

SUBMISSION FORM
FULL PAPER

**DEVELOPMENT OF ACTIVITY BASED COSTING RESEARCH IN
INDONESIA USING A BIBLIOMETRIC APPROACH**

ABSTRACT

This study aims to map the development of activity-based costing and time-driven activity-based costing research published in the SINTA (Science and Technology Index) journal in 2015-2022. The method used is qualitative using the VOSviewer analysis tool and data collection using Harzing's Publish or Perish through the Google Scholar database. The data obtained were 261 SINTA indexed journals and the final results after being eliminated into 52 journals were 78 articles, consisting of 69 Activity-based Costing articles and 9 Time-driven Activity-based Costing articles. The results of the study show that the object of research that is often carried out is service companies. The publication of articles by year obtained the highest results in 2020. The most productive researcher is Ilat, V and the researcher with the most citations is Kaunang, B, and the journal that publishes the most Activity Based Costing articles is the EMBA Journal: Journal of Economic, Management, Business and Accounting Research and the Accounting Journal with the publication of time-based activity-based costing articles. It is concluded that most researchers in Indonesia in SINTA indexed journals use the Activity Based Costing method more than Time Driven Activity Based Costing. This study provides knowledge for further researchers to be able to find out the development of related topics or topics that are still rarely studied.

Keywords: *activity based costing, time driven activity based costing*

INTRODUCTION

The development of management accounting science began in the 19th century, this science then developed in the 20th century, along with Alexander Hamilton's ideas which emphasized the importance of implementing management accounting in production activities (Anita, 2021). In a competitive business environment, strategic decisions must be based on a thorough understanding of cost aspects. Cost analysis is the process of identifying, collecting, classifying, and analyzing costs with the aim of providing information that supports business decision making. (Sigalingging et al., 2024).

Unit cost calculation methods have evolved from traditional to modern (Putuhena & Kamarudin, 2024). Accounting experts from Harvard University introduced a new method for determining production costs called Activity Based Costing (ABC) (Febriani et al., 2022). Activity-based costing (ABC) system started in the 1980s, in the face of economic and technological developments, costing methods were able to overcome the limitations of traditional costing systems, namely charging arbitrary and inaccurate indirect costs due to distortions in imputation criteria. (Quesado & Silva, 2021).

ABC systems are designed and implemented on the premise that products consume activities, activities consume resources, and resources consume costs. Thus, the terms activity, driver, and resource are important to understanding ABC. (Stefano & Filho, 2013). The ABC system is a costing system whose crucial objective is to provide more useful and accurate information to management, both regarding the costs and profitability of the business process itself. In its quote, it states that ABC emerged as an innovation in management accounting to overcome the gaps in traditional systems. (Quesado & Silva, 2021).

However, in the research citation (Nikmah, 2023) there are weaknesses in its implementation, namely that it requires expensive costs both in terms of finance and time. Similar research from Kate, ABC does not provide accurate profitability information for managers (Kate-Riin Kont, 2011). Some

criticism of the methodology has arisen because it suggests that activity is not a simple task. Other criticisms focus on the difficulty of its implementation. As a result, not all companies are encouraged to use the system (Niñerola et al., 2021). With these limitations, Kaplan and Anderson were motivated to develop Time Driven Activity Based Costing (TDABC), a revised version of ABC that solves these problems without losing its benefits (Kate-Riin Kont, 2011). TDABC was developed in 2004 (Nikmah, 2023). (Sulisityono et al., 2021) in his quote also stated that TDABC is an evolution of the previous method, this method has many advantages compared to traditional accounting techniques or the ABC method. This method uses time cost drivers, which provide effective results and do not cause distortions that occur due to inappropriate cost recognition or assumptions.

