that ensures more comprehensive control of participants' primary needs [11]. An understanding known as integration engineering was developed, in which requirements, boundaries, interoperability, factors, testing, program validation and rationale, and significant elements such as architecture are developed [12].

The influence of integration management on construction project management performance has been a source of concern. In which integration management and its success on building projects are addressed in depth. It is observed that financial factors have a significant impact on project performance. It is claimed that better project performance is contingent on good risk management [13]. Integration of information and procedures is also said to improve project and organizational performance [14]-[16]. Project integration management ensures that multiple project activities work together effectively. A major fragment in the present studies has beforehand proved the important role of efficient integration in managing projects. It was evident that planning and knowledge integration in construction projects can positively influence on project's success [17]. Also the integration of modern tools and technologies into the processes aids in the successful project outcomes [10][18][19]. Therefore, this paper analysis the research output on this important topic for project management professionals.

2. Research Method, Data Collection & Analysis

In the first phase of this research, the complete database available on Scopus from 1980 till 2021 was collected in .exe format. In the later phase, all the data was analyzed using Microsoft Excel for trend assessment of various features targeted in this research. Following publication, access types were considered in this research for analysis purposes.

- a. **Open Access:** Offered to all with no restriction.
- b. **Gold Open:** Documents that are in journals that only publish open access.

- c. **Hybrid Gold:** Documents that are in journals that provide authors with the choice of publishing open access.
- d. **Bronze:** Published version of record or manuscript accepted for publication. The publisher has chosen to provide temporary or permanent free access.
- e. **Green:** Published version of a manuscript accepted for publication, available at the repository.
- f. **Closed Access:** Restricted article which needs permission or nominal fees to access the full version of the article.

3. Results & Discussion

The following section shows the complete results of this research which comprises the number of publications on integration management and the statistics of frequent researchers of this area, publishers, publications categories, publications access types, publication status, countries publishing the most on integration management and others. Figure 1 shows the total number of open access publications and others.

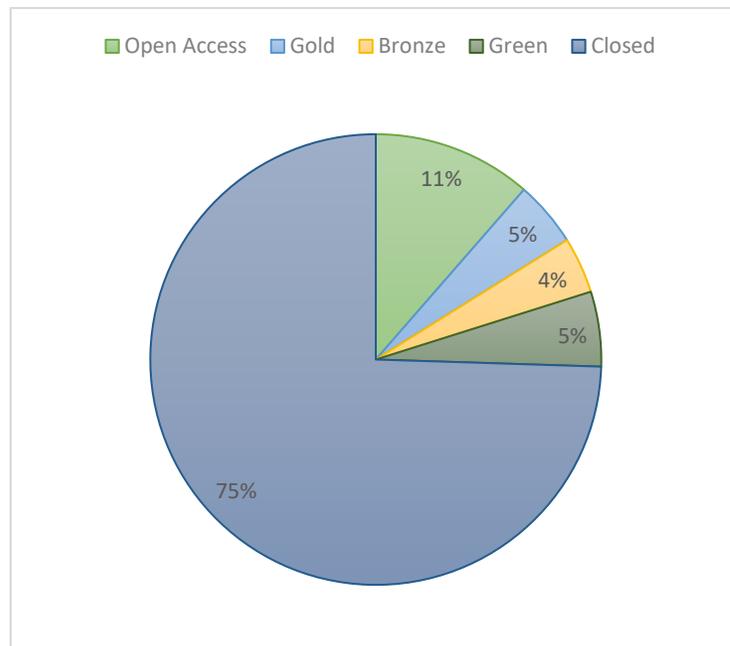


Figure 1: Publications Access Type

Figure 1 inspects the publications' access to the audience and represents five types of publication accesses: open, gold, bronze, green, and closed. 75% of the publications are open access followed by closed access type with 11% making its availability at the repository. Publications of gold and green accesses are very limited in number, i.e., 5% each. Papers in bronze access are in limited quantity, with only 4% publications. Thus, the concerned audience would have access to approach,

read and review the relevant publications. Figure 2 shows the publication research trends since 1980.

