UNLOCKING THE FUTURE OF ASSET MANAGEMENT: A SYSTEMATIC REVIEW OF IOT TRENDS, CHALLENGES, AND OPPORTUNITIES

Yeni Priatna Sari[1]*, Ida Afriliana[2], Abdul Kharis Almasyhari[3], Ayu Nurkhasanah[4]

[1,2,4] Polytechnic Harapan Bersama, Tegal/Central Java, Indonesia. [3]Muhamadiyah Semarang University, Semarang, Indonesia.

Email :

[1]yeni.priatna@gmail.com*,[2]idaafriharahap@gmail.com,[3]abdul.kharis@unimus.ac.id,[4]ayunrkhsnh@gmail.com

*Correspondence Author

Abstrak

Penelitian ini bertujuan untuk mengkaji secara sistematis berbagai literatur yang membahas tentang pemanfaatan Internet of Things (IoT) dalam manajemen aset. IoT sebagai salah satu teknologi yang berkembang pesat memiliki potensi yang signifikan dalam mendukung otomatisasi dan efisiensi proses akuntansi. Penelitian ini mengidentifikasi tren terkini dalam adopsi IoT, baik dari sisi korporat maupun regulasi. Penelitian ini akan mengkaji penelitian dengan batasan penelitian yang dipublikasikan oleh penelitian terindeks Scopus dan penelitian yang dilakukan selama 10 tahun terakhir. Kata kunci yang akan digunakan untuk mencari berbagai literatur antara lain internet of things, sistem informasi aset. Temuan kajian literatur ini akan memberikan landasan bagi peneliti dan praktisi akuntansi untuk mengembangkan sistem akuntansi yang lebih inovatif dan responsif terhadap kebutuhan bisnis yang terus berkembang di era digital serta penelitian yang dapat dikembangkan terkait dengan teknologi dan manajemen aset.

Unlocking the Future of Asset Management: A Systematic Review of IoT Trends, Challenges, and Opportunities

Abstract

This study aims to systematically review various literature that discusses the use of the Internet of Things (IoT) in asset management. IoT, as one of the rapidly developing technologies, has significant potential in supporting the automation and efficiency of accounting processes. The study identifies the latest trends in IoT adoption, both from the corporate and regulatory side.This study will review research with the limitations of research published by Scopus indexed research and research conducted over the last 10 years. Keywords that will be used to search for various literature include the internet of things, asset information system.The findings of this literature review will provide a foundation for researchers and accounting practitioners to develop more innovative and responsive accounting systems to the evolving needs of businesses in the digital era as well as research that can be developed related to technology and asset management.

INTRODUCTION

The development of information technology has had a significant impact on various fields, including in the field of accounting. One of the innovations that continues to grow is the use of the Internet of Things (IoT) in the management of accounting systems (Fauzi et al., 2022). IoT allows devices and systems to connect with each other and exchange data in real-time, creating greater automation and efficiency in the collection, processing, and reporting of financial data. Amidst

these technological advancements, various companies in developed countries are beginning to adopt IoT to improve accuracy and transparency in their accounting processes. However, the adoption of this technology also poses various challenges that require in-depth study. The application of IoT in the field of accounting promises many benefits. Among the benefits are increased efficiency and reduced human error (Beryl Odonkor et al., 2024). In addition to the benefits of using the technology, it also has challenges. Those challenges include data security, privacy, and compatibility between different systems. Additionally, the adoption of IoT in accounting requires significant investments in technology infrastructure and workforce training, which can be a barrier for some organizations. Systematic research on the trends, challenges, and opportunities for using IoT in accounting is important to provide a comprehensive overview of how this technology can be applied effectively in the field of accounting (Lu et al., 2018).

This study aims to conduct a systematic review of the literature that discusses the use of IoT in accounting systems, especially in the field of asset management, with a focus on emerging trends, challenges, and opportunities (Amon, 2022)(Romdloni, 2022). This review is expected to provide a comprehensive overview of IoT implementation in accounting and help companies understand how to make optimal use of this technology. In addition, this study also seeks to identify gaps in the literature and provide recommendations for further research on the integration of IoT technology in the world of accounting. References from this study include the work of Cai et al (Beryl Odonkor et al., 2024) and Vazquez et al. (Vazquez et al., 2020) which has highlighted the role of IoT in accounting and data security.

Some previous research is related to the development of the internet of things on accounting and asset management. Among them is a study conducted by Mudiar and Hidayat, 2019 (Mudiar & Hidayat, 2019) outlining about web-based asset management. Meanwhile, research conducted by Karmanska, 2021 (Karmańska, 2021) Explain about the advantages as well as challenges in the field of accounting. This study was conducted with primary data and only outlined the advantages and some future challenges without comparing it with previous research. Research conducted by Utama et al, 2024 (Nur et al., 2024) explain the influence of the Internet of Things (IoT) on operational changes to business and asset management strategies. This study only explains the benefits and does not show comparisons with previous studies. Meanwhile, research conducted by Lu et al, 2018 (Lu et al., 2018) has compared several previous studies on the use of the Internet of Things in the business world, but it is still around the business world and organizations.

This research is important to carry out because the accounting profession is a profession that is closely related to data and technology(Kroon et al., 2021) So that various kinds of the latest trends, as well as challenges related to the implementation of the latest technology must be carried out. Therefore, this study focuses on comparing previous studies related to the use of Internet of Things technology in the world of accounting and in particular on the management of organizational assets. Based on the background description above, the formulation of the problem in this study is as follows:

1. How is the literature increasing that reveals about Internet of Things technology and accounting?
2. How is the use of the internet of things in the world of accounting?
3. How big is the impact of using the internet of things in managing company assets?
4. What are the trends, opportunities and challenges for accounting research related to the use of the internet of things?