There are several researchers such as (Febriani et al., 2022; Husna & Sayekti, 2023; Quesado & Silva, 2021; Syahrial, 2020) in his bibliometric research, he only focused on the topic of ABC and ignored other relevant or similar costing and management systems, such as activity-based management (ABM) and TDABC. (Febriani et al., 2022) based on similar research results, it shows that the research methods frequently used in ABC research are qualitative and quantitative, as well as descriptive analysis methods. According to (Quesado & Silva, 2021) in his research he concluded that ABC research has continued to stimulate high interest among researchers in recent years, as seen from the increasing number of studies in similar fields. (Berg & Madsen, 2020) argue that ABC has evolved and expanded, and produced new concepts. Research indicates that this model is less popular compared to accounting concepts like the Balanced Scorecard. Overall, the development of activity-based thinking has tended to decline, and is currently rarely discussed in accounting journals.

TDABC articles report higher research impact in both traditional and alternative metrics than ABC. Articles about TDABC tend to be cited more frequently, published in better journals, and are more visible in academic social networks (Niñerola et al., 2021). The diversity of information sources results in the need for proper mapping to view studies or research topics (Perkasa et al., 2022). Mapping can be done using bibliometric studies, bibliometric analysis was first introduced by Pauli Gauthier in 1998. Bibliometric analysis is useful as a descriptive tool that provides a number of publishing activities at a regional level in a particular area or at a particular institution as a form of comparative productivity analysis (Wahyudin et al., 2023). Bibliometric studies have indicators as knowledge that has the function of evaluating research results and is able to analyze the interaction between science and technology to produce mapping visualizations in certain scientific fields and monitor the latest developments in a scientific field (Perkasa et al., 2022).

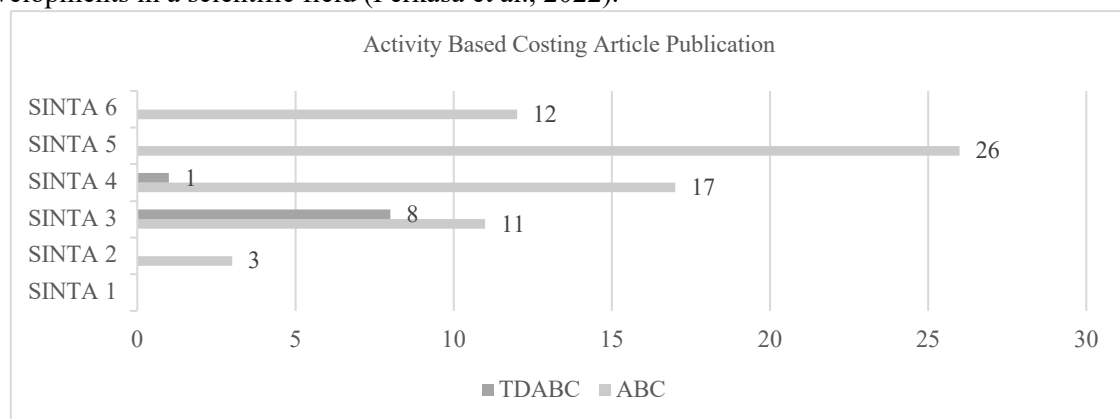


Figure 1. ABC and TDABC publications on SINTA

Source: Output Publish or Perish, 2024

Based on Figure 1, there are still few scientific publications that carry the theme of ABC and TDABC published in SINTA indexed journals with a total of 78 articles (69 ABC articles and 9 TDABC articles) from SINTA indexed journals in 2015-2022. It is known that research in reputable journals in Indonesia shows that the growth of ABC research is 88.5% more than research using the TDABC

method which is only 11.5%. TDABC was developed in 2004, so it has been used in research and has only been practiced recently (Alves et al., 2018).

Although many studies have examined the spread of ABC-related techniques, more than 30 years have passed since the term ABC was developed (Berg & Madsen, 2020). Therefore, this article has the main objective to see the development of research through a bibliometric study of the publication of articles in recent years on the topic of ABC and TDABC. The relevance of this study is to strengthen the research trend in this field of knowledge and is useful for researchers who intend to conduct future investigations in this field (Quesado & Silva, 2021).