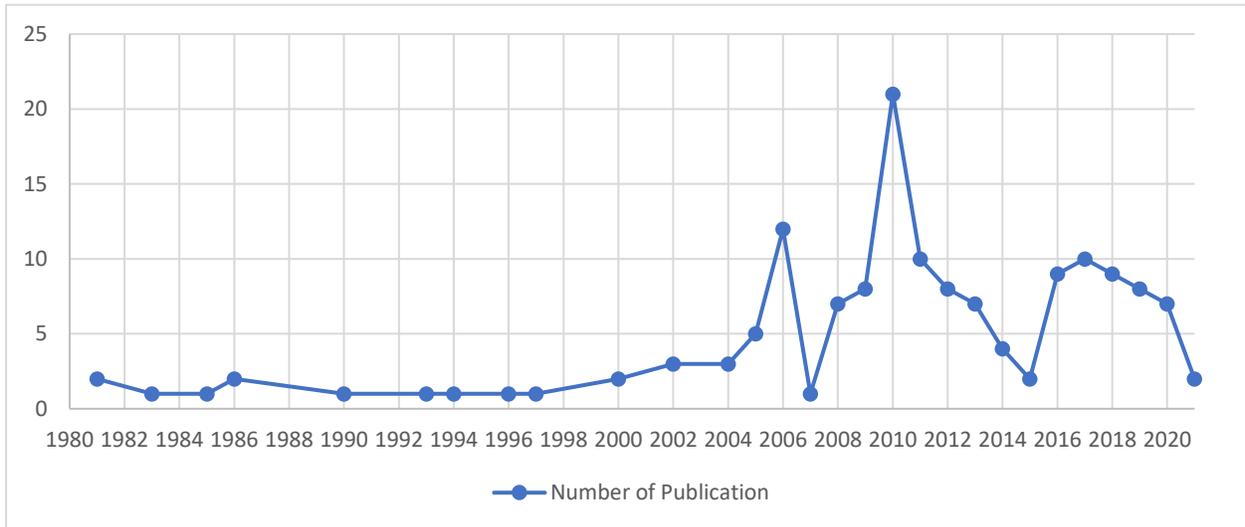


Figure 2: Integration Management Publication Trend for Last 50 Years

Figure 2 shows the research publications trend line on integration management since 1980. The flow of publications has steadily increased over time. It is observed that this topic is catching attention and popularity over time. But the year 2007 marked a certain demise. After 2007 the number of publications is increased slowly and gradually. The year 2010 reported the highest number of publications in the database which is around 22 publications. The trend then foresees a fall in publications, and it continued till 2015. After 2015, the publication rate again observed an increase. The research trend on integration management is gradually growing in current years. It is still one of the prevalent topics of research for scholars and researchers. David Biggins [20] made an attempt to research trends and to shift emphases in project management. Figure 3 highlights the different study areas in which the authors are researching regarding integration management.

