Technology Acceptance Model (TAM) Applied to Microbusinesses: A Bibliometric Analysis.

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Abstract
The bibliometric scientific production is a documentary analysis tool that allows the analysis of the state of the art of microbusinesses and the technological acceptance model (TAM) with the Scopus database. Descriptive study on the technology acceptance model applied to microbusinesses, analyzing the use of methods and strategies within the research. Documents published by institution, the affiliation of University of Electronic Science and Technology of China, School of Management and Economics of UESTC, Indian Institute of Technology Kharagpur; countries with the most documents published, Indonesia, Malaysia, China; documents published by area, there is a greater trend in the area of Business, Management and Accounting, followed by the sub-area Computer Science, Social Sciences; productivity by authors who wrote the largest number of articles are the following authors Zhao, H.; Abayaawien Atuilik, W.; Chatterjee, S.; This study applied the freely available VOSviewer software in the creation of bibliometric maps for keyword co-occurrence based on network data capturing attention and its relationship with terms such as perceived ease of use and SMEs.
Keywords: Bibliometrics, Technology Acceptance Model, SMEs, Digital transformation

INTRODUCTION

This paper presents the results obtained through a bibliometric analysis of the technology acceptance model (TAM) applied to microbusinesses, using the Scopus database and the analysis in the VOSviewer software, this made it possible to determine the behavior of the literature on this subject. Bibliometrics is a branch of scientometrics that allows the study of scientific activity. Its unit of analysis is the scientific article (Romaní et al., 2011). In today's era of technological advances, technology adoption and acceptance have become key elements to the growth and sustainability of businesses around the world, this is where the Technology Acceptance Model (TAM) is a theory about the adoption of information technology in organizations (Davis, 1987). This theory proposes that individual reactions to technology influence intentions to use technology, which ultimately affects actual use (Gyamera et al., 2023).

Technology acceptance model highlights how people adapt to new technologies (Okine et al., 2023). These technological advances and the availability of models that measure the acceptance of technology is a relevant phenomenon in the case of micro-businesses, small-scale business entities that play a key role in the global economic fabric; these models have also been used to investigate the conditions under which technology is used (Gartner et al., 2022). Small and medium-sized enterprises (SMEs) contribute significantly to the economic performance of countries around the world (Bening et al., 2023; Pourmorshed & Durst, 2022). Therefore, they are a key component of national economic growth, that is why, attention to the contribution of small and medium-sized enterprises (SMEs) to development continues to be a central issue in policy discussions in many countries. These policies formulated by governments, mainly in developing countries, play a key role

in encouraging small and medium-sized enterprises to adopt environmentally friendly production methods (Wasiq et al., 2023). In order to gain different advantages, governments and integrated private sectors at all levels have initiated measures to promote the growth of SMEs (Thathsarani & Jianguo, 2022). The relevance of this research is accentuated by the need to provide micro-businesses with practical tools that allow them to effectively integrate available technologies into their daily operations, being the main facilitators of the digital transition and fundamental change in business models offering SMEs (small and medium-sized enterprises) a way to overcome competitive disadvantages (Meier & Peters, 2023). Assimilation is the level of technology integration into the work operations of a business (Ahmad & Siraj, 2023). The combination of technology with business processes in the digital economy is known as "digital transformation" (Nguyen et al., 2023). SMEs face multiple challenges in the adoption and use of new technologies (Zamani, 2022). In this context, the Technology Acceptance Model (TAM) has emerged as a fundamental theoretical framework for understanding the factors that influence the adoption and use of information and communication technologies.

