

Communication Research Trends in Virtual Project Team: Bibliometric Analysis

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Abstract

The research on communication within the virtual project team has been conducted, and it is essential to identify which parts of the study have been explored and need more attention. It is necessary to analyze which countries and authors contributed the most and the types of publications used the most on communication in virtual project teams. Although there are many reviews of the literature on project communication issues and the different aspects of virtual teams, none of them are specifically dedicated to the topic of communication in virtual project teams. This article aims to identify scientific outputs in communication in virtual project teams from 2001 to 2020 and analyze their volume and geographic distribution. A bibliometric analysis approach was applied to this study to answer research questions regarding the number of publications in the research period, the most contributing countries and the most prolific authors, the types of publications applied, and the research topics discussed in the literature studied. Three search engine databases, Scopus, Web of Science, and Google Scholar, are used to find the publications of communication in the virtual project team and answer research questions. The results of the bibliometric analysis explain that the most frequently discussed topics concern the methods and tools for communication in virtual teams, while issues on communication-related to trust or leadership are the least explored areas.

Keywords

virtual communication;
communication in the virtual
project team; bibliometric
analysis



I. Introduction

The organization's project-based operating mode results in multiple virtual project teams that collaborate via online communication. However, there are many advantages in virtual teams, such as more accessible access to a skilled workforce, shorter development time, fast response to changes etc. (Ebrahim et al., 2009) the virtual teams are also a source of communication problems. In that case, the issues might be a misinterpretation of information and misrepresented ideas (Zakaria, 2017). This causes problems in the communication process which becomes ineffective and unpleasant (Ismoyo, 2013). This can be caused by the central nervous system filtering inappropriate sensory information that is characterized by nerve suppression of the activity (Pramono et al., 2022). Problems in collaborating and communicating are challenges experienced by virtual teams. The reason

for these communication problems in the virtual project team has been studied a lot (Mheidly & Fares, 2020). Moreover, there are some papers found on various aspects of virtual project team communication, communication patterns (Serçe et al., 2011; Zaitsev, 2011; Zheng et al., 2016), communication management (Holzmann & Panizel, 2013; Stapel et al., 2011), communication problems in multicultural teams (Dumitrascu-Baldu & Dumitrascu, 2019), or the influence of communication on their performance (Ehsan et al., 2008). Of all the bibliometric literature reviews found on virtual teams and project communication in general, there is no research focused on communication in virtual teams. Effective communication is essential for all organizations. Organizational communication is satisfaction of organizational member toward several communication aspects occurs within organization (Syakur, 2020). Communication is the process of delivering accurate, clear, consistent, and comprehensive information as well as coordination between relevant agencies in the implementation process (Mahendra, 2021). Based on the explanation above, the research aims to study and provide new information related to scientific output in virtual project team communication. The questions of the research are as follows:

RQ1. Who are the most prolific writers contributing to communication research in virtual project teams?

RQ2. How have the results of scientific research in communication in virtual project teams developed during 2001-2020?

RQ3. Is there any geographic distribution of the scientific output in the field of communication in the virtual project team?

RQ4. What types of publications are often used to convey the results of new research related to communication in virtual project teams?

RQ5. What are the main research topics in the communication of virtual project teams?

RQ6. What type of research is applied to communication in virtual project teams empirically or theoretically?

II. Research Method

2.1 Research Design

Standard bibliometric methods include analysis and visualization of publication frequency, authorship, the geographical distribution of publications, most productive institutions, and places of publication (Briganti et al., 2019). Moreover, citation analysis, co-citation analysis, bibliographic aggregation, co-author analysis, and word analysis altogether could also be applied (Zupic & Cater, 2015). However, the problems when combining data from three databases, including Google Scholar, were decided. This resulted in the impossibility of using tools such as VOSviewer or SciMAT. They require input files containing detailed metadata, which are available from Scopus and Web of Science but not from Google Scholar (Moral-Muñoz, J. A. et al., 2020). Therefore, the scope of the research question is limited only to the aspect of volume and geographical distribution (Kim, 2019)

2.2 Research Procedure

The research procedure applied to conduct a bibliometric review includes the following steps:

1. Selecting of data sources and specification of search criteria
2. Grouping and combining data obtained from data sources
3. Answering research questions through analysis with bibliometric methods,
4. Data visualizing and data processing

2.3 Sample and Data Collection

The data sources used to search for articles are Scopus, Web of Science (WoS), and Google Scholar. Those sources are often used for bibliometric literature. Scopus and the Web of Science (WoS) allow the extraction of metadata that supports bibliometric methods. Searching in the Scopus and WoS databases is similar and has similar searching criteria. Communication is a keyword that must be applied in the articles' title.