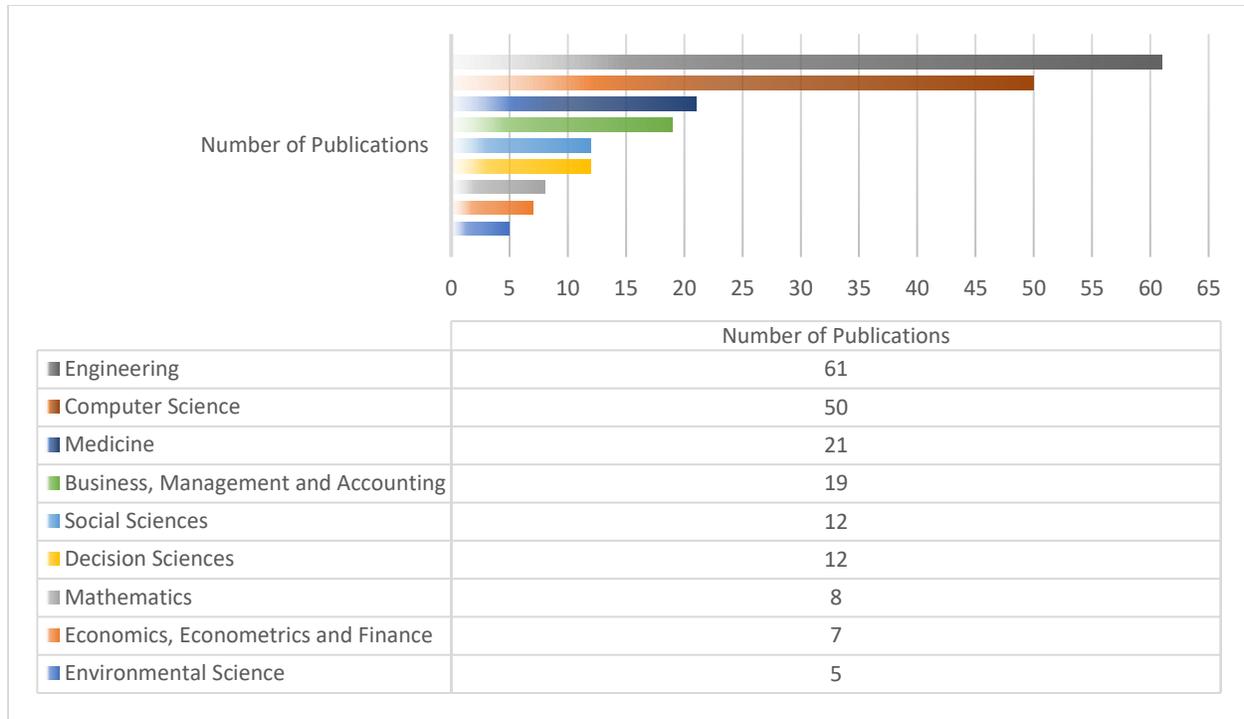


Figure 3: Integration Management Research in Different Fields

It is analyzed that the topic of integration management is interrelated to too many fields. Most publications (61) are made in the engineering field as it is a fundamental topic in construction management in civil engineering. After that, next most publications (50) are in the field of computer science which is also a branch of engineering science. The third in the list is the field of medicine (21), followed by business, management, and accounting (19). The social sciences and decision sciences share an equal number of publications (12). It is observed that limited work on integration management has been carried out in the fields of mathematics, economics, econometrics and finance and environmental science with (8) (7) and (5) number publications, respectively. Figure 4 shows the top authors frequently researching the topic of integration management.

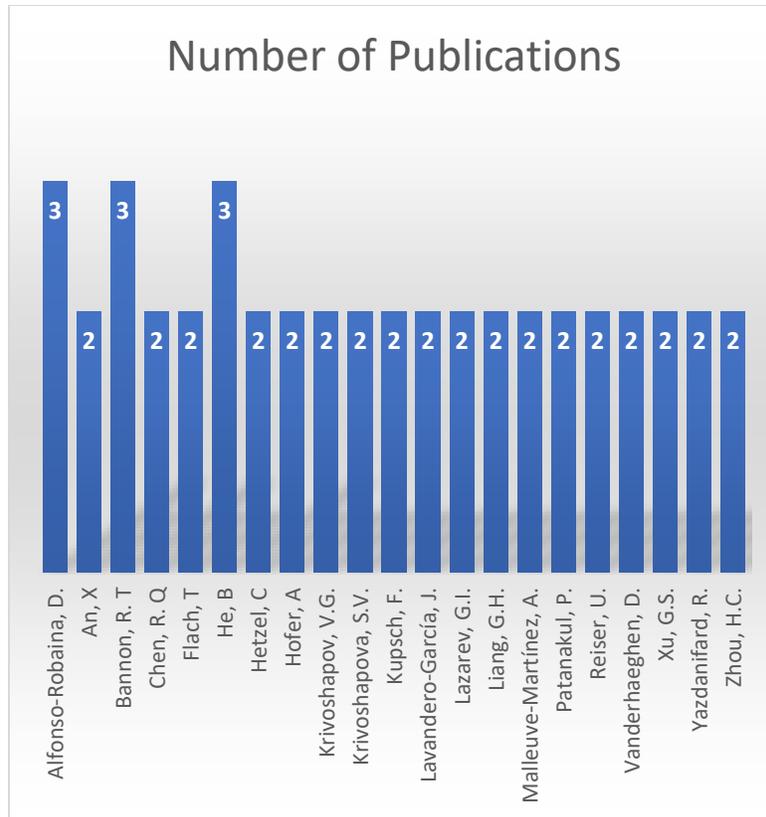


Figure 4: Authors frequently publishing articles on Integration Management

The term "integration," which comes from the Latin word "integer" is used in a range of domains, including business, mathematics, electronics, programming, process design, psychology, and evolution theory. These topics can be used as a baseline for further discussion of integration since they demonstrate the concept's breadth [21]. Figure 4 represents the names of the authors who have published the maximum number of research papers on integration management. The Alfonso-Robaina D, Bannon R.T and He, B are the top authors among all with (3) publications for each. The remaining authors in the graph share an equal number of publications (2) for each field integration management. Figure 5 shows the article types published on integration management since 1980.



