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BRIDGING GAPS: A BIBLIOMETRIC ANALYSIS OF DIGITAL TECHNOLOGY IN ACCOUNTING EDUCATION AND ITS ROLE IN SUSTAINABILITY

Dian Li[♣]
Tunku Puteri Intan Shafinaz School of Accountancy
Universiti Utara Malaysia

Rafeah Mat Saat
Accounting Information System Research and Development Institute
Tunku Puteri Intan Shafinaz School of Accountancy
Universiti Utara Malaysia

Ku Maisurah Ku Bahador
Institute for Strategic and Sustainable Accounting Development
Tunku Puteri Intan Shafinaz School of Accountancy
Universiti Utara Malaysia

ABSTRACT

This study investigates the role of digital technology as a driver of inclusive and adaptive learning practices in accounting education, with a focus on its contribution to Sustainable Development Goals (SDG 4 on Quality Education and SDG 8 on Decent Work and Economic Growth). Drawing on bibliometric analysis of 261 publications from Scopus (1986–2024), the study maps publication trends, leading contributors, and thematic developments in the field. The findings reveal that digital tools enhance accessibility, support lifelong learning, and prepare students with digital competencies for future employment opportunities, thereby aligning with the aims of both SDGs. Thematic clustering identifies four key dimensions: digital learning methods, institutional adaptation, professional alignment, and data-driven tools. While global interest in this area is growing, significant gaps remain in embedding sustainability principles and addressing geographical disparities in academic publications. The study offers insights for educators, researchers, and policymakers seeking to advance digital technology in accounting education in support of inclusive and sustainable development.

Keywords: digital technology; accounting education; sustainability; Sustainable Development Goals; bibliometric analysis

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[♣] Corresponding author: Tunku Puteri Intan Shafinaz School of Accountancy, Universiti Utara Malaysia, 06010 UUM Sintok Kedah Darul Aman, Malaysia, +601118970291, li_dian@cob.uum.edu.my

1. INTRODUCTION

The Sustainable Development Goals (SDGs), introduced by the United Nations (UN) in 2015, provide a blueprint for tackling critical global challenges by 2030. They aim to eradicate poverty, protect the planet, and foster peace and prosperity for all (Jusoh et al., 2024). Among these goals, education is central to this agenda, equipping individuals with the knowledge and skills needed to address pressing issues (Oparaji & Ugwu, 2019). Some goals explicitly stress equitable learning and inclusive growth. SDG 4 promotes inclusive, quality education (Costa et al., 2024) , while SDG 8 focuses on productive employment, sustainable growth, and decent work (Othman & Ameer, 2024). Together, they highlight the need for education systems that are forward-looking and socially responsible.

As the accounting profession evolves through digitalisation, accounting education must adapt accordingly. Emerging technologies such as artificial intelligence, blockchain, and big data are reshaping graduate skillsets and the delivery of content. Digital platforms not only modernise pedagogy but also expand access to lifelong learning, supporting SDG 4 on quality education (Saini et al., 2023). By equipping students with future-ready competencies and enhancing employability in a digital economy, these innovations also advance SDG 8 on decent work and sustainable growth (Makarenko & Plastun, 2017).

Although technology integration in accounting education shows significant potential, existing literature lacks comprehensive and integrative analysis. Most studies focus on either pedagogical or professional dimensions, often neglecting links to broader sustainability goals (Amin et al., 2024). While some work addresses digital education and sustainability separately, little explores how digital tools in accounting education can support the SDGs (Bebbington & Unerman, 2020; Kunskaja et al., 2023). Moreover, bibliometric studies are also limited, constraining insights into how educational innovations can align with industry needs and sustainability priorities (Theuri et al., 2024). This gap restricts understanding of how technology-enhanced accounting education can advance lifelong learning, professional readiness, and social inclusion.

In response, this study investigates how digital technology in accounting education contributes to SDG 4 (Quality Education) and SDG 8 (Decent Work and Economic Growth). Through bibliometric analysis, it explores publication trends, key contributors, and thematic developments to show how digitalisation fosters inclusive, adaptive, and sustainability-oriented learning in higher education. This study is guided by the following research questions, which aim to investigate how digital technology in accounting education relates to sustainable development, particularly regarding access, innovation, and global equity:

1. What is the current trend of scholarly literature on digital technology in accounting education, and how do these relate to themes of access and skills development aligned with SDG 4 and SDG 8?
2. How have global publication patterns evolved in addressing digital inclusion and employability in accounting education?

3. Which countries, journals, and authors have contributed most significantly to advancing digital innovation in accounting education aligned with quality education and decent work?
4. What are the prevailing themes and emerging topics relating to the principles of sustainable development in accounting education?

2. LITERATURE REVIEW

2.1 Digital technology in Accounting Education

According to Garfield (2006), bibliometric research provides a comprehensive approach for analysing the historical evolution and structural dynamics of a field. It tracks the information flow, assesses the influence of academic journals, and evaluates the long-term citation impact of publications. This presents the distinctive role of bibliometrics as a research method for assessing and comprehending specific research fields.

Only few studies have examined the impact of emerging technologies on accounting education in depth. Pan & Seow (2016) stress the importance of IT and propose specific courses, while Tavares et al. (2023) call for broader curriculum reform to meet Era 5.0's demands. Pargmann et al. (2023) highlight the need for greater expertise in managing digitalisation, and Amin et al. (2024) identify essential modern skills and curriculum integration. Handoyo (2024) points to evolving post-COVID learning environments, advanced strategies, and the role of mental well-being, while Indrayani et al. (2024) focuses on AI, big data, and blockchain, offering pathways for their integration into curricula. Collectively, these studies emphasise the need for stronger collaboration between academia and the accounting profession to ensure resilience and sustainability.

Other studies assess specific technologies on accounting education. Dalwai et al. (2021) highlight the slow progress of big data analytics in education, while Lardo et al. (2022) stress updating curricula to enable blockchain adoption. Brabete et al. (2024) and Romero-Carazas et al. (2023) highlight AI's growing role, emphasising curriculum reform and continuous training to equip accountants with evolving skills.

