




“Emerging trends and research focal points of information technologies for financial control and accounting at the state and corporate level: Bibliometric research and visualization”

AUTHORS	Olena Skrynnyk  Serhiy Lyeonov 
ARTICLE INFO	Olena Skrynnyk and Serhiy Lyeonov (2022). Emerging trends and research focal points of information technologies for financial control and accounting at the state and corporate level: Bibliometric research and visualization. <i>Accounting and Financial Control</i> , 4(1), 49-62. doi: 10.21511/afc.04(1).2023.05
DOI	http://dx.doi.org/10.21511/afc.04(1).2023.05
RELEASED ON	Friday, 26 May 2023
RECEIVED ON	Tuesday, 18 April 2023
ACCEPTED ON	Friday, 05 May 2023
LICENSE	 This work is licensed under a Creative Commons Attribution 4.0 International License
JOURNAL	"Accounting and Financial Control"
ISSN PRINT	2543-5485
ISSN ONLINE	2544-1450
PUBLISHER	LLC “Consulting Publishing Company “Business Perspectives”
FOUNDER	Sp. z o.o. Kozmenko Science Publishing



NUMBER OF REFERENCES

28



NUMBER OF FIGURES

6



NUMBER OF TABLES

3

© The author(s) 2023. This publication is an open access article.


BUSINESS PERSPECTIVES


LLC "CPC "Business Perspectives"
Hryhorii Skovoroda lane, 10,
Sumy, 40022, Ukraine
www.businessperspectives.org

Received on: 18th of April, 2023

Accepted on: 5th of May, 2023

Published on: 26th of May, 2023

© Olena Skrynnyk, Serhiy Lyeonov,
2023

Olena Skrynnyk, Ph.D., Economics and
Management, Sumy State University.
(Corresponding author)

Serhiy Lyeonov, Doctor of Economics,
Professor, Economic Cybernetics
Department, ERI of Business,
Economics and Management, Sumy
State University, Ukraine.



This is an Open Access article,
distributed under the terms of the
[Creative Commons Attribution 4.0
International license](https://creativecommons.org/licenses/by/4.0/), which permits
unrestricted re-use, distribution, and
reproduction in any medium, provided
the original work is properly cited.

Conflict of interest statement:

Author(s) reported no conflict of interest

Olena Skrynnyk (Ukraine), Serhiy Lyeonov (Ukraine)

EMERGING TRENDS AND RESEARCH FOCAL POINTS OF INFORMATION TECHNOLOGIES FOR FINANCIAL CONTROL AND ACCOUNTING AT THE STATE AND CORPORATE LEVEL: BIBLIOMETRIC RESEARCH AND VISUALIZATION

Abstract

The rapid development of information technologies poses challenges to various processes of the financial departments of companies or the state. The aim of the paper is to substantiate the main directions of global research on information technologies for financial control and accounting for a better perception and derivation of the potentially associated requirements, challenges, and risks under the evolutionary magnifier. Applied bibliometric and network analysis, comprising analytical and visualization tools of Scopus and VosViewer, reveals the constantly increasing research interests of scholars in the field of research that has reached its maximum in 2022 and continues to rise, especially in the countries with the frontrunner affiliations (the United States, China, and the United Kingdom). The cluster analysis identified 19 total thematic clusters, eleven at the state and eight at the corporate levels, that determined the focal research points Big Data, Blockchain, and Artificial Intelligence are similar for financial control and accounting at the state and corporate level and underlined the partial similarity in terms of technical specification (cryptocurrency) as well as differences in specific levels (social networking issues at the state level) that are reflected in the recommendations for the elaboration of significant technology interfaces for both levels under investigation.

Keywords

bibliometric, financial control, accounting, state,
corporate

JEL Classification

M40, N01, O16

INTRODUCTION

Financial control is an integral part of the management system, regardless of the reference level. To ensure that expenditures remain transparent and that their sound control is provided for, a regulated framework becomes necessary. To enable intelligent and effective implementation of financial control, and to optimize the existing mechanisms, researchers conduct feasibility studies of various information technologies for this purpose. The digitization of financial control and accounting has progressed significantly in the last decades. The corresponding emerging technologies and their retrospective development, which have caused and supported this change in general, at the state and corporate levels, constitute the objects of investigation of the study described in this article. Control of organizational income and expenditure, as well as an orderly recording of operational business transactions on the basis of existing receipts, are part of the activities

of financial transparency in a company. New technologies serve for accurate recording, optimal handling and transparency about the financial control of a company or even country. Despite the fact that numerous literature analyses already provide information on the individual aspects of technologization in financial controlling and accounting, a knowledge gap has been identified in the area under investigation, particularly at the state and corporate levels.