To focus on articles about communication in virtual project teams, the additional words team, project, and virtual were selected and defined as mandatory words that must appear in at least one of the three fields of the articles' title, abstract, or keywords section.

2.4 Analyzing of Data

The research period taken is 20 years (from 2001 to 2020), not included in the content of the patent and citation. It is essential to note that it is not possible to perform the same methods for searching on Google Scholar. This is caused by limited abstract searching options, which often occur in bibliometric reviews (Giustini et al., 2013). One of the main parts to look for is the article's title. The searching criteria are similar to the ones on Scopus and WoS. The words communication, team, and virtual are set as mandatory keywords.

The next step of the searching, filtering procedure, and obtaining the results in the Scopus and WoS databases could be done with their respective criteria. The searching was carried out in early September 2021. The next step of the searching and screening procedure is to eliminate certain subject areas if the articles included were outside the scope, judging by the title. The subject area is defined in the classification used by Scopus and WoS. In the final step, the remaining articles are investigated for relevance by tracing the title and the abstract.

The following search phrases are used for the Google Scholar database: allintitle: communication AND team AND (virtual OR distributed OR dispersed), year limit are 2001 to 2020, excluding patents and citations. After searching for titles, some irrelevant articles are eliminated. The final step is to compile the databases' results into a single dataset. This is done using a Python script that compares the article titles from the three databases. The compilation resulted in a dataset of 260 articles.

III. Discussion

The final step of this research is data analysis using the bibliometric method. The first research question relates to the most prolific authors who contributed to communication research in virtual project teams. As seen in Table 1, there is no dominant leader of the author who appears most frequently in the last 20 years.

Table 1. List of the Most Prolific Writers in the Field of Communication in Virtual Project Teams

<i>Author</i>	<i>Country</i>	<i>No. of publications</i>
Bond-Barnard, T.J	South Africa	3
Muszynska, K.	Poland	3
Damian, D	Canada	3
De Farias, I.H	Brazil	4
Schneider, K	Germany	4
De Moura, H.P.	Brazil	4
Marczak, S.	Brazil	5
Nawi, M,N.M	Malaysia	5
Pozin, M.A.A	Malaysia	5

The answer to the second research question is reflected in Figure 1, which visualizes the number of publications in the following years. It can be observed that since 2010-2015 there has been an endless number of articles published every year. However, in 2016, it reached 25 publications and then dropped to 11 publications in 2020.

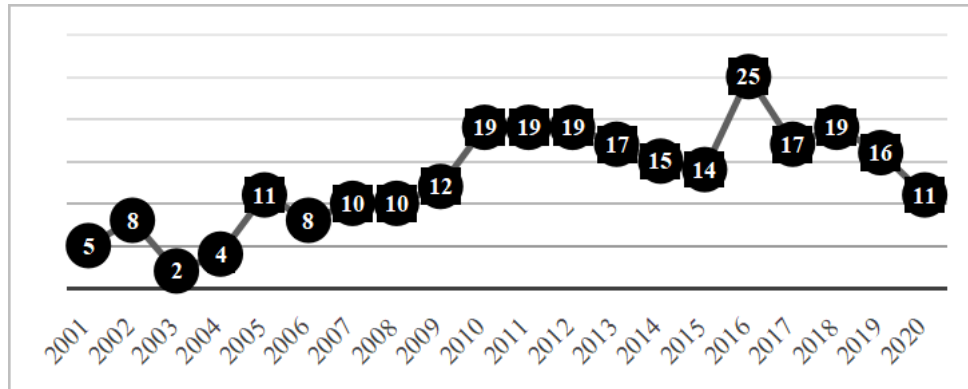


Figure 1. *The Number of Publications Published*

The third research question aims to find the geographic distribution of scientific output in the field of communication in virtual project teams. Figure 2 shows the countries that are most represented in the data set. An imbalance in the number of published papers was found. The United States became the leader with 93 papers, the following three countries, such as England, Germany, and Brazil published about 20 papers each. As for Australia, India, Pakistan, and South Africa published eight papers each.