The integration of digital technologies in accounting education is not only a response to technological change but also aligns with sustainable development, particularly SDG 4. Tools such as MOOCs, cloud platforms, and virtual classrooms enhance access, flexibility, and inclusion, advancing lifelong learning and educational equity (Lambert, 2020). At the same time, the profession's rapid digitalisation demands agile curricula to address critical skills gaps (Andiola et al., 2020). Cloud platforms, data analytics, and automation enhance employability and support SDG 8 by linking training with professional practice. More broadly, digitalisation promotes inclusive, adaptable learning while advancing sustainability through participation and lifelong learning.

Although sustainability-related terms were not included in the initial bibliometric search, digitalisation in accounting education clearly aligns with SDGs 4 and 8. It should therefore be

seen not only as a pedagogical or technological development but also as a strategic contributor to Education for Sustainable Development, an area often underexplored in higher education discourse.

2.2 Sustainability in Accounting Education

Although the importance of embedding sustainability in accounting education has long been recognised (Gray et al., 1994; Parker, 2007), integration across curricula remains uneven. Early critiques in the U.S. and New Zealand highlighted the dominance of technical content and the neglect of broader competencies such as ethics, critical thinking, and social responsibility (Albrecht & Sack, 2000; Wells et al., 2009). Despite frameworks designed to expand learning outcomes (Scott & Yates, 2002), sustainability often stayed peripheral, addressed more conceptually than in practice.

Recent studies view sustainability as a transformative force in accounting education. Twyford et al. (2024) argue that SDG-aligned pedagogy is essential for developing socially responsible and digitally fluent graduates, directly supporting SDGs 4 and 8 through inclusive learning, employability, and lifelong learning. Similarly, Cho & Costa (2024) identify sustainability accounting education as a higher education imperative, calling for constructivist pedagogies and closer collaboration between universities and professional bodies to embed sustainability into professional expectations.

In digitally evolving contexts, Abdullah et al. (2024) show how blockchain adoption in Saudi Arabia enhances innovation, access, and quality in accounting education. Their findings highlight the potential for digital tools to advance equity and global engagement, reinforcing SDGs 4 and 8 even without explicit sustainability framing. While sustainability is often peripheral in the broader literature, individual cases such as blockchain adoption illustrate its potential for integration. Yet, regional disparities remain. Franco et al. (2019) report gaps in curricula and policies, with Asia-Pacific lagging in several SDGs and Europe and the Americas facing challenges in others. Such variation highlights the uneven capacity of higher education institutions and the difficulty of building a unified framework.

Together, those insights emphasise the growing convergence of sustainability and digital transformation in accounting education, particularly in relation to SDGs 4 and 8. However, the absence of systematic bibliometric mapping highlights a clear gap, providing the rationale for the subsequent review and the focus of this study.

2.3 Previous Studies on Bibliometric Analysis on Technology in Accounting Education

While digitalisation is reshaping how accounting is taught, sustainability is redefining why it is taught. Yet, bibliometric research has paid limited attention to the role of technology in accounting education. To address this gap, the present study conducts a comprehensive bibliometric analysis of the existing literature. Table 1 summarises prior studies, outlining their authors, domains, search queries, objectives, data sources, coverage, and main findings.

Table 1: Summary of Previous Studies

Author	Domain & Search Query	Objective of the Study	Total Document, Data Source & Coverage	Main Findings
Amin et al. (2024)	("Emerging Technologies" OR "Digital Transformation," OR "Accounting Technologies" OR "Digitalization," OR "Big Data" OR "Machine Learning," OR "Artificial Intelligence," OR "Cybersecurity," OR "Blockchain" OR "ChatGPT," AND "Accounting Education" OR "Accounting Profession" OR "Accounting Skills" OR "Accounting Graduates" OR "Accounting Curriculum").	Identify and discuss influential aspects of accounting education literature in the digital era.	287 studies indexed by the Scopus Database from 1982 to 2023	The impact of emerging technologies on the accounting profession," "the essential skills for modern accountants" and "the integration of technology into the accounting curricula. The most productive institutions and the leading journals, countries, peaking publishing year of 2023.
Indrayani et al. (2024)	'Accounting' AND 'technology'	Exploring the progression of research on developing technologies in the accounting domain.	324 articles indexed by the Scopus Database from 1982 to 2024	The study maps emerging technologies in accounting into four clusters based on the technology acceptance model and highlights research gaps, focusing on automation, AI, big data, blockchain, and cloud computing.

Author	Domain & Search Query	Objective of the Study	Total Document, Data Source & Coverage	Main Findings
Handoyo (2024)	"Information," AND "Technology," AND "Accounting," AND "Education."	Identify the prevailing themes, trace the development of trends over time, and identify any gaps in the literature that require further research.	522 documents indexed by Scopus Database from 1991 and 2023	Integrating higher education with emerging technologies and the need for advanced educational strategies; Learning environments have shifted by the COVID-19 pandemic; the importance of mental well-being in accounting education
Theuri et al. (2024)	Technology related articles in seven journals	1. Identify the type of technology-based accounting education research being published, 2. Identify the methodology used and the sources of data, 3. Identify the trends on technology-focus in accounting education research, and 4. Discuss possible future research directions.	187 articles from 2010-2020 from seven journals including: (1) Accounting Education, (2) The Accounting Educators' Journal, (3) Accounting Perspectives, (4) Advances in Accounting Education: Teaching and Curriculum Innovations, (5) Global Perspectives on Accounting Education, (6) Issues in Accounting Education, and (7) Journal of Accounting Education.	Three time-period was categorised based on AACSB's timeline for issuance of Standard A7 and Standard A5. 2010-2012 as Period 1, 2013-2017 as Period 2 2018-2020 as Period 3. Research method are mainly case study (29%) and empirical/survey (27%); technology focus is Excel (Excel) and XBRL (16%); Empirical survey articles focus on online courses/degrees (18%), curriculum development (16%) and online