Bibliometric Analysis

Bibliometrics comes from the words biblio or bibliography and metrics. Biblio means books and metrics related to measurement. Bibliometrics means measuring or analyzing books/literature using mathematical and statistical approaches (Aria & Cuccurullo, 2017). Bibliometric analysis is a quantitative method used to measure and analyze scientific literature. This technique leverages data from publications, such as journal articles, books, and conferences, to evaluate patterns of publications, citations, and collaborations between researchers, institutions, or countries. Through this analysis, researchers can understand research trends, identify trending topics, and evaluate the impact of specific scientific works. In addition, bibliometric analysis is also used to assess the productivity of researchers or institutions and see how a work affects a particular field of study (Paul & Criado, 2020)   In practice, bibliometric analysis often involves using specialized software

such as VOSviewer or CiteSpace to visualize data and identify collaboration networks or citation patterns. Techniques such as citation analysis, co-keyword analysis, and co-author analysis are often used to dig deeper into the relationships between different elements in the scientific literature. Thus, this analysis becomes a useful tool for researchers and policymakers to get an overview of the development and direction of research in a field (Priatnasari et al., 2023).

Technology in Accounting and Business

Technology plays an important role in the world of accounting by improving efficiency, accuracy, and speed in the processing of financial data (Kroon et al., 2021). With the help of technology, accountants can perform complex data analysis more easily and quickly, reduce the risk of human error, and produce more timely financial reports. In addition, technology enables the automation of accounting processes, such as transaction recording, bank reconciliation, and financial reporting, which previously required a lot of time and effort. This not only increases productivity, but also allows accountants to focus on more strategic tasks, such as performance analysis and financial planning (Zenuni et al., 2016).

Internet of Things

There are several definitions of *Internet of Things. Internet of Things* (IoT). Among them is a concept that describes a network of physical devices that are interconnected through the internet, allowing them to collect and exchange data (Atzori & Morabito, 2010). IoT devices can include a wide variety of objects, such as sensors, machines, vehicles, home appliances, and other devices equipped with sensors and software. IoT allows these devices to interact with each other as well as with humans through internet networks, creating automated and intelligent systems that can improve efficiency and convenience. Another definition based on a relevant Wikipedia article is 'The Internet of Things (IoT) is a network of devices such as vehicles and household appliances that contain electronics, software, sensors, actuators, and connectivity that allow these things to connect, interact, and exchange data. IoT involves extending internet connectivity beyond devices such as smartphones to a variety of physical devices and everyday objects. Embedded with technology, these devices can communicate and interact over the Internet, and they can be monitored and controlled remotely (ICAEW, 2019)
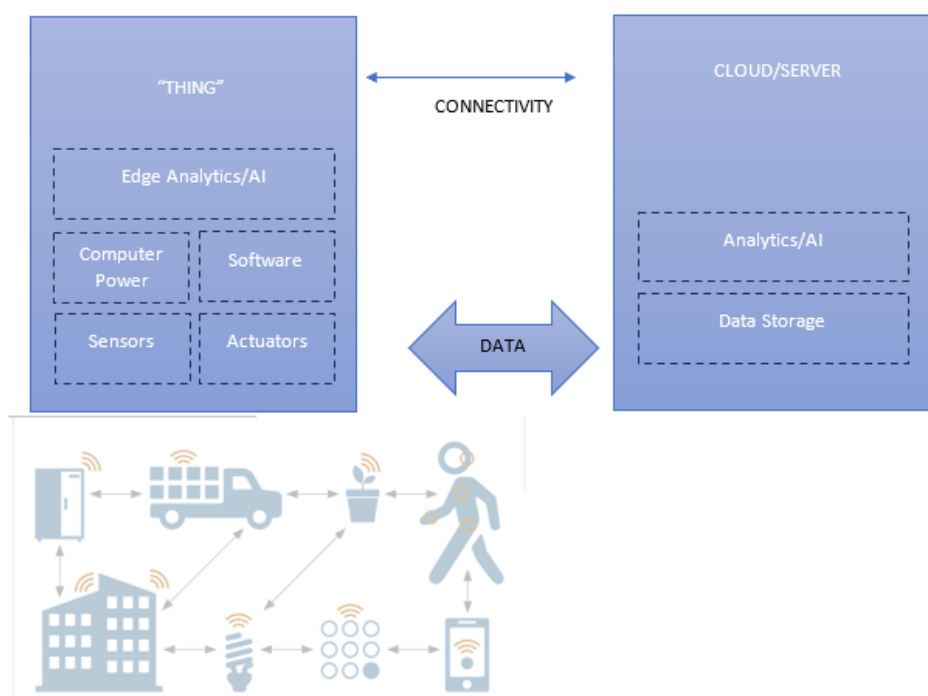

Figure 1. Internet of Things

The first definition of IoT was formulated by Atzori et al., 2010 (Atzori & Morabito, 2010), which states that IoT is the result of the convergence of three visions, namely "thing-oriented", "internet-oriented", and "semantic-oriented" vision. Atzori first introduced IoT semantically as a "network of interconnected objects around the world". They approach IoT from the point of view

of "widespread presence"IoT semantically as a "network of interconnected objects around the world". Atzori approaches that IoT is seen from the point of view of the "widespread presence" of uniquely handled objects around people with whom it can interact

Asset Management

Asset Management by using *Internet of Things* (IoT) is a modern approach to managing physical assets more efficiently and effectively. IoT enables connectivity between devices and assets through sensors and internet networks, which allows for real-time data collection. In the context of asset management, IoT is used to track the location, condition, and usage of assets continuously (I. Lee & Lee, 2015). IoT sensors can be installed on various types of assets, such as manufacturing equipment, vehicles, or inventory items, to monitor critical parameters such as temperature, humidity, usage levels, and operational status.