METHOD, DATA, AND ANALYSIS

Types of Research

The research method used is a qualitative research method. Qualitative research is a descriptive and analytical research. Descriptive in qualitative research means describing and explaining events, phenomena and social situations being studied. Analysis Analysis means interpreting and comparing research data (Waruwu, 2023).

Data Source

This study uses data sources through the SINTA website (<https://sinta.kemdikbud.go.id/>) to collect accounting journal data. This website was developed in 2017 as a government initiative through the Ministry of Research, Technology, and Higher Education (KEMENRITEKDIKTI). This website functions as an indexer to measure the work of lecturers and researchers in Indonesia. Furthermore, researchers collected data on articles indexed in the SINTA journal using Harzing's Publish or Perish, software introduced in October 2006. Harzing explained that PoP was designed to support academic activities, especially in the citation process, which was then converted into various statistics using Google Scholar Query (Husna & Sayekti, 2023).

Data Collection Technique

The data collection technique in this study uses literature studies. The researcher began searching and collecting data in May 2024. The journal data used in this study are accounting journals indexed by SINTA (n=261) the journals were collected and duplicates were removed using Microsoft Excel (eliminated n=18), so that the final journal results are (n=243). Research articles using the ABC and TDABC methods through Harzing's Publish or Perish with the Google Scholar database with the criteria used, namely the publication name is filled in according to the accounting journal that has been obtained and eliminated, the title word and keywords are filled in "activity based costing", with a maximum result of 1000, and the criteria for the years 2015-2022. 52 journals were obtained from all the latest journals, namely 85 articles and 7 articles were eliminated that were not open access or the website was not available. So that the final data was obtained as many as 78 articles (69 ABC articles and 9 TDABC).

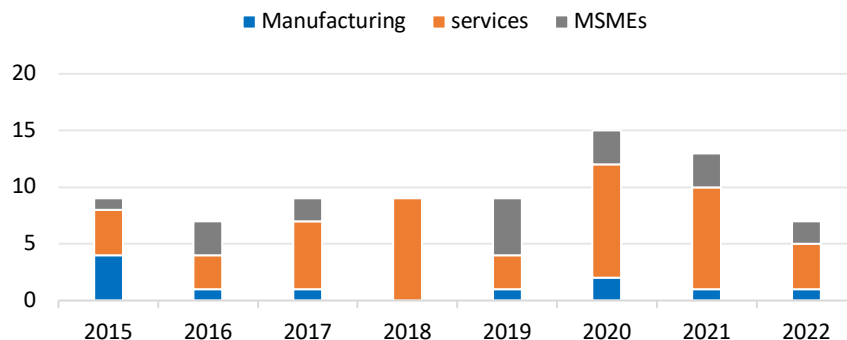
Data Analysis Techniques

In mapping to see the development of scientific publications on the topic of ABC and TDABC using bibliometric analysis. Researchers use Microsoft Excel to process data containing duplicates and group data, Mendeley software to complete and ensure that abstracts and author keywords have been filled in. Then for data visualization using Vosviewer software as an analysis tool. This software facilitates data processing, so that it can produce image visualizations based on the mapping focus. VOSviewer is used to build and visualize bibliometric networks. The results from VOSviewer will then be used as a descriptive illustration regarding the results of the analysis of the development of scientific publications (Perkasa et al., 2022).

RESULT AND DISCUSSION

Bibliometric analysis is carried out on publications using the ABC and TDABC methods, this approach directs researchers to map the literature published in the Google Scholar database (Quesado & Silva, 2021). The number of articles published during a given time is used to calculate publication activity (Mohammad & Mohd Salleh, 2022). Research on ABC has been carried out by many researchers and published in various scientific journals. Based on the total journals that publish articles about ABC, there are 3 journals with many articles, namely: Jurnal EMBA: Jurnal Riset Ekonomi, Manajemen, Bisnis dan Akuntansi with a total of 11 articles, publisher of Universitas Sam Ratulangi Manado; (2) Going Concern: Jurnal Riset Akuntansi with a total of 6 articles, publisher of Universitas Sam Ratulangi Manado; (3) Jurnal Riset Akuntansi dan Keuangan with a total of 2 articles, publisher of Universitas Pendidikan Indonesia. Researchers also grouped the most journals into articles that used the TDABC; (1) Jurnal Akuntansi with a total of 3 published articles, publisher of Universitas Katolik Indonesia Atma Jaya Jakarta and; (2) Jurnal Akuntansi Universitas Jember with a total of 2 articles, publisher Universitas Jember.