Author	Domain & Search Query	Objective of the Study	Total Document, Data Source & Coverage	Main Findings
				homework platform (14%).
Al Ghatrifi et al. (2023)	Stage 1 "Accounting learning" AND "software" OR "artificial intelligence" OR "AI" OR "cloud-based" OR "cloud based" OR "cloud" OR "big data" OR "bigdata" OR "information communication technology" OR "ICT" OR "information technology" OR "IT" OR "data analytics" OR "mobile" OR "internet of things" OR "IoT" OR "block chain" OR "blockchain" OR "enterprise resource planning" OR "ERP" OR "financial technology" OR "Fintech" OR "crowd funding" OR "computer assisted auditing techniques" OR "CAATs" stage 2 "Accounting teaching" AND "software" OR "artificial intelligence" OR "AI" OR "cloud-	This study aims to find and assess the literature on technology (Software, artificial intelligence, blockchain, cloud, big data, enterprise resource planning, information communication technology, data analytics, mobile computing, fintech, internet of things, and computer assisted auditing techniques) in accounting teaching and learning.	66 articles indexed in Scopus Database from 1993 and 2022	Accounting courses are utilising modern technologies like AI, technology-based educational materials, gamified mobile learning apps, big data analysis, cloud computing, Linux-based teaching platforms, blockchain coding, storytelling techniques, hands-on technical exercises, practical blockchain implementation, IDEA software use, and MS Excel. The study also emphasizes ChatGPT as a valuable interactive tool for assisting and improving teaching and learning in accounting education.

Author	Domain & Search Query	Objective of the Study	Total Document, Data Source & Coverage	Main Findings
	based" OR "cloud based" OR "cloud" OR "big data" OR "bigdata" OR "information communication technology" OR "ICT" OR "information technology" OR "IT" OR "data analytics" OR "mobile" OR "internet of things" OR "IoT" OR "block chain" OR "blockchain" OR "enterprise resource planning" OR "ERP" OR "financial technology" OR "Fintech" OR "crowd funding" OR "computer assisted auditing techniques" OR "CAATs"			

3. METHODS

3.*1 Search Strategy*

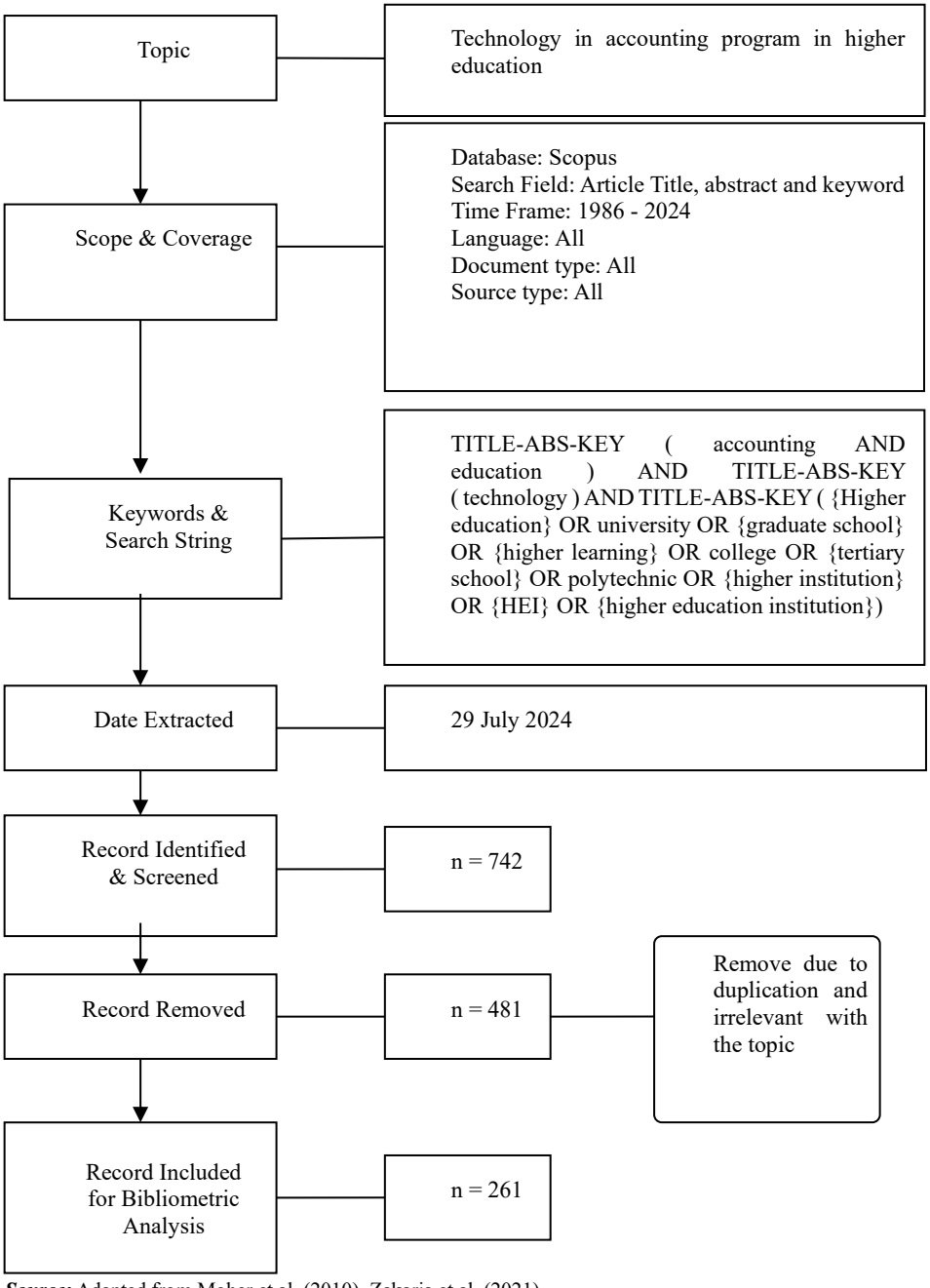
Data was collected on July 29, 2024, covering subject area, document type, source type, language, country, author affiliations, citation data, and keywords. Scopus database was chosen for its extensive coverage of scientific publications (Mongeon & Paul-Hus, 2016) and broad inclusion of peer-reviewed literature beyond Web of Science, with greater accuracy than both Web of Science and Google scholar (Franceschini et al., 2015; Visser et al., 2021).

The strategy was: "(TITLE-ABS-KEY (accounting AND education) AND TITLE-ABS-KEY (technology) AND TITLE-ABS-KEY ({Higher education} OR university OR

{graduate school} OR {higher learning} OR college OR {tertiary school} OR polytechnic OR {higher institution} OR {HEI} OR {higher education institution})).” Only documents with titles, abstracts and keywords that contain those keywords are included. Although sustainability is central to this study, it was not explicitly used as a keyword to capture the broader landscape of digital technology in accounting education and then assess its integration with sustainability. This choice may have underrepresented explicitly sustainability-focused papers, but all documents were manually screened for such content.