The main advantage of using IoT in asset management is increased visibility and control (Gubbi et al., 2013). Organizations can monitor their assets in real-time, so they can identify potential issues before they become critical, reduce operational downtime, and improve operational efficiency. Additionally, the data collected through IoT can be analyzed to understand usage patterns and predict maintenance needs, allowing for a predictive maintenance approach. Thus, IoT helps in better decision-making regarding resource allocation, asset replacement, and investment planning.

2.1 Research Model

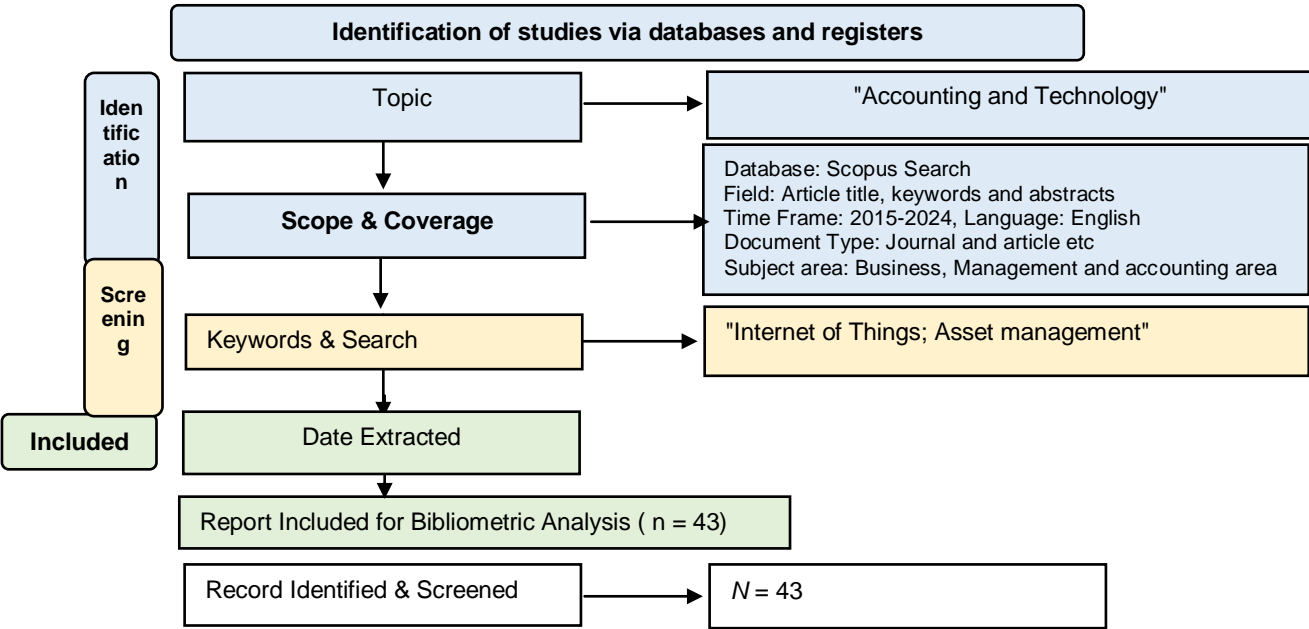The research model to be carried out is as follows:

Figure 2. Research Model

METHODOLOGY

This type of research is quantitative descriptive research. Quantitative descriptive research is a research method that aims to describe or explain phenomena or problems that occur using quantitative data, namely data that can be measured and processed statistically (Sugiyono, 2018). In this study, the researcher did not try to make a cause-and-effect relationship or test a specific hypothesis, but instead focused on collecting data and information that could provide a comprehensive picture of the subject being studied. Quantitative research according to Suliyanto (Suliyanto, 2018) is a research that uses data in the form of numbers or numbers as a basis by researchers.

The type of data that will be used in this study is quantitative data. The data source used is secondary data. Secondary data in this study was obtained from processing data from various studies that were included in the researcher's criteria. The population used for this study is all research published by Scopus indexed journals from 2015 to 2024 using keywords Internet *of things* search and asset management.

The analysis method used is bibliographic analysis. Bibliographic analysis or bibliometric analysis is a statistical method that can quantitatively analyze the research paper in question on a particular topic through mathematical means (Wibowo & Salim, 2022). This research uses R Studio analysis tools with biblioshiny (M&C, 2017) to process the data obtained.
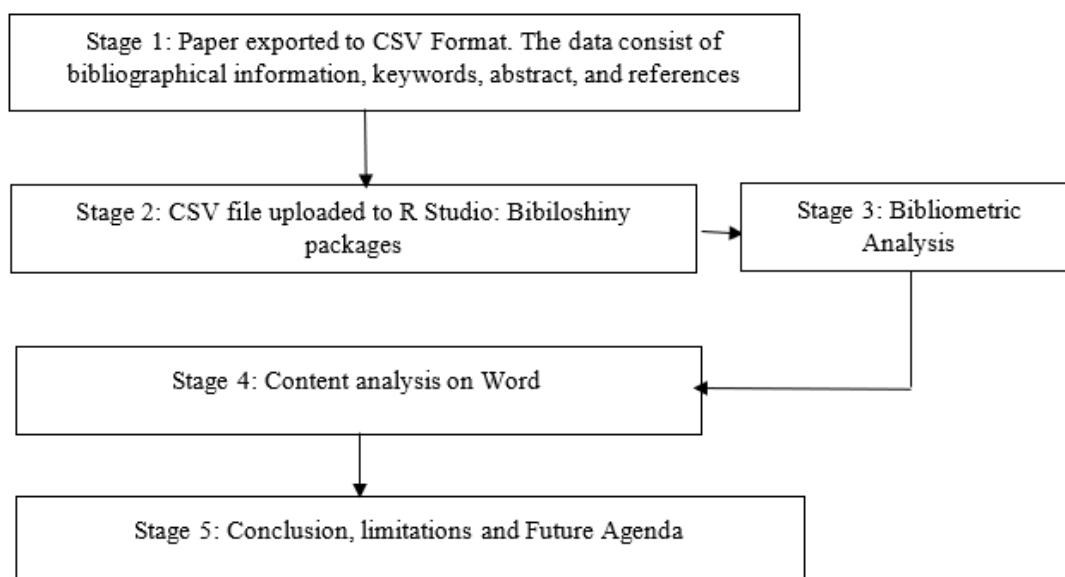