When adopting technology, the objective should be to understand what specific technology is required by the microbusiness and what its effects will be (Pierre et al., 2022). However, the specific application of TAM to microbusinesses represents an area of research that is not only relevant but also essential, given the uniqueness of their operations and challenges. Similarly, the low adoption of technology in SMEs is due to the complex adoption process, because numerous factors influence such as technological, organizational and environmental aspects among others (Chau et al., 2021). Increasing digitization, advancement of computing and a competitive business environment force microbusinesses to make decisions based on their data processing (Perdana et al., 2022). Adopting technology can help to make decisions in less time, which is a challenge today. A fundamental transformation is required in small and medium-sized enterprises (SMEs), which requires specific technological and organizational resources for successful adoption (Omrani et al., 2022). The bibliometric analysis reveals a significant growth in scientific production in the field of microbusinesses study and the Technological Acceptance Model (TAM) in the period of time analyzed, observing a steady increase in the number of papers published from the year 2020, which makes it clear that there is a growing interest in this subject. In addition, keyword co-occurrence provides information on the relationships and frequency of occurrence of keywords in the documents analyzed. These findings suggest that there is an increasing focus on the technologies adoption and the acceptance of information systems in microbusinesses.
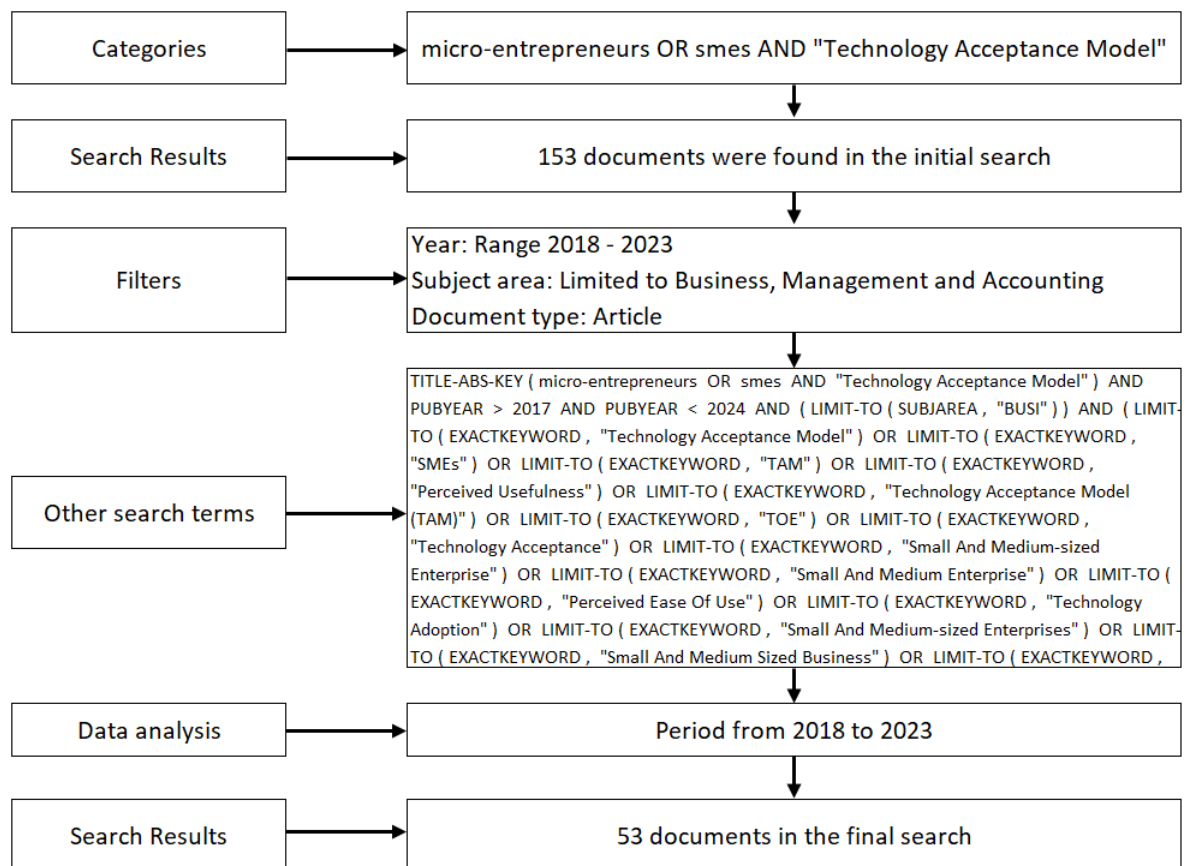
Methodology

Descriptive bibliometric study on the technology acceptance model applied to microbusinesses, analyzing the use of methods and strategies within the research available in the Scopus database. Bibliometrics as the application of mathematical tools and statistical methods to written sources covering various forms of communication, supported by indicators, which seek to evaluate science and the productivity of scientists (Duque & Cervantes-Cervantes, 2019).