Over time, the ABC method has been applied in various industries and sectors. Although identical in the manufacturing sector, this method is now also widely used in various service and public sectors (Mubaroq & Setyorini, 2024). In viewing ABC and TDABC articles, 52 journals were obtained with 78 articles indexed by SINTA, consisting of 69 ABC articles (88.5%) and 9 articles discussing TDABC (11.5%). The article is classified into 3 companies, namely manufacturing companies, service companies, and SMEs. There are 10 articles that use the ABC method for manufacturing companies, 44 articles for service companies, and 15 articles for SMEs. Meanwhile, for articles that use the TDABC method for manufacturing companies, there is 1 article, 4 articles on service companies, and 4 articles on SMEs. It can be seen that the types of service companies from these two methods were most frequently studied over a period of 8 years.



Picture 2. Article Publication Based on the 2015-2022 Period

Source: Publish or Perish, 2024

Based on Figure 2, article publications by year can be seen that in 2015 there were 9 articles consisting of 3 ABC articles and 1 TDABC article on manufacturing companies, 4 ABC articles on service companies, as well as 1 TDABC article on SMEs. In 2016 there were 7 articles consisting of 1 ABC article on manufacturing companies, 2 ABC articles and 1 TDAB article on service companies, as well as 2 ABC articles and 1 TDABC article on SMEs. In 2017 there were 9 articles consisting of 1 ABC article on manufacturing companies, 4 ABC articles and 2 TDABC service companies, and 2 ABC articles on SMEs. In 2018 there were 9 articles consisting of 0 ABC articles on manufacturing companies, 9 ABC articles on service companies, and 0 for SMEs. In 2019 there were 9 articles consisting of 1 ABC article on manufacturing companies, 3 ABC articles on service companies, 4 ABC articles and 1 TDABC on SMEs. In 2020 there were 15 articles consisting of 2 ABC articles on manufacturing companies, 10 ABC articles on service companies, as well as 2 ABC articles and 1 TDABC on SMEs. In 2021 there are 13 articles consisting of 1 ABC manufacturing company article, 8 ABC articles and 1 TDABC service company, 3 ABC UKM articles. In 2022 there will be 7 articles

consisting of 1 ABC article on manufacturing companies, 4 ABC articles on service companies, and 2 ABC articles on SMEs. From this analysis, in the 2015-2022 period, article publication was generally highest, namely in 2020 with 15 articles and the lowest in 2022 and 2016, only 7 articles each.

In a study there are research methods used, research methods are basically a scientific way to obtain data with certain purposes and uses (Sugiyono, 2013). The results of the analysis from ABC and TDABC found 6 types of research methods, namely research using quantitative methods, there were 21 articles (26,9%), Qualitative research methods contained 28 articles (35,9%), descriptive research methods, there are 25 articles (32,1%), research and development (R&D) there are 2 articles (2,6%), Comparative research methods and charting the field contain 1 article each (1,3%). These results are the overall results of the two methods.