Figure 3. Bibliometric Analysis Procedur

RESULT AND DISCUSSION

Results

From the results of the research that has been carried out, the following results are obtained. This study uses the Scopus indexer to see the entire research document related to the material being researched. The Scopus indexer is used so that this research can produce a more reliable study.

Table 1. Description of Research Data

| Description	Results
Timespan	2015:2024
Sources (Journals, Books, Etc)	39
Documents	43
Annual Growth Rate %	27,65
Document Average Age	2,93
Average Citations Per Doc	22,93
References	1820

Table 1 above shows a description of the data from the study to be conducted. The data description shows the duration of the research period, the source of the documents used, the number of documents used, the annual growth rate of the paper, the age rate of the document, the average citations per document and the total number of citations from the documents used. This study uses data from the Scopus indexer from 2015 to 2024. The research that has been indexed is a total of 43 documents whose sources consist of journals, books, book chapters, conference papers and reviews.

**Table 2**. Types of Documents Used in this Study

DOCUMENT TYPES	
Article	20

Book	2
Book Chapter	6
Conference Paper	10
Reviews	5
Total Documents	43

In table 2, the number of details of the documents used in this study, namely research articles that have been indexed by Scopus in the amount of 20 articles, books related to asset management and *the internet of things* in the amount of 2 books, 6 book chapters, and the most papers presented in the conference in the amount of 10 pieces, In addition, there are also 5 reviews of conference papers.
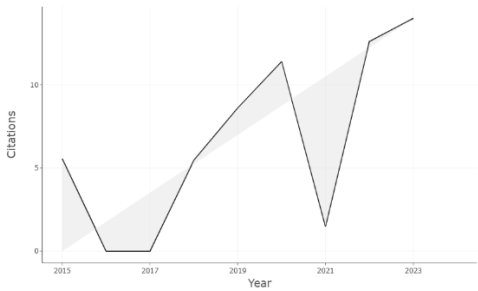
Picture 1. Total Citations per year

From table 2, a graph of citation trends (*citations)* from 2015 to 2024. The horizontal axis represents the year, while the vertical axis shows the number of citations received. The graph shows fluctuations in the number of citations throughout the year, with some significant spikes seen in the 2020 and 2022-2024 periods. In previous years (such as 2015 and 2019), quotes were relatively low, while in certain periods, quotes showed a sharp increase. The shaded areas in the graph show a general trend that is increasing over time, indicating that citations have been increasing in recent years, this can be said to be an indication of the increased relevance or acceptance of the work cited.
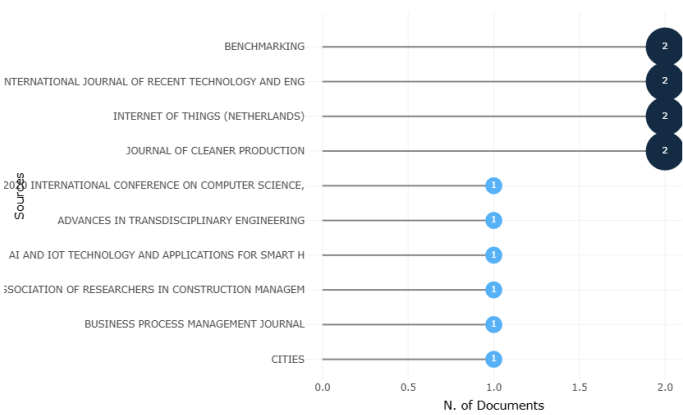

Picture 2. Most Relevant Sources

Figure 6 shows a visualization that illustrates the number of articles published by various institutions or affiliates. The horizontal axis represents the number of articles, while the vertical axis lists the names of universities or affiliates. From this visualization, it can be seen that the most studied articles in this study are sourced from Journal Benchmarking, Interneationa Journal of Recent Technology, Internet of Things, Journal of Cleaner Production. While other sources are only cited in one article. In general, this

visualization depicts the distribution of article publications based on affiliation with a circle size that shows the number of articles published by each institution.

Figure 4 is a *word cloud* that displays words related to the theme of asset management and related technologies, including the *Internet of Things*. Larger, thicker words indicate a higher frequency of their occurrence, signaling the importance of the topic in the context discussed.
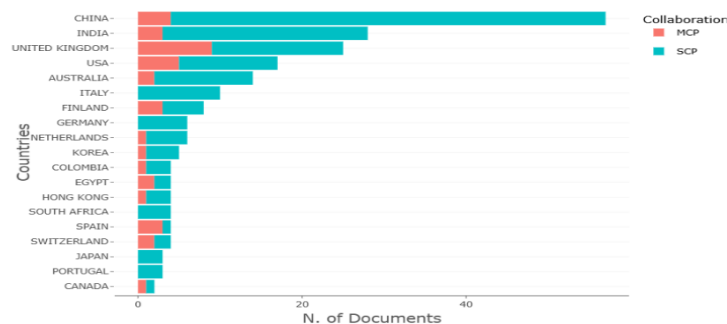
Picture 3. Country coresponding author

Figure 5 shows a visualization of the number of research documents or scientific publications from different countries, divided by type of collaboration. The horizontal axis depicts the number of documents (N. of Documents), while the vertical axis shows a list of countries. The publications are grouped into two categories of collaboration: MCP (*Multiple Country Publications*), which involves cross-country collaboration, and SCP (*Single Country Publications*), which shows research conducted within a single country without international collaboration.