The literature review was constructed from an initial inspection in the Scopus database as search criteria the categories "micro-businesses" and "Technology Acceptance Model (TAM)", in this initial search TITLE-ABS-KEY (micro-entrepreneurs OR smes AND "Technology Acceptance Model") AND PUBYEAR > 2017 AND PUBYEAR < 2024 AND (LIMIT-TO (SUBJAREA , "BUSI")) AND (LIMIT-TO (EXACTKEYWORD , "Technology Acceptance Model") OR LIMIT-TO (EXACTKEYWORD , "SMEs") OR LIMIT-TO (EXACTKEYWORD , "TAM") OR LIMIT-TO (EXACTKEYWORD , "Perceived Usefulness") OR LIMIT-TO (EXACTKEYWORD , "Technology Acceptance Model (TAM)") OR LIMIT-TO (EXACTKEYWORD , "TOE") OR LIMIT-TO (EXACTKEYWORD , "Technology Acceptance") OR LIMIT-TO (EXACTKEYWORD , "Small And Medium-sized Enterprise") OR LIMIT-TO (EXACTKEYWORD , "Small And Medium Enterprise") OR LIMIT-TO (EXACTKEYWORD , "Perceived Ease Of Use") OR LIMIT-TO (EXACTKEYWORD , "Technology Adoption") OR LIMIT-TO (EXACTKEYWORD , "Small And Medium-sized Enterprises") OR LIMIT-TO (EXACTKEYWORD, "Small And Medium Sized Business") OR LIMIT-TO (EXACTKEYWORD, "Small And Medium Scale Enterprise (SME)")) (153) documents were found, filters were applied starting with the application of a thematic filter with the categories "Business,

Management and Accounting"; a following filter for a time interval between the year (2018 to 2023); and a last filter of seven (7) keywords as they are: Technology Acceptance Model, SMEs, TAM, Small And Medium-sized Enterprise, Perceived Usefulness, Technology Acéptense Model (TAM) y Small And Medium Enterprise. With the application of these new filters, a sample of (55) documents was obtained, generating an analysis of results by Scopus, as well as obtaining a CSV (comma separated values) file that can be read in the VOSviewer software, with this tool it was possible to construct and visualize the graphs of the bibliometric networks. For the elaboration of the content analysis, an interval was specified from the year (2018 to 2023) with the two categories "microbusiness" and "Technology Acceptance Model (TAM)", finally selecting 55 articles that were related with a greater strength with the thematic searched. In order to meet the inclusion criteria, documents classified as articles in the scientific database corresponding to Scopus were used.

Figure 1. Search criteria used for information selection

| Categories	micro-entrepreneurs OR smes AND "Technology Acceptance Model"
Search Results	153 documents were found in the initial search
Filters	Year: Range 2018 - 2023 Subject area: Limited to Business, Management and Accounting Document type: Article
Other search terms	TITLE-ABS-KEY (micro-entrepreneurs OR smes AND "Technology Acceptance Model") AND PUBYEAR > 2017 AND PUBYEAR < 2024 AND (LIMIT-TO (SUBJAREA , "BUSI")) AND (LIMIT-TO (EXACTKEYWORD , "Technology Acceptance Model") OR LIMIT-TO (EXACTKEYWORD , "SMEs") OR LIMIT-TO (EXACTKEYWORD , "TAM") OR LIMIT-TO (EXACTKEYWORD , "Perceived Usefulness") OR LIMIT-TO (EXACTKEYWORD , "Technology Acceptance Model (TAM)") OR LIMIT-TO (EXACTKEYWORD , "TOE") OR LIMIT-TO (EXACTKEYWORD , "Technology Acceptance") OR LIMIT-TO (EXACTKEYWORD , "Small And Medium-sized Enterprise") OR LIMIT-TO (EXACTKEYWORD , "Small And Medium Enterprise") OR LIMIT-TO (EXACTKEYWORD , "Perceived Ease Of Use") OR LIMIT-TO (EXACTKEYWORD , "Technology Adoption") OR LIMIT-TO (EXACTKEYWORD , "Small And Medium-sized Enterprises") OR LIMIT-TO (EXACTKEYWORD , "Small And Medium Sized Business") OR LIMIT-TO (EXACTKEYWORD ,
Data analysis	Period from 2018 to 2023
Search Results	53 documents in the final search

Source: Authors, 2023.