The initial search yielded 742 documents. Titles, abstracts, and keywords were examined, with full texts consulted when necessary. Fourteen conference review papers overlapped with separately published full papers, creating duplicates. After removing these, 728 documents remained. Manual screening excluded studies not addressing both accounting and technology in higher education, resulting in 261 documents for bibliometric analysis. The process is showed in Figure 1.

Figure 1: Flow Diagram of The Search Strategy



Source: Adapted from Moher et al. (2010), Zakaria et al. (2021)

3.2 Tool and Analysis

This study uses Microsoft 2023, biblioMagika 2.9 (Ahmi, 2024), OpenRefine, and VOSviewer to clean, harmonise and analyse data, later on to create visualisations. Each of those tools has its own strengths and can complement each other. Microsoft Excel was used for the initial organisation of the data. BiblioMagika was then applied to convert the Scopus metadata into various metrics and to streamline the cleaning of author, affiliation, and country data. OpenRefine was subsequently employed to clean and harmonise author names, affiliations, and author keywords in order to remove duplication (Ahmi, 2023). The data cleaning and harmonisation process was followed by network analysis and visualisation using VOSviewer. VOSviewer, a graphical interface, was used to create and visualise maps for co-authorship and co-word analyses. It also enabled the exploration of research themes and the evolution of topics within the technology trends in accounting education.

4. RESULTS

Following established bibliometric methodologies (Donthu et al., 2021; Zupic & Čater, 2015), we analysed publications on digital technology in accounting education in higher education, focusing on trends, citations, keyword co-occurrence, and geographical patterns. Particular attention was given to their links with SDG 4 and SDG 8. The analysis was structured around the study's research questions to trace the field's evolution and its alignment with broader sustainability objectives.

4.1. Current Trend of the literature

To answer the first research question about the current trend regarding technology in accounting education, Table 2 presents the overview of the scholarly literature on technology in accounting education from 1986 to 2024, including number of publication and key findings, whereas **Error! Reference source not found.** and **Error! Reference source not found.** shows document types and source type. Subjective areas are shown in **Error! Reference source not found.**.

Table 2: Main Information

Main Information	Data
Publication Years	1986 - 2024
Total Publications	261
Citable Year	39
Number of Contributing Authors	692
Number of Cited Papers	184
Total Citations	2,254
Citation per Paper	8.71
Citation per Cited Paper	12.36
Citation per Year	59.84
Citation per Author	3.29
Author per Paper	2.65
Citation sums within h-Core	2,063
h-index	25
g-index	40

m-index	0.641

Table 3: Document Type

Document Type	Total Publications	Percentage (%)
Article	167	63.98%
Conference Paper	77	29.50%
Book Chapter	13	4.98%
Review	4	1.53%
Total	**261**	**100.00**

Table 4: Source Type

Source Type	Total Publications	Percentage (%)
Journals	170	65.13%
Conference Proceedings	67	25.67%
Book Series	18	6.90%
Books	6	2.30%
Total	**261**	**100.00**

Table 5: Subject Area

Subject Area	Total Publications	Percentage (%)
Social Sciences	152	58.24%
Business, Management and Accounting	102	39.08%
Computer Science	101	38.70%
Engineering	33	12.64%
Decision Sciences	24	9.20%
Economics, Econometrics and Finance	24	9.20%
Environmental Science	9	3.45%
Mathematics	9	3.45%
Physics and Astronomy	9	3.45%
Psychology	7	2.68%
Arts and Humanities	6	2.30%
Energy	6	2.30%
Agricultural and Biological Sciences	4	1.53%
Health Professions	3	1.15%
Medicine	3	1.15%
Multidisciplinary	3	1.15%
Earth and Planetary Sciences	1	0.38%
Materials Science	1	0.38%

Table 2 summaries the main bibliometric indicators. From 1986 to July 2024, a total of 261 publications were identified, contributed by 692 authors. These works generated 2,254 citations, averaging 8.71 citations per document. Of the total, 184 publications were cited at least once, with a higher average of 12.36 citations per cited paper. These figures suggest selective influence, with only part of the literature attracting.

The field's h-index of 25 signifies that 25 publications have each garnered at least 25 citations, revealing a core of influential research. The g-index of 40 further indicates that the top 40 publications collectively received at least 1,600 citations (Ahmad Izhan et al., 2024). The m-index, calculated as 0.641, reflects the average citation impact per year since 1986. While modest, this score is contextual: the field only gained momentum recently due to the digital and sustainability push in education, particularly post-2015.

The dominance of journal articles (Table 3: 63.98%) and journals as source types (Table 4: 65.13%) affirms the academic rigour in this domain. However, the low presence of reviews and book chapters suggests limited theoretical synthesis, which might hinder the development of integrative frameworks.

As shown in Table 5, the field is interdisciplinary but primarily focused within Social Sciences (58.24%), Business, Management & Accounting (39.08%), and Computer Science (38.70%). This concentration implies that while the integration of digital tools is technologically enabled, its implications are most intensely debated within educational, managerial, and pedagogical contexts.

4.2 Publication Trends and Growth

To address the second research question on trends and growth patterns in the evolution of digital accounting education in relation to SDGs, **Error! Reference source not found.** presents data on publications from 2015 to 2024 related to this topic and **Error! Reference source not found.** and **Error! Reference source not found.** highlight the growth of scholarly publications from the first year until 2024. A significant rise in output occurred in 2020 and peaked in 2021 with 45 publications, likely driven by the COVID-19 pandemic. The crisis catalysed global experimentation with remote teaching, leading to rapid digitalisation in accounting curricula.

After 2021, growth was inconsistent. Citations fell from 9.11 in 2021 to 0.71 in 2024, likely due to citation lag or lower-impact. The high average citations per paper in earlier years, such as 24.17 in 2016 and 20.63 in 2017, may reflect foundational contributions that continue to shape the discourse.

Collectively, the uneven growth patterns indicate that while scholarly interest is growing, it has yet to stabilise into a mature and continuously expanding field. Furthermore, this erratic evolution underscores the importance of assessing not just quantity but quality and regional equity of contributions.