Judging from citations, there are 451 citations resulting from research published in the time period 2015 to 2022. There are 2 articles (2.6% of the total 78 articles) with the highest number of citations (≥ 30 citations). In addition, 2 articles (2.6% of the total 78 articles) with ≥ 20 citations, 10 articles (12.8% of the total 78 articles) with citations ≥ 10 citations, and 64 articles (82.1% of the total 78 articles) with < 10 citations. From the results of this citation, The 4 articles with the most citations are by title (1) Penerapan Metode Activity Based Costing System Dalam Menentukan Besarnya Tarif Jasa Rawat Inap Pada Rumah Sakit Umum Bethesda Kota Tomohon, author Brando Kaunang and Stanley Kho Walandouw with 41 citations; (2) Analisis Perbandingan Harga Pokok Produksi Dengan Metode Full Costing dan Metode Activity Based Costing Dalam Menetapkan Harga Jual Ruko Pada PT. Megasurya Nusalestari, author Sri Indriani Sugawa, Ventje Ilat and Meily Kalalo with 31 citations; (3) Penentuan Harga Pokok Produksi Pembangunan Rumah Dengan Menggunakan Metode *Activity Based Costing* (Studi Pada Perum Perumnas Regional VII Makassar), author Nurfatimah Rahmadani and Andi Wawo with 23 citations; (4) Analisis Penerapan Activity Based Costing Dalam Penentuan Tarif Rawat Inap Pada Rumah Sakit Robert Wolter Monginsidi Manado, author Aldi Geraldo Politon with 22 citations.

Research on ABC has been carried out by many researchers and published in many scientific journals. Based on the total journals that publish articles about ABC, there are 3 journals with the most articles; Jurnal EMBA: Jurnal Riset Ekonomi, Manajemen, Bisnis dan Akuntansi with a total of 11 articles, publisher Sam Ratulangi University Manado; (2) *Going Concern*: Jurnal Riset Akuntansi with a total of 6 articles, publisher of Sam Ratulangi University Manado; (3) Jurnal Riset Akuntansi dan Keuangan with a total of 2 articles, publisher of the Indonesian Education University. Researchers also grouped the most journals that published TDABC articles; (1) Jurnal Akuntansi with a total of 3 articles, publisher of the Indonesian Catholic University Atma Jaya Jakarta and; (2) Jurnal Akuntansi Universitas Jember with 2 articles, publisher of Jember University.

Co-authorship Mapping

This mapping is based on the results of an analysis of the relationships between researchers who contributed to a study. The data used in this co-authorship analysis is data collected via Harzing's Publish or Perish via the Google Scholar database and downloaded in RIS format, then input into VOSviewer software.



Figure 3. Co-authorship visualization

Source: VOSviewer Processed 2024

In the visualization in Figure 3, there are names of researchers from the articles that have been collected into one. These researchers are connected to each other, the name of the author or subject in Vosviewer is called an item which is marked with a small colored circle and the connecting line between items is called a link and the combination of items is called a cluster (Amalia & Suharso, 2024). These results were obtained with the criterion "minimum number of authors document " is 1 and the results obtained from a total of 141 authors diperoleh 11 items which is interconnected with 5 clusters. Clusters have different colors, this is used to differentiate clusters from each other. Based on this visualization, it can be seen that researchers have a productivity of documents that are connected and the most numerous are Ilat, V with 5 documents and 10 links. Meanwhile, the others only have 1 document and 2 links each.

Co-occurrences Mapping

Keyword mapping (Co-occurrences) is a mapping that is built from the results of analyzing the relationship between words that are key in a research. These keywords can be used to make it easier for other researchers to find references for the research they want to conduct (Amalia & Suharso, 2024). Keywords in the literature on ABC and TDABC research were analyzed using the co-occurrence network analysis tool in Vosviewer software. Co-occurrence analysis is one of the most effective methods for discovering trends and new study ideas in a particular field. The number of articles displaying a keyword map is determined by their appearance in the title, abstract, and keywords (Mohammad & Mohd Salleh, 2022), which was previously processed via Mendeley.