The application of filters such as specific categories and keywords against the exclusion criteria will not be taken into account as papers, conferences, book chapters, reviews, conference reviews, errata (error correction in a text) and books, as well as those texts that are only in English language.

Results

To achieve the objectives of this research, the graphs generated by Scopus were taken into account, in addition to selecting some bibliometric indicators such as the co-occurrence of keywords and authors.

Figure 2. Scientific production of microbusinesses and Technology Acceptance Model (TAM) by year.
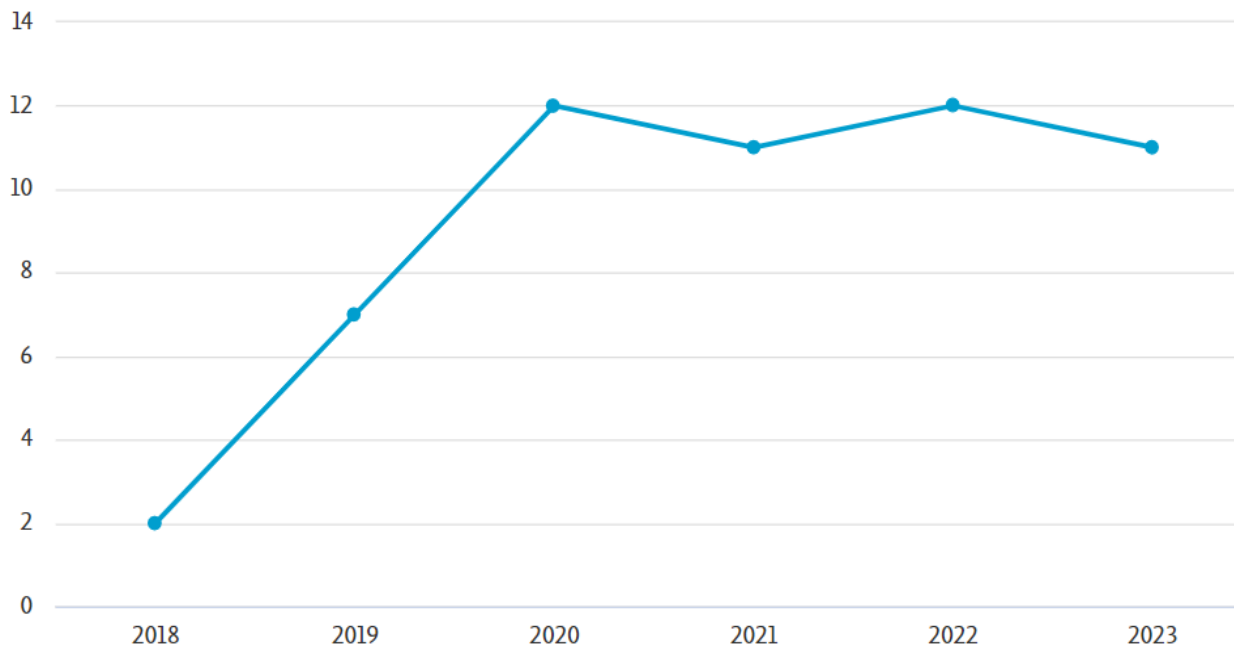
Source: Scopus database, 2023.

In the year 2018, two papers were published with a percentage of (4%); in the year 2019, seven papers were published with a percentage of (13%); in the year 2020, twelve papers were published with a percentage of (22%); in the year 2021, eleven papers were published with a percentage of (20%); in the year 2022, twelve papers were published with a percentage of (22%); in the year 2023, eleven papers were published with a percentage of (20%).