From the graph, it can be seen that China has the highest number of documents, especially in the SCP category, which shows that the majority of research is conducted domestically. India, the United Kingdom, and the United States also rank at the top with significant contributions in both categories of collaboration, although each country has a more dominant proportion of SCPs than MCPs. Meanwhile, countries such as Canada, Portugal, and Japan have fewer documents, but still show involvement in international collaboration (MCP). This graph provides an overview of the distribution of research contributions and trends in collaboration patterns between countries.
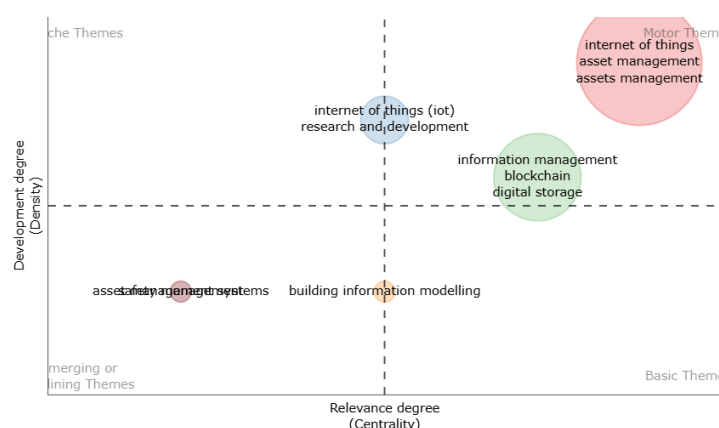

Picture 4. Thematic Map

This image is a strategic map or thematic analysis that groups various research themes based on two main dimensions: density on the vertical axis and centrality on the horizontal axis. The chart area is divided into four quadrants: Motor Themes (top right), *Niche Themes* (top left), *Emerging or Declining Themes* (bottom left), and *Basic Themes* (bottom

right). The theme in each quadrant reflects its level of development and strategic role in a particular research area.

The Quadrant Motor Themes includes themes such as the internet of things, asset management, information management, blockchain and digital storage that are considered to have a high level of development and relevance. This theme became the center of attention of the research because it had a great impact. On the other hand, *the Basic Themes* quadrant includes themes such as building information modelling, which are fundamentally relevant but less developed than motorcycle themes. Themes such as the internet of things and research and development are in the *Niche Themes* quadrant, showing topics that are growing but with more specific relevance. Meanwhile, themes in the Emerging *or Declining Themes* quadrant such as asset management systems have relatively low development and relevance, indicating the potential to decline or develop further depending on research trends.
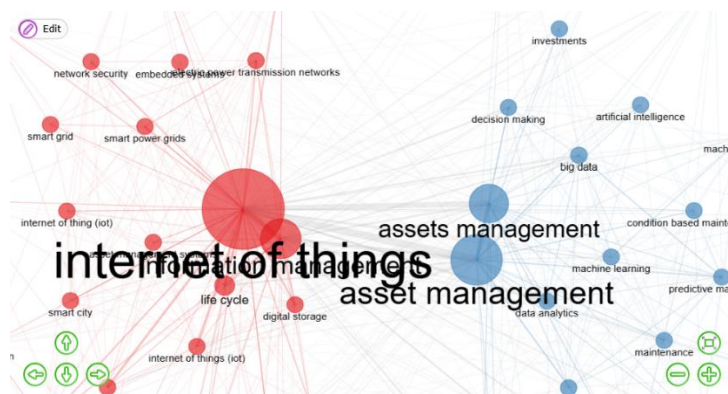
Picture 5. Co Occurence

This image is a visualization of a co-occurrence network that depicts the relationship between various research topics based on their simultaneous occurrence in scientific documents. The size of a circle or node indicates the rate at which a topic appears: the larger the node, the more often it appears. Lines or connections between nodes indicate the relationships between topics; Thicker lines signify higher contact frequencies. Key nodes such as the Internet of Things (IoT) and asset management appear to be dominant, signaling their central role in the analyzed literature.

The color of the nodes signifies different thematic groups or clusters. Red nodes tend to focus on technology infrastructure such as *the internet of things* and *smart power grids*, while blue nodes are related to asset management such as *maintenance, decision making, data analytics and machine learning*. This network structure shows that IoT and asset management have a broad relationship with various themes, demonstrating the importance of technology integration for asset management, data analytics, and network security in current research trends. This network helps identify key research themes and potential collaborations between fields.
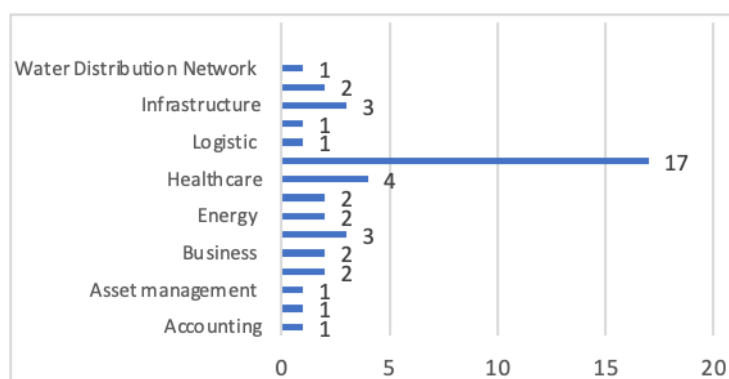
Picture 11. Areas of Life Using the Internet of Things

Figure shows the areas of life that use the Internet of Things in this study. From the graph, it can be seen that the field that uses the internet of things the most is in the manufacturing industry / smart factory. Figure 8 is a bar chart depicting the distribution of Internet *of Things* (IoT) technology development fields. In this diagram, the Industrial/Smart Factories field is the most dominant with a total of 17 developments, far surpassing other fields. This reflects that IoT technology is widely applied in the industrial sector and smart factories to improve efficiency, productivity, and process automation. In addition, the Healthcare field ranks second with a total of 4 developments. The health sector is one of the important areas for IoT applications, such as in real-time patient health monitoring and medical data management. Other areas that are showing considerable attention include *Construction*, *Business*, *Energy*, and *Smart City*, each of which has a development figure between 2 and 3. This shows that IoT is not only limited to one sector, but also touches various aspects of modern life.