Figure 5: Publication types of Integration Management

It is observed that majority (74 in number) of work done on integration management consists of type ‘article’ followed by conference papers (56) and book chapters (9). The ratio of work in report, book chapter, note and review are very limited in number. There should have more work done in the form of book chapters, reports, and reviews so that a better understanding of integration management can be developed. Figure 6 shows the status of the publication.

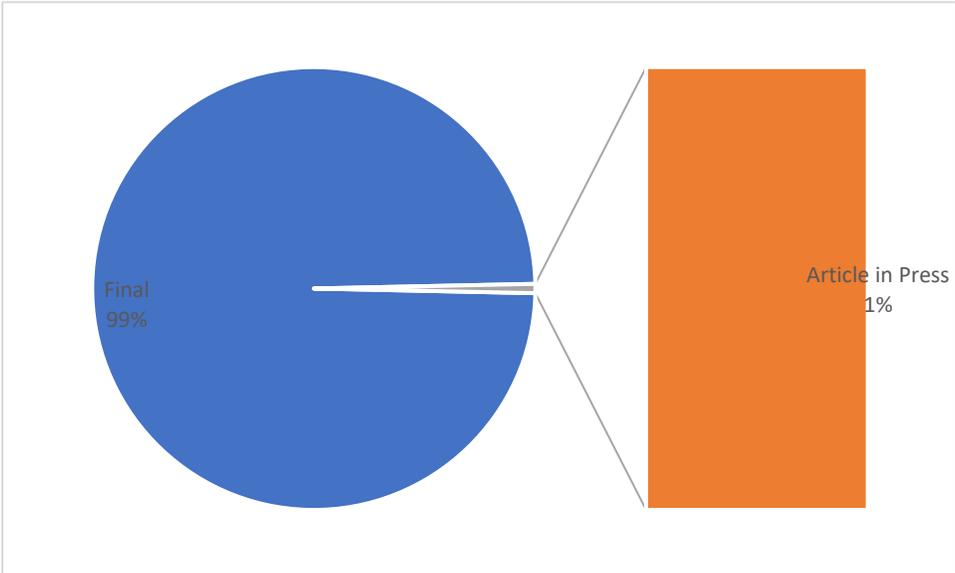


Figure 6: Publication Status

Figure 6 indicates the status of publications, showing that only 1% of papers are in the press for publication, while 99% are already published and online. This enlightens the fact that researchers can easily and deeply examine this subject due to vast majority of published articles and diagnose the gap for future research. Figure 7 presents the institutes publishing the research on integration management.