Figure 3. Document production by institution.
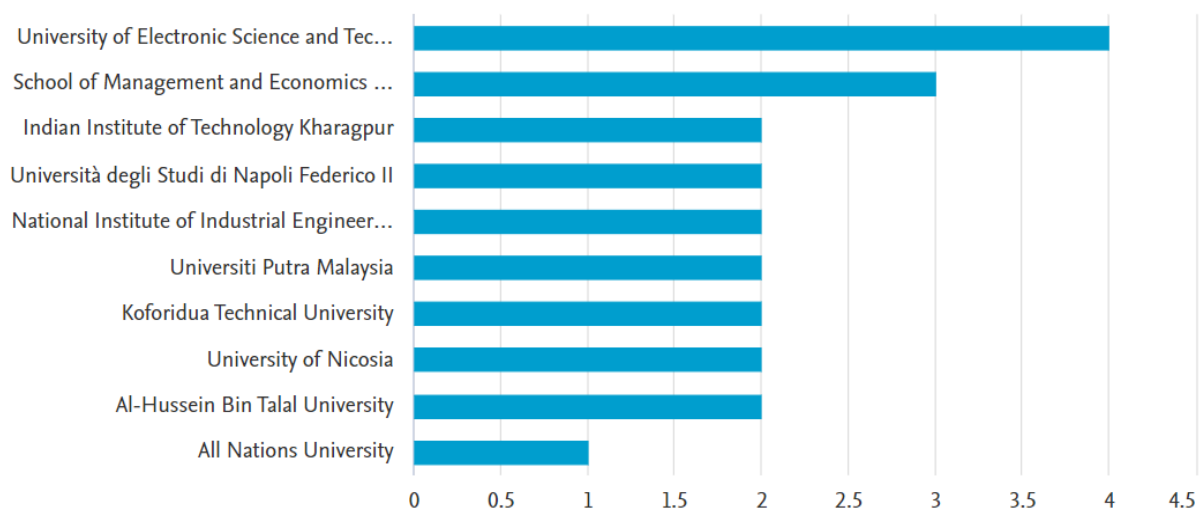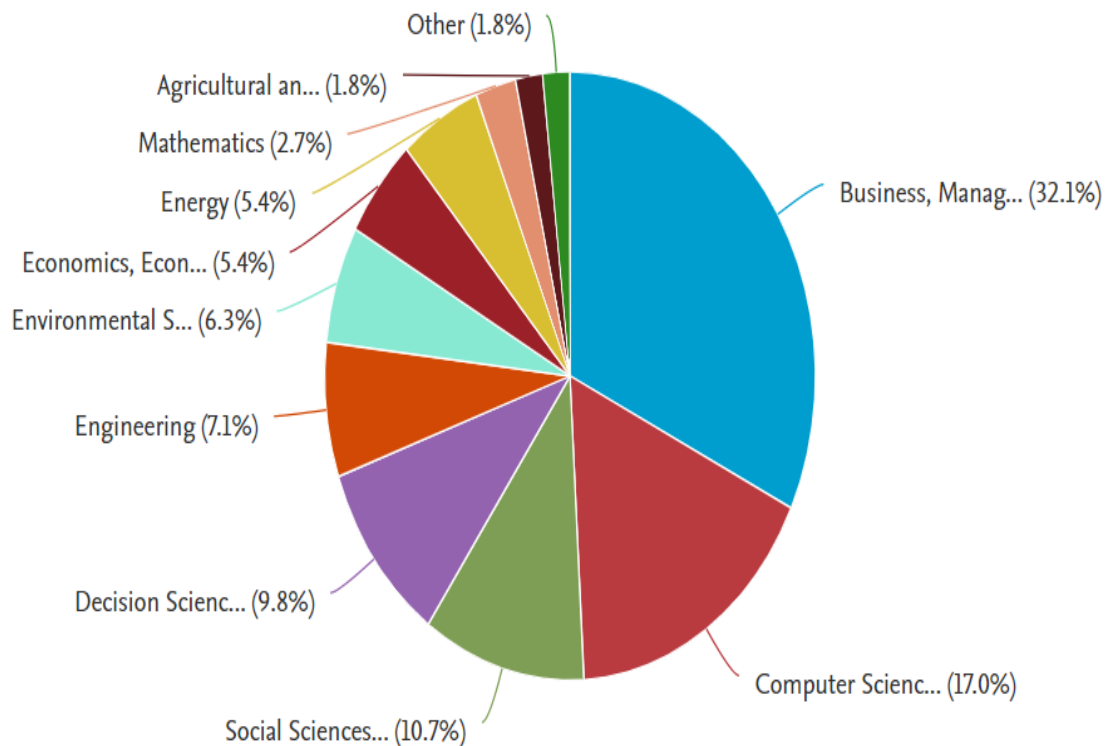

Source: Scopus database, 2023.