Discussion

From table 1 above, it can be seen that this research was carried out for approximately 14 years to be able to produce as many documents as possible related to asset management and the internet of things. From table 1, it can also be seen that the growth rate of the paper is 18.04 per year, meaning that there is an average increase of 18.4% of publications per year, which can be interpreted that this topic still has opportunities to be researched. This study also has an *average age* of 3.71 years, which means that the journals cited in the papers studied are still in the last 3 to 4 years. And the average citations of the paper being researched is 11 times or one paper has been cited by 11 other papers on average.

Table 2 shows that research related to asset management and *the internet of things* is found in conference papers compared to research journals. This can show that this research is still very developed so that it is more discussed in research meeting forums. Research related to asset management and *the internet of things* also still has opportunities to be researched because the number is still less than 200 papers in the past 14 years. As for Figure 3, which is the relevant source in this study, it can be seen that the sources of the paper are the ejournal Benchmarking which is a business and management journal at the international level, the International Journal of Recent Technology and Engineering, the Internet of Things journal from the Netherlands with a field in computer science, and the Journal of Cleaner Production which focuses on the field of strategy and management. Of the four journals, unfortunately there is one journal that is indicated to be discontinuous in 2019, namely the Journal of Recent Technology and Engineering. Looking at these journals, it can be seen that the papers used in this study are quality papers.

From figure 5 above, it can be seen that China contributes scientific publications that come from *a single country publication* or a country with authors from one country. This shows that China is very leading in research in the field of internet of things and asset

management. China's position is followed by India and then the United Kingdom. This can be a concern for future researchers to look for sources from countries that conduct scientific publications. Figure 6 shows the motor themes in the form of the internet of things, asset management, blockchain, digital storage and information management. Meanwhile, niche themes are still with more or less the same theme, namely the internet of things and research and development. As for the theme of the building information model, it is a theme that is in the declining and basic areas. This shows that the theme of the building information model is a theme that is still rarely mentioned in this study. In figure 8, the researcher will describe what is discussed from each study. The research that explores the problem of water distribution network was conducted by (Rousso et al., 2023). Research with keywords *Smart City* using the internet of things has also been done by (Minoli, 2017) (Minoli et al., 2017) and (Heaton, 2019) (Heaton & Parlikad, 2019).

The use of IoT in the industrial world or in smart factories occupies the highest position in this study. Several researchers have conducted research on the application of IoT in the industrial world. Among them is the Ponnan research (2019) (Ponnan et al., 2019) Venkateswaran et al (Venkateswaran, 2020) Soori, 2023(Soori et al., 2023) Teoh, 2023 (Teoh et al., 2023) and Gopi, 2019 (Reddy & Kone, 2019). Research conducted by Venkateswaran et al (Venkateswaran, 2020) Revealing about the relationship between machines and humans through cloud computing which turns out to show a dramatic improvement in growing business efficiency and protecting the environment with better asset management techniques. The use of IoT in the healthcare sector is also researched by Carman et al, 2015 (C. K. M. Lee et al., 2015), and Madrin et al, 2021 (Madrin et al., 2021). The research conducted by Carman et al examines how the healthcare industry has focused efforts to optimize inventory management procedures through the incorporation of Information and Communication Technology in the form of tracking and data mining devices, in order to build an ideal inventory model. In contrast to what was done by Carman, et al, 2015 (C. K. M. Lee et al., 2015) research conducted by Madrin et al, 2021 (Madrin et al., 2021) conducting research on the use of real time location system (RTLS) technology so that hospitals can track their medical devices.

The use of IoT in construction written by Maxwell et al, 2024 (Meng et al., 2024), Guo et al, 2022(Guo et al., 2022) and research by Sarkar et al, 2020 (Sarkar et al., 2022). Research conducted by Maxwell et al, 2024 (Meng et al., 2024) aims to conduct a scientific mapping review of Digital Twin (DT) applications based on Building Information Modelling (BIM) to identify current hot topics and future research directions in this domain. In this study, a total of 85 relevant articles from the Scopus database have been reviewed and analyzed using bibliometric and scientific mapping approaches. Meanwhile, research conducted by Guo et al, 2022 (Guo et al., 2022). The agriculture sector has also developed IoT in terms of IoT-based data-based agricultural supply chain performance measurement frameworks. The research on measuring supply chain performance was conducted by Yadav et al, 2020 (Yadav et al., 2020). There are still few studies that research related IoT to the realm of agriculture.

In Karmanska research, 2021 (Karmańska, 2021) The Institute of Chartered Accountants in England and Wales (ICAEW) and in partnership with the Shanghai National Accounting Institute and Inspur have compiled a report on research related to the impact of IoT on accounting (ICAEW, 2019). The study took a sample of 211 respondents from Chinese companies of which 20% have used IoT in manufacturing, finance and IT sectors, procurement, supply chain management, quality process improvement, and financial management. According to them, the importance of IoT for accounting includes: 1) more accurate and transactions can be automated; 2) can track assets that can reduce downtime, improve asset analysis, reduce audit costs, can check automated stock taking,

asset location; 3) increasing asset utilization through process development and asset sharing; 4) cost optimization through analysis and preventive maintenance; 5) increasing company prices through improved fund management and data analysis; 6) improving employee performance through improving occupational health and safety; 7) an improvement in the company's forecasting and budgeting.