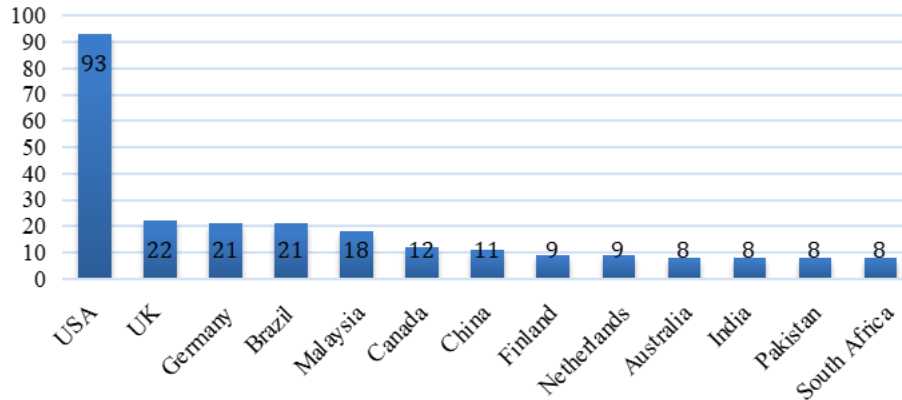


Figure 2. *Geographic Distribution of Scientific Output*

The answers to the fourth research question are visualized in Figure 3, the number of publications of each type of publication is presented. The two most popular types of publications are conference papers, which make up about 55% of all publications and about 40%.

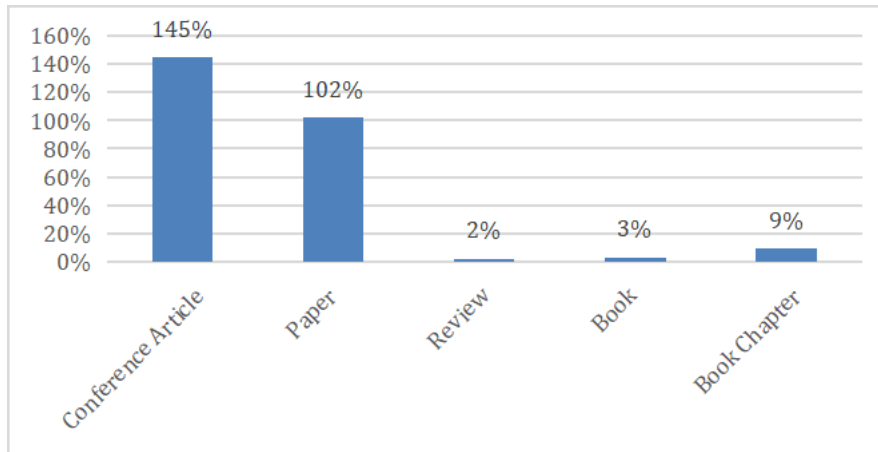


Figure 3. *The Number of Publications of Each Type*

Answering the fifth research question regarding the main research topics in communication in virtual project teams. This involves the publication of a specific research topic, which allows for a more in-depth analysis of the field research conducted by researchers. Figure 4 lists the identified research areas, and the number of publications each field has; the categories related to the methods and the tools in virtual team communication were the most significant representation, while the communication and the trust issues were the least popular ones. It should be mentioned that if a publication covers different aspects and can be placed in more than one category, only the dominant one will be selected.

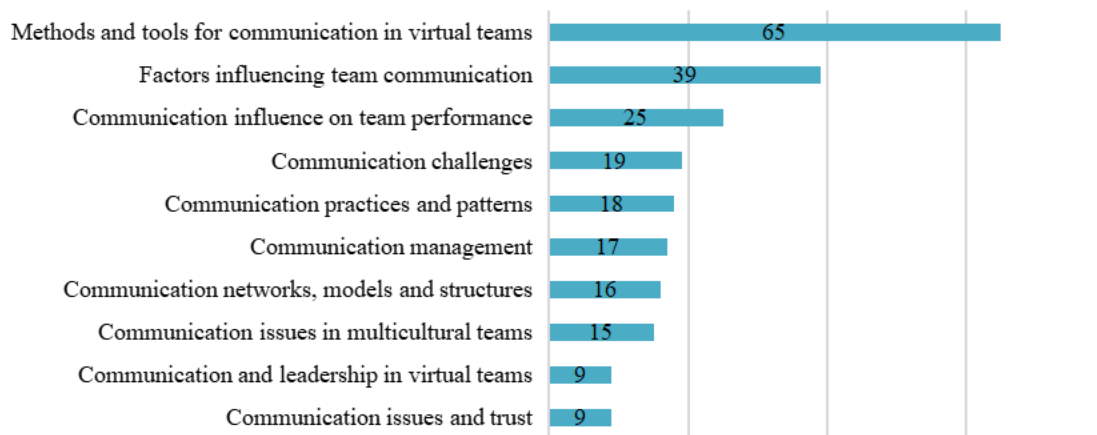


Figure 4. *Data on the Number of Publications Included in Specific Research Topics*

From analyzing the abstracts of publications in the data set, it is also possible to categorize them into the empirical research and the one which concentrates on the theoretical considerations, which provide answers to the sixth research question.