Figure 3 shows the number of published papers by institution, as reported in the Scopus database, the affiliation of University of Electronic Science and Technology of China with (4) published papers giving (3%) percent; the affiliation of School of Management and Economics of UESTC with (3) published papers giving (2%) percent; the affiliation of Indian Institute of Technology Kharagpur with (2) published papers giving (2%) percent; the affiliation of Università degli Studi di Napoli Federico II with (2) published papers giving (2%) percent; the affiliation of National Institute of Industrial Engineering with (2) published papers giving (2%) percent; the affiliation of Universiti Putra Malaysia with (2) published papers giving (2%) percent; the affiliation of Koforidua Technical University with (2) published papers giving (2%) percent; the affiliation of University of Nicosia with (2) published papers giving (2%) percent; the affiliation of Al-Hussein Bin Talal University with (2) published papers giving (2%) percent; the affiliation of All Nations University with (1) published paper giving (1%) percent.

Figure 4. Countries with published documents.
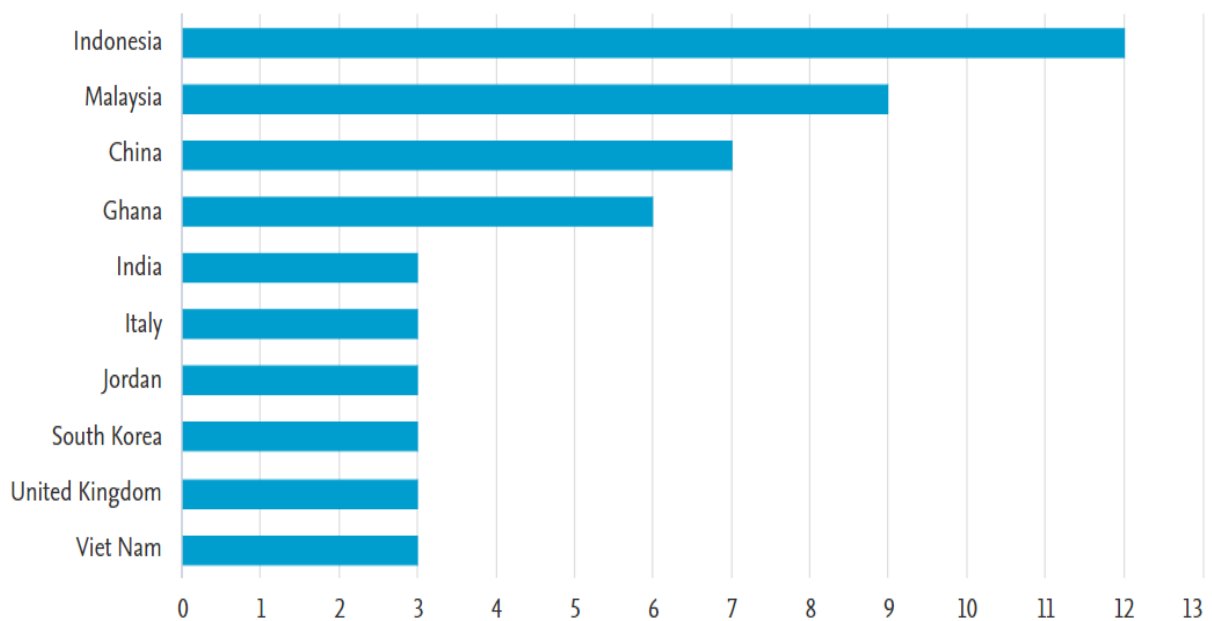
Source: Scopus database, 2023.

Figure 4 shows the countries with the most published documents on the subject of microbusiness and the Technology Acceptance Model (TAM). According to the Scopus database, the country with the highest number of publications are Indonesia, Malaysia and China, where the country Indonesia with (12) papers giving (14%) percent of the productivity; the country Malaysia with (9) papers giving (11%) percent of the productivity; the country China with (7) papers giving (8%) percent of the productivity; the country Ghana with (6) documents giving (7%) percent productivity; the country India with (3) documents giving (4%) percent productivity; the country Italy with (3) documents giving (4%) percent productivity; the country Jordan with (3) documents giving (4%) percent productivity; the country South Korea with (3) documents giving (4%) percent productivity; the country Viet Nam with (3) documents giving (4%) percent productivity; the country United Kingdom with (3) documents giving (4%) percent productivity; the country United Kingdom with (3) documents giving (4%) percent productivity; the country South Korea with (3) documents giving (4%) percent of productivity; the country United Kingdom with (3) documents giving (4%) percent of productivity; the country Viet Nam with (3) documents giving (4%) percent of productivity.