Further, **Error! Reference source not found.** and **Error! Reference source not found.** highlight the growth of scholarly publications from the first year until 2024, revealing that researchers are increasingly acknowledging the importance of technology integration in accounting programs. This trend suggests a rising interest in the issue, potentially leading to more effective strategies for incorporating information technology in higher accounting education.

Table 6: Publication Trends

Year	TP	NCA	NCP	TC	C/P	C/CP	*h*	*g*	*m*
2015	1	2	0	0	0.00	0.00	0	0	0.000
2016	6	20	6	145	24.17	24.17	2	6	0.222
2017	8	23	7	165	20.63	23.57	4	8	0.500
2018	7	21	7	68	9.71	9.71	3	7	0.429
2019	13	27	9	117	9.00	13.00	5	10	0.833
2020	24	60	15	128	5.33	8.53	6	11	1.200
2021	45	119	32	410	9.11	12.81	11	19	2.750
2022	33	90	25	189	5.73	7.56	9	12	3.000
2023	35	119	23	95	2.71	4.13	6	8	3.000
2024	21	60	6	15	0.71	2.50	2	3	2.000

Notes: TP=total number of publications; NCA=Number of contributing authors; NCP=number of cited publications; TC=total citations; C/P=average citations per publication; C/CP=average citations per cited publication; h=h-index; g=g-index; m=m-index.

Figure 2: Total Publications and Citations by Year

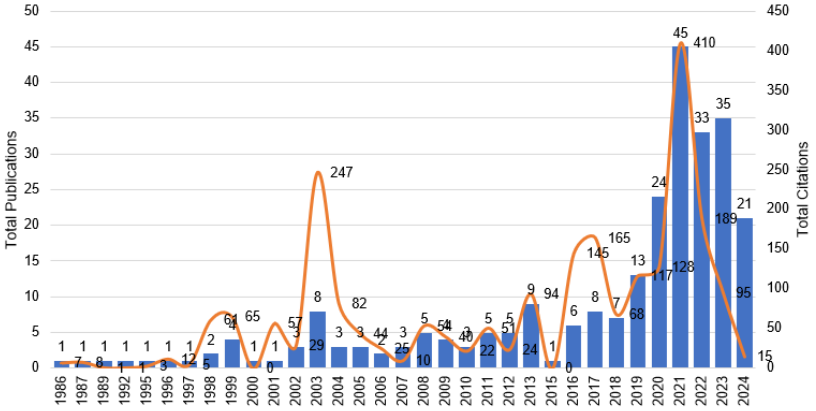
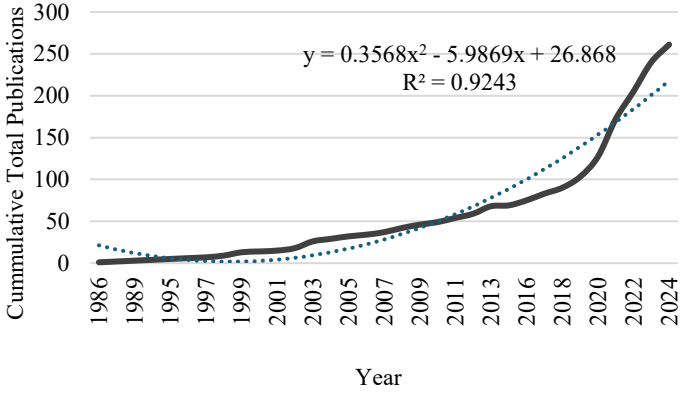


Figure 3: Publication Growth



4.3 Geographical, Journal, and Author Contributions

To answer the third research question on the most active countries leading journals and prominent authors in the field of digital accounting education. Table 7 and Figure 4 show strong contributions from the United States (46 publications, 721 citations) and Australia (22 publications, 511 citations), consistent with past findings (Al Ghatrifi et al., 2023; Amin et al., 2024). Their dominance suggests robust infrastructure and institutional support for research that aligns with SDG 4's focus on high-quality, inclusive education. The high citation-per-paper ratio further suggests deep-rooted integration of technology into curriculum and pedagogy.

In contrast, countries like Malaysia, Indonesia, and South Africa show growing engagement but lower average citations, indicating a rising but still maturing research presence. This growth from emerging economies reflects efforts to expand inclusive and equitable access to digital learning, in line with SDG 4's emphasis on global education equity and lifelong learning.

Table 8 shows Accounting Education and Journal of Accounting Education as the most impactful outlets, reflecting the dominance of Western-led platforms. This concentration suggests that access to influential publication avenues remains uneven, which relates to the challenges of SDG 4, aiming for equal access to quality higher education and the elimination of disparities in education outcomes. However, Table 9 shows a more geographically diverse author base, including contributors from South Africa, Mexico, Malaysia, and Oman, indicating that global scholarly participation in digital technology in accounting education is

expanding. This trend aligns with SDG 4, which emphasizes enhancing skills for work through inclusive and relevant education, and SDG 8, which promotes inclusive access to skills development and improving employability. While high-impact platforms are still concentrated, the increasing contribution from authors in developing regions points to meaningful progress toward a more inclusive and globally representative academic landscape.

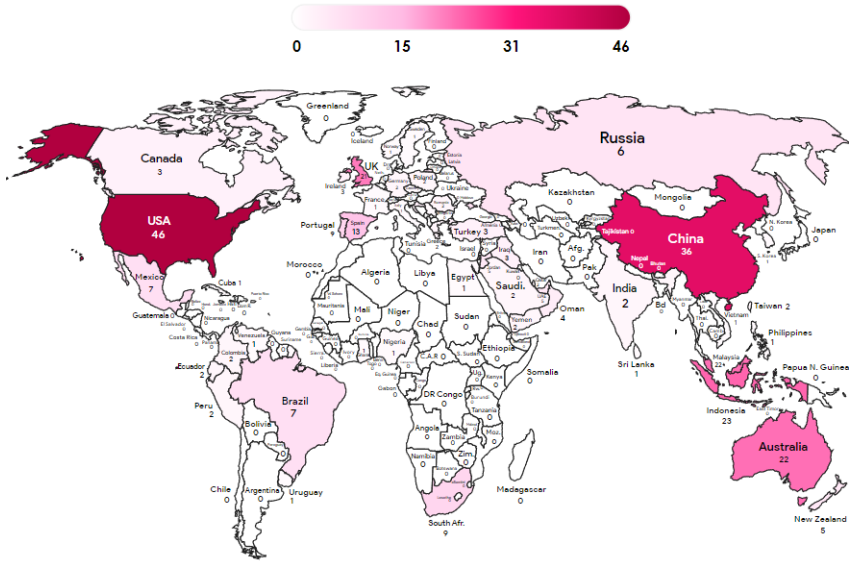
With 261 publications overall, the United States ranked first with 46 publications, followed by China with 36 publications, Indonesia in third place with 23 publications, Malaysia in fourth place and Australia in fifth place both with 22 publications. These rankings are based on total publications. In terms of total citations, the United States ranked first with 721 citations, followed by Australia in second place with 511 citations, The United Kingdom in third place with 305 citations, Spain in fourth place with 123 citations and Malaysia in fifth place with 118 citations. These countries have made significant contributions to the field of research, and dedication to research has enhanced their scientific communities and contributed to the global body of knowledge in education fields.