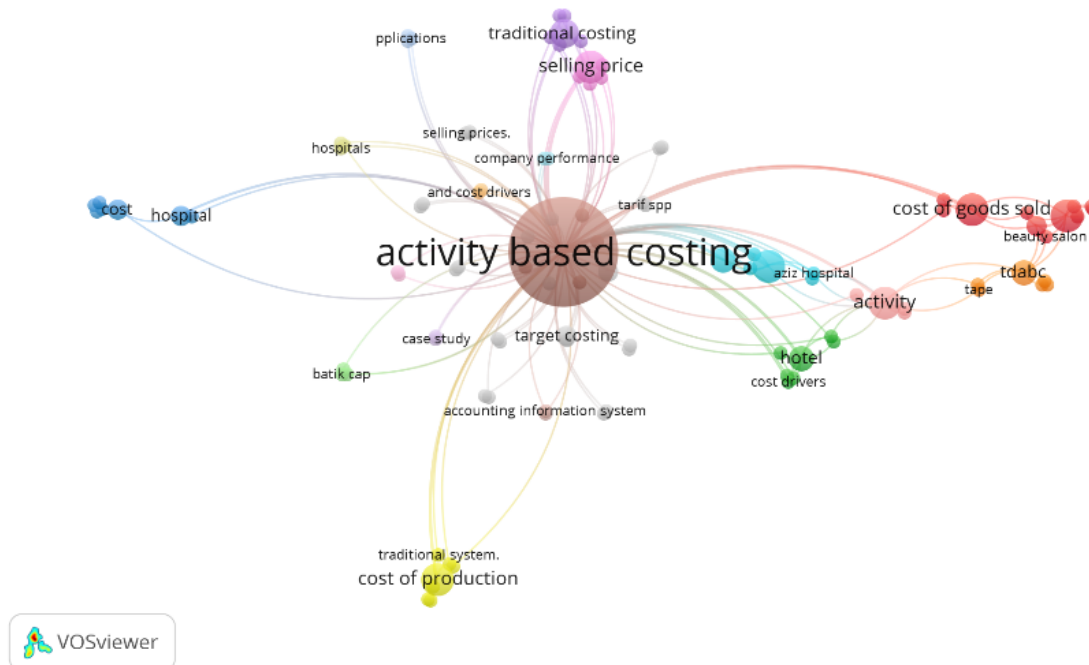


Figure 4. Keyword visualization

Source: VOSviewer processed 2024

Based on Figure 4, the data obtained with the criteria for the minimum number of occurrences of keywords in the title and abstract is set to 1 (Wibowo & Salim, 2022). The results of the analysis showed that 107 keywords were found and the visualization contained 32 clusters with different colors. In mapping keywords are shown by circles, while the relationships between these keywords are shown by lines (Mohammad & Mohd Salleh, 2022). Each cluster color contains the concepts most frequently used in ABC research and has a different size (Mubaroq & Setyorini, 2024).

Based on link strength and visualization frequency, keywords that are often used in research and keywords that are rarely used in research can be found. The highest frequency of keywords is activity based costing (55), activity (5), selling price (5), time driven activity based costing (5), traditional costing (4), dan cost of good sold (4). Meanwhile, the lowest keyword frequency is education cost, company performance, derterminant of leases, apartment, competitive advantage, product cost, cost accounting, health care, stamped batik, selling price, traditional system, costing method with each appearance 1 time.

CONCLUSION

This bibliometric analysis can provide an overview of research trends and developments related to ABC and TDABC. Based on mapping visualizations in 78 published articles, this research found several important pieces of information that help describe an appropriate representation of ABC and TDABC research. Through article analysis, it was concluded that in 2015-2022 a large number of researchers in Indonesia in SINTA indexed journals used the ABC method more than TDABC, these results are in accordance with the data processing criteria. Based on the empirical findings, the level of interest of researchers shows that the highest number of publications occurs in service company types, and there are keywords that are interconnected with the ABC and TDABC methods which are still minimally researched. The results of keyword mapping can be used as an evaluation for future ABC research.

Keywords with a low frequency indicate that little research has been carried out using these keywords. This can be used as an opportunity for updating research.

Apart from the findings, of course there are limitations to this research, in particular the data used is only taken from journals indexed by SINTA via the Google Scholar database, limited years of data taken, and the screening data used must contain the words "activity based costing" in the title of the article. Based on these limitations, future researchers can develop broader research using data sources such as Scopus, Web of Science, and so on. The implications of this research can identify knowledge gaps for further research, seen from the co-occurrence results which provide an overview of keywords that are still little researched. Therefore, this could be an opportunity for future researchers in the same field.

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