1. LITERATURE REVIEW

The reviewed publications of a significant number of fundamental global studies are devoted to the retrospective technologization research of financial control and accounting. Despite the fact that a total of 187 bibliometric analysis and literature research sources on this subject were obtained, the study shows a lack of research analyses on information technologies for financial control and accounting, especially at the state and corporate levels. The literature analyses collected are specified by a limited number of the research areas. Thus, the search identified publications that focus on ethical decision-making research in accounting studied by Owusu and Korankye (2023). Other perspective is highlighted in the publication by Poje and Groff (2022) who underline the value of ethics education in accounting. This topic is referred to, moreover, in connection with trends in managerial finance, measurement on green/ecological/environmental capital in research publications by Benameur et al. (2023), Frizon and Eugénio (2022), Thottoli (2022), and Yu et al. (2019). A large block of different bibliometrics is made up of publications in the thematic areas of the accounting information system, among other things, with mapping technique, for example supported by Amirul et al. (2022), Baker et al. (2020), Behrend and Eulerich (2019), Di Vaio et al. (2020), İyibildiren et al. (2023), and Monteiro and Cepêda (2021), and the application of new technologies such as blockchain technology in accounting and auditing, from Bellucci et al. (2022), Lombardi et al. (2022), Afaishat et al. (2022), Polinkevych et al. (2021), Savchuk et al. (2021), Mishchenko et al. (2021), and Secinaro et al. (2021); big data for accounting and international development in Esteban et al. (2022) and Varma et al. (2021). Some bibliometric studies such as Verhun et al. (2020), Gonçalves et al. (2022), Pererva and Maslak (2022), and Vysochan et al. (2022) focus on finance and accounting aspects of sustainability intellectual property in accounting. Worth mentioning are

the topics of state or nation specific characteristics and processes in financial institutions, such as Islamic financial institutions investigated by Alshater et al. (2022).

Certain publications on research into technologies for financial control and accounting at the state or corporate levels are limited due to the publication year, since 2022 is the year in which most of the scientific results describing the newest technologies were published (Adebayo & Ilesanmi, 2020; Abad-Segura & González-Zamar, 2020; Behrend & Eulerich, 2019).

Therefore, the potential for research of information technologies for financial control and accounting at the state and corporate levels becomes evident.

The purpose of the study is to obtain a holistic view of the current state of scientific interest and respective publications in the research fields of information technologies for financial control and accounting, using the results obtained through a comprehensive bibliometric and network analysis. Therefore, the points under investigation include the development of the research field in the retrospective and forecasting for the outlined emerging trends, main actors (countries, affiliation organizations, researchers), most publish journals, most frequent cited publications.

The starting point of the analysis comprised the investigation of the disparities in the research areas of information technologies for financial control and accounting at the state and corporate levels.

2. METHODOLOGY

This section provides a brief description of the statistical analysis, synthesis, theoretical generalization and corresponding visualization based on meta-analysis procedures applied in the study.