Table 7: Top 10 Countries Contributed to the Publications

Country	TP	NCA	NCP	TC	C/P	C/CP	*h*	*g*	*m*
United States	46	97	35	721	15.67	20.6	13	26	0.342
China	36	55	20	36	1	1.8	3	6	0.5
Indonesia	23	81	13	53	2.3	4.08	3	7	0.5
Malaysia	22	50	17	118	5.36	6.94	6	10	0.375
Australia	22	41	19	511	23.23	26.89	11	22	0.367
United Kingdom	21	32	18	305	14.52	16.94	9	17	0.25
Spain	13	35	10	123	9.46	12.3	5	11	0.333
South Africa	9	19	6	34	3.78	5.67	4	5	0.222
Portugal	9	25	6	48	5.33	8	4	6	0.444

Notes: TP=total number of publications; NCA=number of contributing authors; NCP=number of cited publications; TC=total citations; C/P=average citations per publication; C/CP=average citations per cited publication; h=h-index; and g=g-index.

Figure 4: Countries Contributed to The Publications



Source: Generated by authors using iipmaps.com

Table 8: Top 10 Most Productive Journals Contributed to the Publications

Source Title	TP	NCA	NCP	TC	C/P	C/CP	*h*	*g*	*m*
Accounting Education	20	42	19	495	24.75	26.05	11	20	0.333
Journal of Accounting Education	10	29	9	458	45.8	50.89	8	10	0.211
Journal of Physics: Conference Series	7	9	6	8	1.14	1.33	2	2	0.4
ACM International Conference Proceeding Series	7	9	1	1	0.14	1	1	1	0.143
Journal of Education for Business	5	11	4	89	17.8	22.25	4	5	0.138
Cogent Education	4	18	2	4	1	2	1	2	0.2
International Journal of Management Education	4	7	3	33	8.25	11	2	4	0.5
Education and Information Technologies	4	18	4	108	27	27	3	4	0.5
Advances in Accounting Education: Teaching and Curriculum Innovations	3	6	3	12	4	4	2	3	0.143

Accounting Research Journal	3	7	3	83	27.67	27.67	3	3	0.5

Notes: TP=total number of publications; NCA=Number of contributing authors; NCP=number of cited publications; TC=total citations; C/P=average citations per publication; C/CP=average citations per cited publication; h=h-index; g=g-index; m=m-index.

Table 9: Top 10 Most Productive Authors Contributed to the Publications

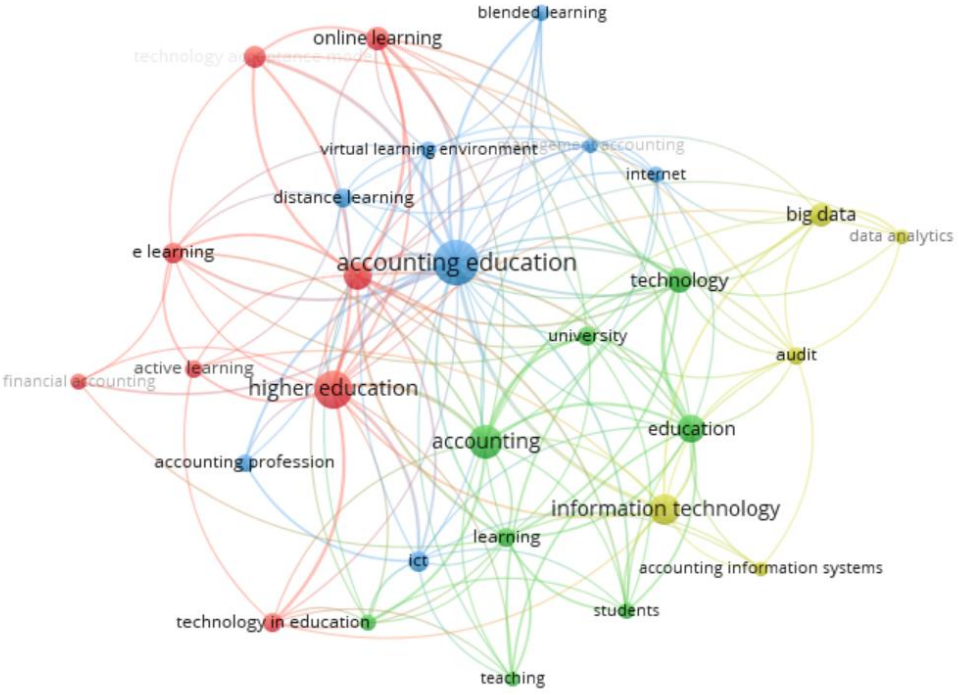
Author's Name	**Current Affiliation**	**Country**	**TP**	**NCP**	**TC**	**C/P**	**C/CP**	***h***	***g***	***m***
Van Rooyen, Annelien	University of South Africa	South Africa	4	2	3	0.75	1.50	1	1	0.053
Broad, Martin	University of Southampton	United Kingdom	3	3	40	13.33	13.33	2	3	0.091
Santos-Jaén, Jose Manuel	University of Murcia	Spain	3	2	23	7.67	11.50	1	3	0.250
Al-Hattami, Hamood Mohammed	A'Sharqiyah University (ASU)	Oman	3	2	39	13.00	19.50	2	3	0.400
Sapién Aguilar, Alma Lilia	Universidad Autónoma de Chihuahua	Mexico	3	3	28	9.33	9.33	3	3	0.429
Piñón Howlet, Laura Cristina	Universidad Autónoma de Chihuahua	Mexico	3	3	28	9.33	9.33	3	3	0.429
Novak, Ana	University of Zagreb	Croatia	3	3	5	1.67	1.67	1	2	0.200
Hamdan, Allam	Ahlia University	Bahrain	3	2	9	3.00	4.50	2	3	0.667
Dangi, Mohamad Ridhuan Mat	Universiti Teknologi MARA	Malaysia	3	3	4	1.33	1.33	1	2	0.111
Barišić, Ivana	University of Zagreb	Croatia	3	3	5	1.67	1.67	1	2	0.200