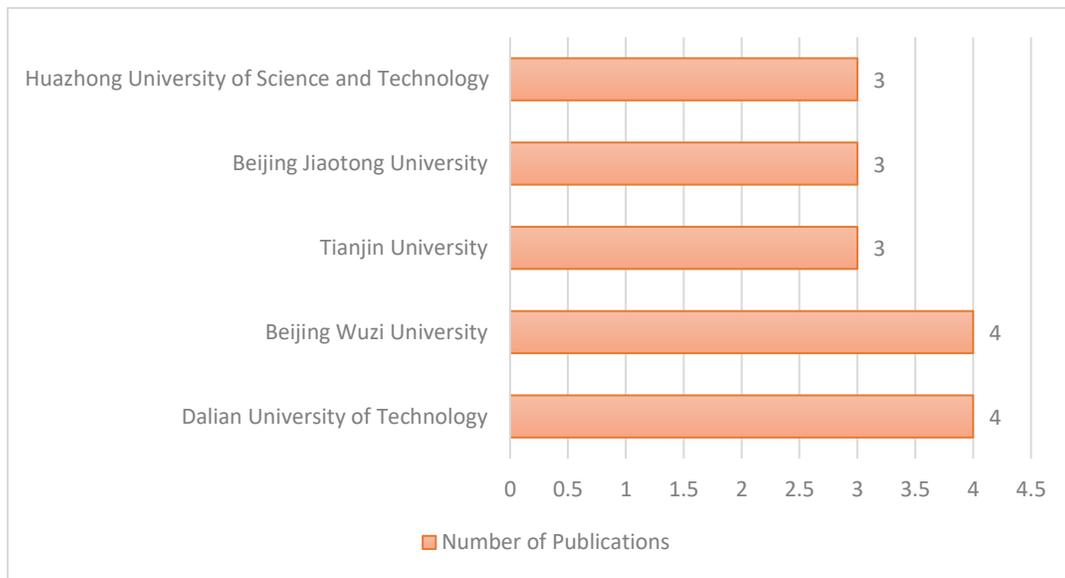


Figure 7: International institutes publishing research on trends of Integration Management

It has been observed that the Beijing Wuzi University and Dalian University of Technology have published (4) number of publications each and remain in the top position for publishing articles on integration management. The Huazhong University of Science and Technology, Beijing Jiaotong University and Tianjin University are at the second rank with (3) numbers of publications each. It is observed that Chinese universities are taking the lead in published research on integration management. Figure 8 shows the country-wise status for article publications on integration management.

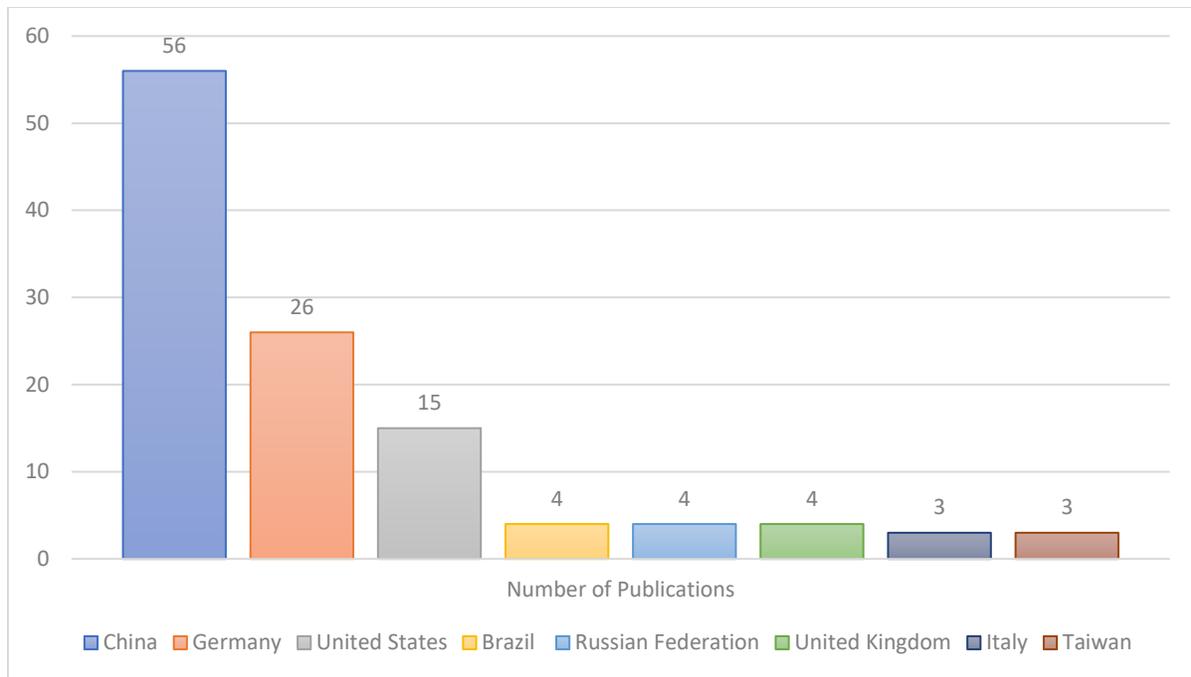


Figure 8: Top countries publishing on Integration Management

It can be realized from the figure that China plays an important role among all other countries in the publication on integration management research with the highest number of publications which is (56). The other countries which are supporting and researching integration management are Germany with (26) and the United States with (15) number of publications. Brazil, Russia, and United Kingdom share an equal number (4) of published research on integration management. Italy and Taiwan are at the end of the list with only (3) publications. Figure 9 shows the status of different languages in which the articles were originally published.