CONCLUSION

This research shows that the Internet of Things (IoT) has great potential in improving the efficiency and effectiveness of asset management. This can be seen from the increasing literature that uses the keywords of the internet of things and accounting and the increasing trend of IoT adoption shows a great opportunity to develop innovation in the field of asset management. The study also identifies the use of IoT in the business and accounting worlds to maximize company value. The impact of IoT on the world of accounting and business is very significant to reduce inventory management costs and the effectiveness of supply chain management. These findings can be the foundation for further research that focuses on the integration of IoT with other technologies, such as blockchain and machine learning to provide input for company management in managing companies. The study also shows that IoT generates real-time-based data that can be used by accountants in **the strategic decision-making process**. For example, decisions related to **resource allocation**, **investment in assets**, and **operational efficiency**. Using the Internet of Things (IoT) using sensors and data-driven technologies, IoT enables real-time asset monitoring, predictive maintenance optimization, and better decision-making. This can reduce downtime, increase productivity, and create transparency in asset management. Research trends related to business development and accounting using IoT are still very promising. While promising, IoT adoption faces various challenges, such as high technological infrastructure requirements, data security issues, user privacy, and difficulties in integrating with existing systems. In addition, the lack of universal standards in the implementation of this technology is also an obstacle for companies on a global scale.

BIBLIOGRAPHY

Amon, N. (2022). *Manajemen Aset Berbasis Internet of Things: Apa dan Mengapa?* Https://Www.Dhealth.Co.Id.

Aria, M., & Cuccurullo, C. (2017). Bibliometrix: An R Tool for comprehensive science mapping analysis. *Journal of Infometrics*, *11*, 959–975.

Atzori, & Morabito. (2010). The Internet of Things: A Survey. *Computer Networks*, *54*(15), 2787–2805.

Beryl Odonkor, Simon Kaggwa, Prisca Ugomma Uwaoma, Azeez Olanipekun

Amon, N. (2022). *Manajemen Aset Berbasis Internet of Things: Apa dan Mengapa?* Https://Www.Dhealth.Co.Id.

Aria, M., & Cuccurullo, C. (2017). Bibliometrix: An R Tool for comprehensive science mapping analysis. *Journal of Infometrics*, *11*, 959–975.

Atzori, & Morabito. (2010). The Internet of Things: A Survey. *Computer Networks*, *54*(15), 2787–2805.

Beryl Odonkor, Simon Kaggwa, Prisca Ugomma Uwaoma, Azeez Olanipekun Hassan, & Oluwatoyin Ajoke Farayola. (2024). The impact of AI on accounting practices: A review: Exploring how artificial intelligence is transforming traditional accounting methods and financial reporting. *World Journal of Advanced Research and Reviews*, *21*(1), 172–188. https://doi.org/10.30574/wjarr.2024.21.1.2721

Fauzi, E., Sinatrya, M. V., Ramdhani, N. D., Muhammad, Z., & Safari, R. (2022). Pengaruh kemajuan teknologi informasi terhadap perkembangan akuntansi Ruhuphy Ramadhan. *Jurnal Riset Pendidikan Ekonomi*, *7*, 190–190.

Gubbi, J., Buyya, R., Marusic, S., & Palaniswami, M. (2013). Internet of Things (IoT): A vision, architectural elements, and future directions. *Future Generation Computer Systems*, *29*(7), 1645–1660. https://doi.org/10.1016/j.future.2013.01.010

Guo, C., Xu, X., Hu, J., Zhang, J., & Zhou, Z. (2022). Intelligent Design and Construction Coordination of Nuclear Power Based on Digital Twin. *Advances in Transdisciplinary Engineering*, *23*, 144–153. https://doi.org/10.3233/ATDE220276

Heaton, J., & Parlikad, A. K. (2019). A conceptual framework for the alignment of infrastructure assets to citizen requirements within a Smart Cities framework. *Cities*, *90*(April 2018), 32–41. https://doi.org/10.1016/j.cities.2019.01.041

ICAEW. (2019). *The internet of things and accounting: lessons from China*. ICAEW. https://www.icaew.com/-/media/corporate/files/technical/business-and-financial-management/internet-of-things-and-accounting.ashx

Karmańska, A. (2021). Internet of Things in the Accounting Field. Benefits and Challenges. *Operations Research and Decisions*, *31*(3), 23–39. https://doi.org/10.37190/ord210302

Kroon, N., Do Céu Alves, M., & Martins, I. (2021). The impacts of emerging technologies on accountants' role and skills: Connecting to open innovation-a systematic literature review. *Journal of Open Innovation: Technology, Market, and Complexity*, *7*(3). https://doi.org/10.3390/joitmc7030163

Lee, C. K. M., Na, C. M., & Kit, N. C. (2015). IoT-based asset management system for healthcare-related industries. *International Journal of Engineering Business Management*, *7*. https://doi.org/10.5772/61821

Lee, I., & Lee, K. (2015). The Internet of Things (IoT): Applications, investments, and challenges for enterprises. *Business Horizons*, *58*(4), 431–440. https://doi.org/10.1016/j.bushor.2015.03.008

Lu, Y., Papagiannidis, S., & Alamanos, E. (2018). Internet of things: A systematic review of the business literature from the user and organisational perspectives. *Technological Forecasting and Social Change*, *136*(January), 285–297. https://doi.org/10.1016/j.techfore.2018.01.022

M, A., & C, C. (2017). Bibliometrix: an R tool for comprehensive science mapping analysis. *Journal of Informetrics*, *11*(4), 959–975.