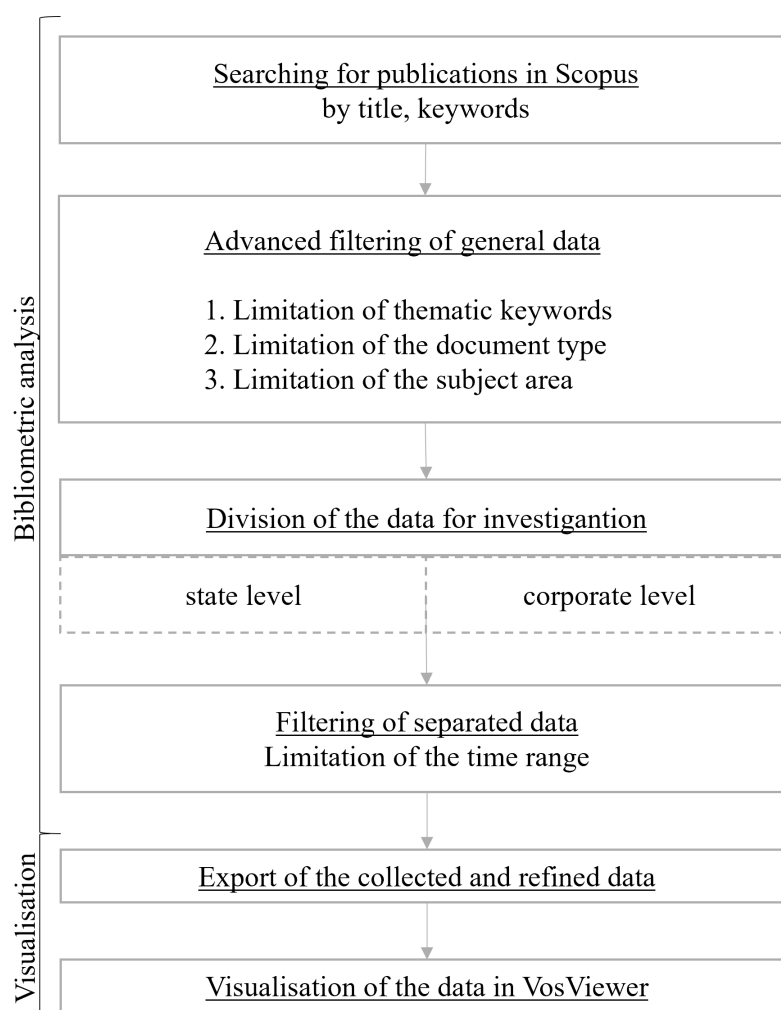


Figure 1. Procedure for bibliometric and network analysis of keywords

The methodological framework applied involves systematic analysis of the scientific landscape on the topic under investigation using contextual, evolutionary, and spatial clustering. This allowed you to determine the number of publications on a particular research subject, identify the circle of the most influential authors and research institutions, determine the year and type of publication, subject area, document type, type and title of the source, keywords, and affiliation (by author's affiliation and country), and for each research step to extend more precise analysis of the data. Figure 1 shows the procedure of the applied research methodology, which can initially be divided into data collection and data visualization.

The analysis of publications commenced with the collection of initial data by searching for the main terms that characterize the object of study. The results of the search were refined and subsequently

applied to bibliometric and network analysis. The results of the bibliometric analysis were visualized in the form of lists, tables, diagrams, and networks. The followed network analysis operated with qualitative scientific data with a primary focus on the correlation of publications and their impact on the research network and provided the evaluation on the keywords and its feasibility in a cluster form.

Further detailing of individual intermediate steps and the presentation of corresponding results are provided in the next section.

3. RESULTS AND DISCUSSION

A review of the literature on the considered bibliometric did not reveal a consistent picture of the development and application of technologies at the state and corporate levels.

This section presents the results of the authors' study on information technologies in financial control and accounting at the state and corporate levels to determine differences in the development of such technologies and their application at the levels under consideration.

3.1. Bibliometric analysis

In the first step, as part of the semantic search, the following search terms were applied for the search of the scientific database: “financial control*” OR “Accounting” AND “technolog*” OR “tool” OR “software”. The search revealed 46,621 sources, which are not proportionally distributed among the search areas shown in Figure 2.

In addition, the temporal distribution of the obtained search results shows that research interest has existed since 1927 and culminates in 2022.

A more extensive review of the initial search results revealed that numerous references to publications belonged to various irrelevant categories, which necessitated refinement of the results. The filtered parameters are limited to all the thematic keywords related to the topic under investigation, as well as to the subject of financial control, accounting, risk, technology and decision making. Therefore, keywords such as “human”, “animal”, “carbon dioxide”, “greenhouse gases”, “female” etc. were filtered out. In the next step, the refine-

ment of the document type was conducted, which caused the limitation of scientific publications to journal articles and conference papers.

The results of the refinements summed 24,193 sources, the majority of which contain the keywords “Cost Accounting” (5,599), “Costs” (1,795), “CostBenefitAnalysis” (1,713), “Accounting” (1,524), and “Economic” (1,447). In the next refinement step, the subject area was limited to Engineering, Computer Science, Business, Management and Accounting, Mathematics, Undefined, Decision Science, Economics, Econometrics and Finance, Multidisciplinary. Further analysis of publications shows that most of them with more than 50 publications were collected by scientists from research organizations (see Table 1), which indicates high interest in the respective countries.

Therefore, the United States dominates with the largest number of publications (5,303) and 163 affiliated research institutions. The pioneer in Asia is China (160 affiliated research institutions, 1,875 publications), and in Europe – the UK (1,450 publications, 161). Numerous research institutions that make a significant contribution to the study of the research issues are located in the Eastern part of the United States, East Asia and Western Europe.

The most cited publications concentrate on prediction models, accounting tools, ecological impact on financial state.