Notes: TP=total number of publications; NCA=Number of contributing authors; NCP=number of cited publications; TC=total citations; C/P=average citations per publication; C/CP=average citations per cited publication; h=h-index; g=g-index; m=m-index.

4.4 Themes and Topics

To address the last research question, which focuses on identifying the prevailing themes and topics in technology integration within accounting education within higher education research, we conducted a keyword co-occurrence analysis using VOSviewer. This method identifies how often author keywords appear together, revealing their interconnections and thematic clusters. The resulting visualisations provide insights into dominant research areas and show how digital transformation in accounting education aligns with broader sustainability goals, particularly SDG 4 and SDG 8.

Figure 5: Co-occurrence of Author's Keywords



Source: Generated by authors using VOSviewer (van Eck & Waltman, 2014)

Error! Reference source not found. represents presents a network visualisation of the author keywords that each had a minimum of 5 occurrences. This study used VOSviewer, a software tool for constructing and visualizing bibliometric networks to map authors' keywords. The colour, circle size, font size, and thickness of connecting lines represent relationships with other keywords. For example, keywords with the same colour were commonly listed together. So, in this study, higher education, active learning, e learning, online learning, technology in education, technology acceptance model has similar colours, suggesting that these keywords were closely related and usually occurred together (Sweileh et al., 2017).

Cluster 1: Digital Learning Methods and Adoption Models

This cluster focuses on active learning, e-learning, online learning, and the Technology Acceptance Model (TAM). COVID-19 accelerated the use of digital platforms in accounting education, showing how necessity drove adoption beyond voluntary conditions. Key terms

highlight how student-centred, interactive methods promote engagement and deepen understanding, supporting SDG 4 by ensuring continuity of inclusive and equitable education during disruption.

Cluster 2: Core Educational Processes and Institutional Context
Keywords such as distance education, teaching, students, and university stress how digitalisation reshapes higher education. The cluster points to the importance of institutional support and organisational structures in sustaining technological change, showing that integration is as much institutional as technological.

Cluster 3: Professional Relevance and Interactive Learning Environments
This cluster links accounting education with the accounting profession. Terms like blended learning, virtual learning environments, and ICT highlight interactive approaches that combine digital and face-to-face delivery. By embedding management accounting and applied digital skills, the cluster aligns with SDG 4 (quality education) and SDG 8 (employability).

Cluster 4: Data-Driven Tools and Technological Skills
This cluster focusing on big data, data analytics, accounting information systems, and audit, this cluster highlights the need for data-driven competencies in curricula. Such skills prepare graduates for the digital workplace, advancing SDG 8 while reinforcing SDG 4 through future-ready education.

Together, the four dimensions, pedagogical innovation, institutional responsiveness, professional relevance, and analytical skill development, provide a framework for integrating technology into accounting education. This approach fosters adaptable, inclusive learning aligned with industry needs and best practices, while advancing SDG 4 through quality education and SDG 8 by enhancing employability and supporting sustainable growth.

5. DISCUSSION AND IMPLICATION FOR POLICY AND PEDAGOGY

This study examines how digital technology and sustainability intersect in accounting education. While e-learning and data analytics enhance efficiency, sustainability integration remains limited. Gaps persist in aligning education with industry needs. Interpreting through TAM and ELT, the findings highlight how technological, institutional, and theoretical factors drive trends and suggest future directions, particularly for SDGs 4 and 8.

5.1 Theoretical Insights from Keyword Clusters

These thematic clusters illustrate the current conceptual landscape of digital accounting education, answering RQ1 by showing the field's dominant focus on adoption, institutional adaptation, and emerging professional competencies.

Cluster 1, which revolves around digital adoption and e-learning, strongly reflects the Technology Acceptance Model (TAM). The prominence of keywords such as "technology

acceptance model," "e-learning," and "online learning" indicates that much of the literature is grounded in exploring the perceived usefulness and ease of use of technology in accounting classrooms. This theoretical orientation is particularly visible during the COVID-19 era, where emergency remote teaching served as a real-world stress test of TAM constructs. However, the evidence also reveals a need to go beyond acceptance toward sustained behavioural change and pedagogical transformation.

Cluster 2, focusing on educational processes and institutional settings, finds resonance with Experiential Learning Theory (ELT). The shift toward hybrid and distance learning environments requires reimagining how experiential learning unfolds in digital formats. Keywords like "students," "teaching," and "university" underscore the shifting role of institutions in fostering active, student-centred learning amid digital change. This cluster illustrates how institutions serve not only as adopters of technology but also as architects of inclusive and adaptive learning environments, supporting the realisation of SDG 4. The trend data further supports this interpretation, where post-pandemic growth in digital learning reflects shifting pedagogical norms rather than transient responses, fulfilling RQ2.

Cluster 3 bridges theory and practice, linking digital learning with the accounting profession. The keywords suggest a focus on curricula that promote both academic knowledge and employability skills, reflecting the principles of Experiential Learning Theory (ELT) and aligning with SDG 8's objective of developing youth skills for decent work and economic growth. This reflects an evolving educational paradigm where accounting education is not just about mastering technical content, but also about cultivating digital, analytical, and ethical competencies required in contemporary workplaces.

Cluster 4 points to the increasing integration of data tools and digital systems in accounting education. The presence of terms like "big data," "audit," and "accounting information systems" supports the theory that educational relevance now depends on digital competence. This aligns with the constructivist view of learning, which asserts that learners build new knowledge by interacting with tools and tasks in contextually meaningful ways. It also supports SDG 8, which emphasises the development of relevant skills for future employment.