Figure 5. Documents published by area.

Source: Scopus database, 2023.

Figure 5 shows the number of documents published by area, with a greater tendency in the area of Business, Management and Accounting. According to productivity by sub-area of knowledge published in Scopus, sub-area of knowledge Business, Management and Accounting has published (36) papers giving (32.1%) percent; sub-area of knowledge Computer Science has published (19) papers giving (17.0%) percent; sub-area of knowledge Social Sciences has published (12) papers giving (10.7%) percent; sub-area of knowledge Decision Sciences has published (11) papers giving (9.8%) percent; sub-area of knowledge Engineering has published (8) papers giving (7.1%) percent; sub-area of knowledge Environmental Science has published (7) papers giving (6.3%) percent; sub-area of knowledge Economics, Econometrics and Finance has published (6) papers giving (5.4%) percent; sub-area of knowledge Energy has published (6) papers giving (5.4%) percent; sub-area of knowledge Mathematics has published (3) papers giving (2.7%) percent; sub-area of knowledge Agricultural and Biological Sciences has published (2) papers giving (1.8%) percent; sub-area of knowledge Psychology has published (2) papers (1.8%) percent out of a total of (11) sub-area of knowledge.

Figure 6 represents the co-occurrence of keywords and provides information about the keywords that are most frequently found together in the analyzed documents. The relationship and frequency of occurrence of the keywords are represented in the figure. This can help to identify the most relevant keywords and their relationship in the field of study of microbusiness and the Technology Acceptance Model (TAM).

Figure 6. Keyword co-occurrence.

Source: Vosviewer software with Scopus data.

For the co-occurrence of keywords there are 344 keywords and leave it with a minimum number of co-occurrence of 3, and a number of selected keywords of 15 from which 10 were selected, citation analysis of published papers with a minimum of (4) citations per paper, out of (55) papers, (29) manage to meet this requirement. The analysis in Figure 6 reveals that the distribution of document production among the authors analyzed.

Figure 7. Co-occurrence of authors.

Source: Vosviewer software with Scopus data.

In the analysis of the number of documents that each author has, the first 15 authors were taken taking into account that almost all of them have published only one document. Figure 7 shows the number of documents per author obtained from the Scopus database in 2023; the distribution of the production of documents among the authors indicates that most of the authors analyzed have published only one document.

CONCLUSIONS

The importance of the study in the bibliometric scientific production of documentary analysis that allows the analysis on the state of the subject of microbusinesses and the technological acceptance model (TAM). There has been a significant increase in scientific production in the field of small and medium-sized enterprises (SMEs) from 2020 to 2023, indicating a growing interest in studying this subject and according to the distribution of document production among the authors is uneven, with most authors having published only one document. This suggests the need for greater collaboration and diversity in research contributions. The Technology Acceptance Model (TAM) is a widely used framework in the study of technology adoption in SMEs, indicating its relevance and applicability in understanding technology acceptance behavior, likewise digital transformation is a key driver.

The collection of documents over time allows identifying documents published by institution, according to information from the Scopus database, the affiliation of University of Electronic Science and Technology of China, School of Management and Economics of UESTC, Indian Institute of Technology Kharagpur, Università degli Studi di Napoli Federico II, National Institute of Industrial Engineering, Universiti Putra Malaysia, Koforidua Technical University, University of Nicosia; The countries with the most documents published on the subject of microbusiness and the Technology Acceptance Model (TAM) are Indonesia, Malaysia, China, Ghana, India, Italy, Jordan, South Korea, United Kingdom, and Vietnam; The productivity by authors on the topic of microbusiness and the Technology Acceptance Model (TAM), who wrote the largest number of articles are the authors Zhao, H. Abayaawien Atuilik, W.; Chatterjee, S.; Chaudhuri, R.; Eklemet, I.; Gyamera, E. Vrontis, D.; and author AJI, H.M.

This study applied the freely available VOSviewer software in the creation of bibliometric maps for keyword co-occurrence based on network data capturing attention and its relationship with terms such as perceived ease of use and SMEs.

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