Madrin, F. P., Klemm, M., & Supriyanto, E. (2021). Reliability Improvement of UWB Tracker for Hospital Asset Management System: Case Study for TEE Probe Monitoring. *ICOIACT 2021 - 4th International Conference on Information and Communications Technology: The Role of AI in Health and Social Revolution in Turbulence Era*, *November*, 69–74. https://doi.org/10.1109/ICOIACT53268.2021.9563986

Meng, Y., Antwi-Afari, M. F., Mehmood, I., Anwer, S., & Umer, W. (2024). Building Information Modelling-Based Digital Twin Applications in Construction Safety Management: a Review. *Association of Researchers in Construction Management, ARCOM 2024 - Proceedings of the 40th Annual Conference*, *September*, 51–60.

Minoli, D., Sohraby, K., & Occhiogrosso, B. (2017). IoT Considerations, Requirements, and Architectures for Smart Buildings-Energy Optimization and Next-Generation Building Management Systems. *IEEE Internet of Things Journal*, *4*(1), 269–283. https://doi.org/10.1109/JIOT.2017.2647881

Mudiar, W., & Hidayat, U. (2019). Sistem Informasi Manajemen Asset Berbasis Web. *Information Management for Educators and Professionals*, *4*(1), 41–50. https://doi.org/10.54543/etnik.v1i1.9

Nur, A., Utama, B., Jambi, U., Haryanti, T., Pemuda, P. T., & Pemuda, P. T. (2024). *IMPACT OF THE INTERNET OF THINGS (IOT) ON BUSINESS OPERATIONS AND ASSET MANAGEMENT*. 2(9), 2397–2410.

Paul, J., & Criado, A. R. (2020). The art of writing literature review: What do we know and what do we need to know? *International Business Review*, *29*(4), 101717. https://doi.org/10.1016/j.ibusrev.2020.101717

Ponnan, R., Supramaniam, M., & Abdullah, A. (2019). Implications for asset management in the broadcasting industry arising from industrial revolution 4.0. *International Journal of Recent Technology and Engineering*, *8*(3 Special Issue), 170–175. https://doi.org/10.35940/ijrte.C1030.1083S19

Priatnasari, Y., Suhardjanto, D., & Nur, A. (2023). A BIBLIOMETRIC ANALYSIS ON RISK REPORTING : A SYSTEMATIC LITERATURE REVIEW. In *Macroeconomic Risk and Growth in the Southeast Asian Countries: Insight from SEA* (Vol. 33, pp. 1–23). https://doi.org/10.1108/S1571-03862023000033B001

Reddy, H. G., & Kone, V. (2019). Study on implementing smart construction with various applications using internet of things techniques. *International Journal of Recent Technology and Engineering*, *7*(6C2), 188–192.

Romdloni, A. (2022). Penerapan Manajemen Aset dan Internet of Things (IoT) dalam Pengendalian Kehilangan Air Minum (Studi Kasus PDAM Kota Malang). *Jurnal Pendidikan Dan Konseling*, *4*, 2295–2307.

Rousso, B. Z., Lambert, M., & Gong, J. (2023). Smart water networks: A systematic review of applications using high-frequency pressure and acoustic sensors in real water distribution systems. *Journal of Cleaner Production*, *410*(April). https://doi.org/10.1016/j.jclepro.2023.137193

Sarkar, D., Patel, H., & Dave, B. (2022). Development of integrated cloud-based Internet of Things (IoT) platform for asset management of elevated metro rail projects. *International Journal of Construction Management*, *22*(10), 1993–2002. https://doi.org/10.1080/15623599.2020.1762035

Soori, M., Arezoo, B., & Dastres, R. (2023). Internet of things for smart factories in industry 4.0, a review. *Internet of Things and Cyber-Physical Systems*, *3*(April), 192–204. https://doi.org/10.1016/j.iotcps.2023.04.006

Sugiyono. (2018). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. CV. Alfabeta.

Suliyanto. (2018). *Metode Penelitian Bisnis untuk Skripsi, Tesis, & Disertasi*. Andi Offset.

Teoh, Y. K., Gill, S. S., & Parlikad, A. K. (2023). IoT and Fog-Computing-Based Predictive Maintenance Model for Effective Asset Management in Industry 4.0 Using Machine Learning. *IEEE Internet of Things Journal*, *10*(3), 2087–2094. https://doi.org/10.1109/JIOT.2021.3050441

Vazquez, A., Garcia, M., & Jimenez, R. (2020). IoT and cybersecurity: Challenges for financial systems. *International Journal of Financial Studies*, *8*(1), 25–39.

Venkateswaran, N. (2020). Industry 4.0 solutions - A pathway to use smart technologies / build smart factories. *International Journal of Management*, *11*(2), 132–140. https://doi.org/10.34218/IJM.11.2.2020.014

Wibowo, E., & Salim, T. A. (2022). Analisis Bibliometrik Penelitian dengan Tema "Digital Archive." *Jurnal Ilmu Informasi, Perpustakaan, Dan Kearsipan*, *24*(2), 93–105. https://doi.org/10.7454/jipk.v24i2.004

Yadav, S., Garg, D., & Luthra, S. (2020). Development of IoT based data-driven agriculture supply chain performance measurement framework. *Journal of Enterprise Information Management*, *34*(1), 292–327. https://doi.org/10.1108/JEIM-11-2019-0369

Zenuni, M. B., Begolli, M. T., & Ujkani, D. M. (2016). Impact of information technology in the accounting profession. *Conference: 3-5 Th International Conference "Information System and Technology Innovations: Projecting Trends to New Economy," June 2014*, 1–11.