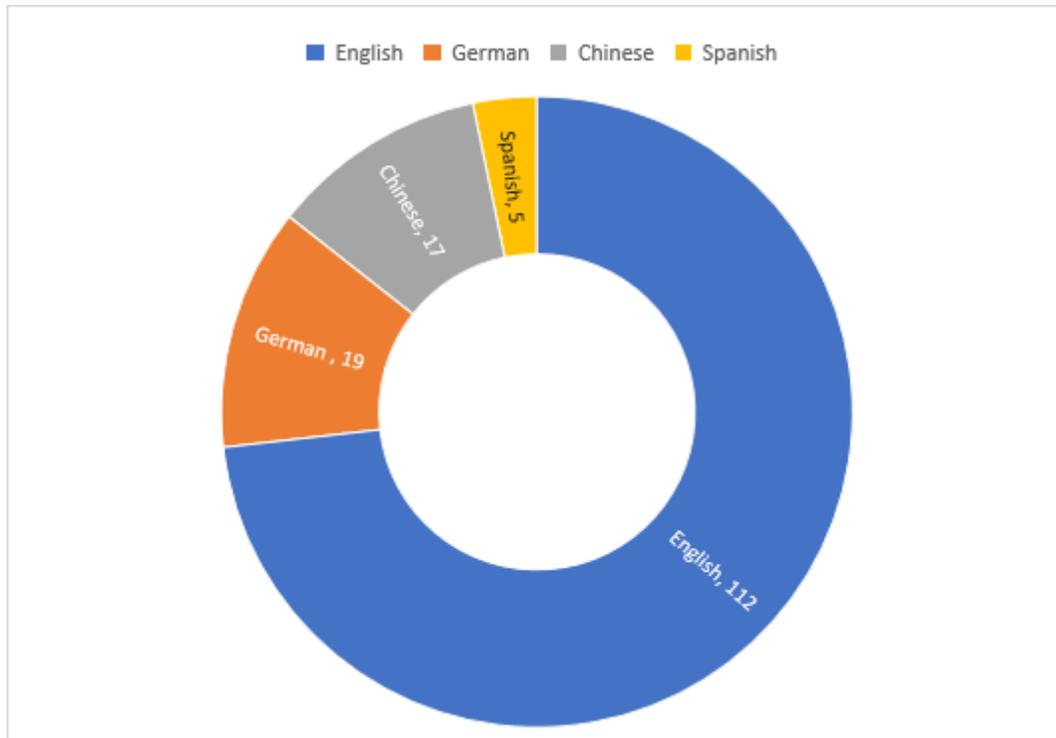


Figure 9: Most frequent language of publications on Integration Management

It is identified from the data that many papers (112) are written in the English language as it is a global language that is widely utilized all over the world. English language articles are easily read and understood by several national and international readers. Besides, the researchers have also published research work on integration management in German and Chinese languages with (19) and (17) number of publications, respectively. A minimal number of publications (5) in the Spanish language were also identified from the records.

4. Conclusion

Construction management's core emphasizes the effective management of construction projects' quality, cost, time, and overall performance. Various elements of project management determine the success of the projects. Among those, integration management is one fundamental and the most critical dimension. Integration reflects how well different project processes converse and smoothly blend-in with one another. It ensures that different project events and stakeholders work together effectively. This study is focused on assessing the research trends on integration management. The aim is to track integration management research trends from 1980 to 2021. It is observed that the research trend on integration management is increasing slowly and gradually and it recorded a peak in 2010 with a maximum number of publications. Most articles (75% of published) are open-access and in the field of engineering, followed by computer science. Many of these i.e., 99% are already published online and only 1% are in press. It is also realized that 74 publications are of type 'article,' i.e., journal paper. Geographically, it is analyzed that most of the published work is

carried out in China followed by Germany and Brazil. Chinese universities, including Beijing Wuzi University and the Dalian University of Technology are taking the lead over others on research in integration management. It is also worth noting that most publications are written in the English language. Alfonso-Robaina D, Bannon R.T and He, B are the top authors who are regularly publishing on integration management.

Conflict of Interest

The authors report no conflict of interest.

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