Building on observed trends, this study proposes a conceptual lens linking four drivers: pedagogical innovation, institutional adaptation, professional relevance, and analytical competencies, as pathways to sustainable accounting education. We argue for the convergence of digitalisation and sustainability through curricula that foster accessible learning, skill-based pedagogy, and industry alignment. Future research should examine how technologies such as AI simulations and blockchain shape student readiness for sustainability reporting, ethical decision-making, and ESG assurance, while accounting for institutional factors including faculty training, policy, and digital equity.

5.2 Equity, Representation, and Global Gaps

The analysis of top-contributing countries and authors answers RQ3 while also revealing disparities in scholarly visibility and impact that require structural intervention. The dominance of Western countries in publication volume and citation impact reflects persistent

inequalities in global academic representation. Although authors from developing countries are contributing more, their work often appears in lower-impact journals. This echoes the 2025 UN SDG Progress Report, which highlights that many nations remain off-track on SDG 4, particularly in providing digital infrastructure and qualified teaching personnel in low-income and rural regions (United Nations, 2025). Addressing these gaps calls for institutional and national investment in research infrastructure, digital learning policies, and curriculum innovation. As shown in the bibliometric results, countries such as Malaysia and Indonesia are emerging contributors, with scope for regional leadership in digital accounting education if supported by targeted funding and international collaboration.

5.3 Implications for Policy and Pedagogy

From a policy perspective, the findings call for national strategies that align digital transformation in education with sustainability agendas. Ministries of education and university leadership must treat digital integration not as a temporary measure, but as a structural shift that requires capacity building, infrastructure investment, and faculty training.

Pedagogically, the integration of digital tools must go hand-in-hand with curriculum reform. Educators should be supported in adopting experiential and constructivist approaches that allow students to engage meaningfully with technologies such as accounting information systems, data analytics platforms, and blockchain. The inclusion of sustainability-focused content alongside digital innovation is essential for ensuring future-ready graduates.

To examine the integration of technology in accounting programmes, we conducted a bibliometric analysis of 261 publications from 1986 to 2024 in Scopus. The study addressed four questions on: (1) the current trend of research, (2) publication trends over time, (3) leading countries and regional variations, and (4) key themes identified through keyword co-occurrence. These questions were analysed across distinct thematic dimensions.

With respect to the first research question, the literature on technology in higher education accounting programs has grown steadily, with 261 publications between 1986 and 2024. The emphasis has been on digital tools and technical skills, while sustainability remains secondary and only loosely integrated into curricula, signalling a gap in aligning education with the SDGs.

For the second question, publication output surged during the COVID-19 pandemic, peaking in 2021 with a focus on online learning and virtual classrooms. Yet progress has since slowed, and sustainability continues to receive limited attention despite its rising relevance in education and industry.

Regarding the third question, the United States leads with 46 publications, followed by China (36), Indonesia (23), and Malaysia and Australia (22 each). Indonesia's growth highlights increasing regional engagement, though research priorities differ: developed countries stress innovation and industry alignment, while developing countries emphasise access and resources. Across regions, however, sustainability remains underexplored (Abitoye et al., 2023), presenting opportunities for collaborative work on its integration with technology.

Finally, co-occurrence analysis for the fourth question identified four themes: digital learning methods, curriculum adaptation through distance education and digital tools, professional relevance via skills like data analytics and ICT, and the use of data-driven tools for challenges such as sustainability reporting. Despite these themes, sustainability remains marginal, reinforcing its potential as a future research frontier.

This paper makes important contributions for both academics and professionals. For researchers, it gives a clear overview of current trends, main topics, and global efforts in the field. It highlights the need for more focus on sustainability, offering ideas for future studies. Scholars can explore how digital tools help achieve sustainability by reducing environmental impact, making education more efficient, and promoting responsible practices in accounting. By addressing these areas, they can develop strategies that combine technical skills with sustainability, preparing students for a tech-driven, sustainable future.

For industry, the findings offer useful guidance to align employee training with technological progress. Companies can use this to create programs that fill gaps in skills like data analytics, blockchain, and ESG reporting. The focus on sustainability also shows how organizations can adopt better practices by using the expertise of graduates trained in modern accounting technology.

This paper bridges the gap between academia and industry, offering practical advice to improve the use of digital tools in accounting education while supporting sustainability and preparing students for future workforce needs.

6. CONCLUSION

This study mapped the bibliometric landscape of digital technology in accounting education, focusing on links to sustainability goals, especially SDG 4 (quality education) and SDG 8 (decent work and economic growth). Quantitative metrics and cluster analysis revealed both emerging strengths and persistent weaknesses. Although research is expanding, it remains uneven across regions and theoretically limited, often descriptive and centred on adoption models such as TAM, with little cross-regional or longitudinal analysis. These gaps are significant in light of the 2025 UN assessment, which reports continuing global shortfalls in SDG 4, particularly in equitable access to educational technology and relevant outcomes. Digital accounting education now stands at a pivotal point where innovation must support inclusive, skills-based, and sustainability-driven reform.
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7. LIMITATION AND FUTURE STUDY

This study provides significant insights into the integration of technology and sustainability in accounting education but acknowledges several limitations. The exclusive reliance on Scopus may have excluded relevant literature available in other databases like the Web of Science or Google Scholar. The keywords used, “technology”, “accounting” and “education,” are too broad, which might have missed studies focused on specific technologies or detailed topics in

accounting education, such as AI, blockchain. Excluding 'sustainability' as a primary keyword has limited its exploration, revealing a gap between digital innovation and sustainability discourse in accounting education.

These limitations point to several directions for future research. Scholars should adopt more inclusive search strategies by incorporating both general and sustainability-related terms such as "education for sustainable development" and "SDG-aligned education" and by expanding database coverage to capture a more representative body of work. Empirical studies are also needed to assess how digital accounting education advances specific SDG targets including participation in tertiary education (Target 4.3), acquisition of ICT skills (Target 4.4), and improvements in institutional infrastructure. Longitudinal and cross-regional analyses will be particularly important for addressing global disparities and building evidence-based models that align accounting education with the needs of a technology-driven, sustainable economy.

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