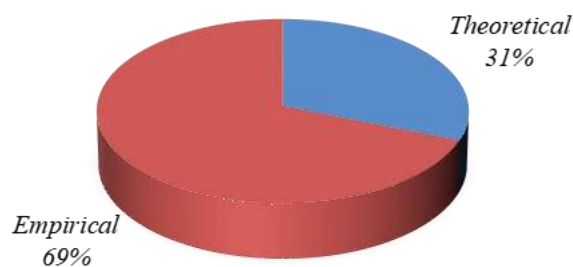


Figure 5. *Different Kinds of Researches*

The results are visualized after applying the bibliometric approach with data from three databases, namely Scopus, Web of Science, and Google Scholar. The research questions that can be answered. Considering the first question, it seems disproportionate that among the most prolific writers, who wrote at least three works in the field under study, there is no writer from the United States, a country with far more publications than the others. This suggests that there is dispersion among the American writers, and none of them is dedicated to communication in virtual teams. This result proves that there is no dominant leader in that field.

Answering the second research question, it can be observed that there is an endless number of publications from 2010 published every year, and then the number of publications drops in 2020. It is also very likely to grow substantially in 2021 due to the COVID-19 pandemic and the need for a transition from much project-based organization, which in most cases affects the process of communication and interaction (Oliveira de Moura e Silva et al., 2021).

Visualization of the answer to the third question that the country of Uncle Sam is the largest country of scientific output in the field of communication in the virtual project team. The following three countries, i.e. UK, Germany or Brazil, had less than a quarter overall from 2001-2020. These findings are in line with those observed by Abarca and colleagues in bibliometric analysis of scientific output in the field of virtual teams (Garro Abarca et al., 2020). The answer to the fourth research question informs that conference proceedings are the most popular dissemination destination for works in the field of communication in virtual teams, but articles are also quite popular.

The fifth research question is dedicated to a key research topic in communication in virtual project teams. The main categories are assumed to derive from the abstract analysis of the work reviewed. Nearly 25% of all reviewed publications fall into tools and methods in virtual teams. Some reported the effect of using a particular tool or method (Käfer, 2018). Others suggest specific solutions to improve communication or reduce problems (Marlina et al., 2020; Muszynska & Swacha, 2017). The next category is quite significant, including nearly 40 papers that pay attention to factors affecting the communication team, such as communication planning, adjusting content and frequency to the situation (Halifa & Bond-Barnard, 2019), the level of trust between team members (Haron et al., 2019), temporal distance, geography, the organization in virtual teams, and culture or group size and social presence (Jaanu et al., 2012).

The sixth research question aims to reveal the research applications in the area being studied theoretically or empirically. The results show that the empirical work is about 72%, including case studies and multi-organizational research.

IV. Conclusion

In this bibliometric review, the research team intends to identify and analyze scientific outputs in the communications sector in the 2001-2020 virtual project teams. Discussions on volume, geographical distribution, types of publications, fields, and types of research and contributing authors answer the research questions. The main observations of this research survey include the endless number of publications in the field of communication in virtual teams over the past decade, the clear advantage of the United States in the number of published works, the two most significant representations of research topics in the category, methods, and tools in virtual groups. And the factors that influence communication within the group, and the absence of an author who dominates the research area to be studied. The researchers considered using publications from the three databases to reproduce the sources analyzed, but this may limit the possible implementation of some bibliometric methods. Due to the limited amount of data that can be retrieved automatically by Scholar, it is not appropriate to apply VOSviewer or SciMAT but only analyze the subject and type of study. This makes it easier to determine the research area, as problems relating to communication seem to get less attention from researchers. It is hoped that the research results presented will inspire new research in communication in virtual project teams.

Recommendations

For future research, it is recommended to use detailed metadata from the Web of Science, Scopus, and Google Scholar, and other sources that allow the metadata obtained to be analyzed using VOSviewer or SciMAT. Likewise, further research is limited to Bibliometric analysis and combined with literature studies related to the topic of Communication in virtual project teams.

Limitations

The researchers realized that the obstacle factor in the study was the decision to combine data from three databases, namely Google scholar, which resulted in the impossibility of using tools such as VOSviewer or SciMAT because it required an input file containing detailed metadata was available from Scopus and the Web of Science. But not from Google scholar; therefore, the scope of this research question is only limited to the aspect of volume and geographical distribution.

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