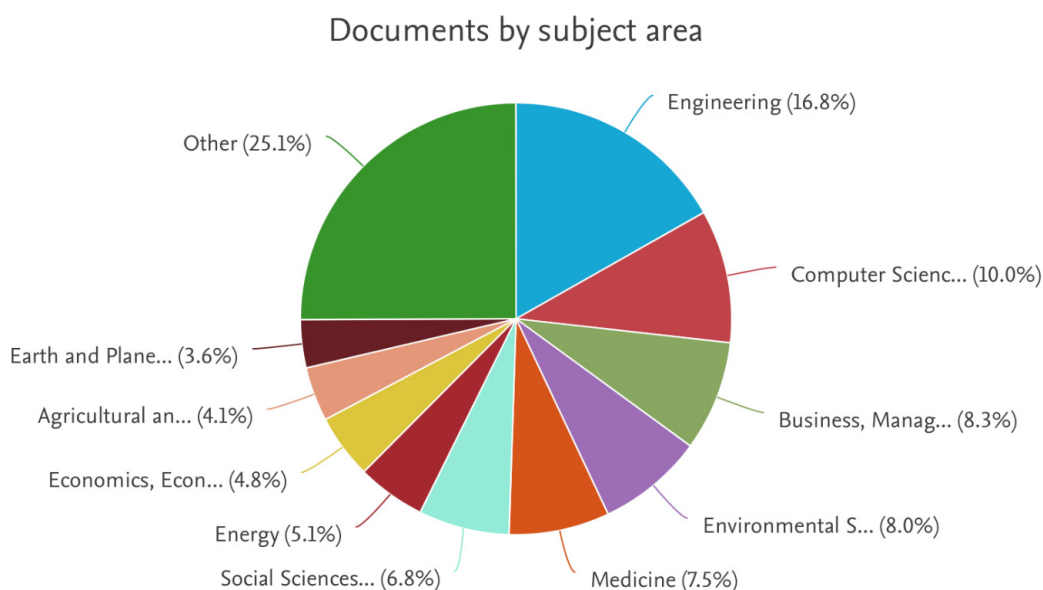


Figure 2. Analysis of publications on research interest in the use of information technology for financial control and accounting

Table 1. Results of network analysis of keywords in the context of the research on information technologies for financial control and accounting

Source: Compiled based on Scopus search results, 2023.

Affiliation	Number of publications	Affiliation	Number of publications
Chinese Academy of Sciences	94	Bina Nusantara University	61
Georgia Institute of Technology	82	Carnegie Mellon University	60
Massachusetts Institute of Technology	79	University of Illinois Urbana-Champaign	58
Polytechnic di Milano	77	Tsinghua University	56
Purdue University	68	Polytechnic di Torino	54
University of Michigan, Ann Arbor	67	University of California, Berkley	54
Texas A & M University	66	Ministry of Education China	53
CNRS Centre National de la Recherche Scientifique	62	Pennsylvania State University	52
The University of Texas at Austin	61	Stanford University	52
ETH Zürich	61	Universita degli Studi di Padova	51

To focus more on the research interest on state and corporate financial control and accounting, in the next step, the obtained results were filtered accordingly. Table 2 shows the results of this refinement.

The results demonstrate that in the scientific publications at the state level, as well as at the company specific level, some similarities can be defined: concerning the most published sources, as well as the countries of the organizations of scientists. A certain similarity in the most frequently used keywords can also be observed. In contrast, the de-

velopment dynamics of scientific interest points to considerable differences: a financial controlling and accounting at the state level became the highest interest at the end of 1980s. The publication dynamics on financial controlling and accounting at the corporate level over the years has a deviating trend (Figure 3).

Final refinement of 2019–2023 schedule was carried out in order to determine the latest trends in recent years and differences in the development of the studied trends at the state and corporate levels (Table 3).

Table 2. Characteristic results of the study of scientific interest in information technologies for financial control and accounting at the state and corporate level over the entire research period

Comparison criteria	State level	Corporate level
Number of publications	3,383	1,223
Most published authors (more than 5 publications)	Handoko, B. L. (9) Funnell, W. (7) Smith, S. S. (7) Haider, A. (6)	Dumay, J. (6) Faccia, A. (6) Handoko, B. L. (6)
Top-3 affiliations	Georgia Institute of Technology The University of Texas at Austin University of Southern California	Bina Nusantara University International Business Machines London School of Economics and Political Science
Top-3 country or territory	United States (1930) China (185) United Kingdom (151)	United States (305) China (147) United Kingdom (113)
Top-3 source titles	Transportation Research Record (70) AACE International Transactions of the Annual Meeting (59) Lecture Notes In Computer Science Including Subseries Lecture Notes In Artificial Intelligence And Lecture Notes In Bioinformatics (51)	ACM International Conference Proceeding Series (34) Accounting Auditing and Accountability Journal (30) Lecture Notes In Networks And Systems (14)
Top-5 key words	Cost Accounting (1,329) Computer Software (361) Costs (317) Decision Making (247) Information Technology (228)	Cost Accounting (244) Accounting (182) Finance (129) Information Technology (127) Management Accounting (104)

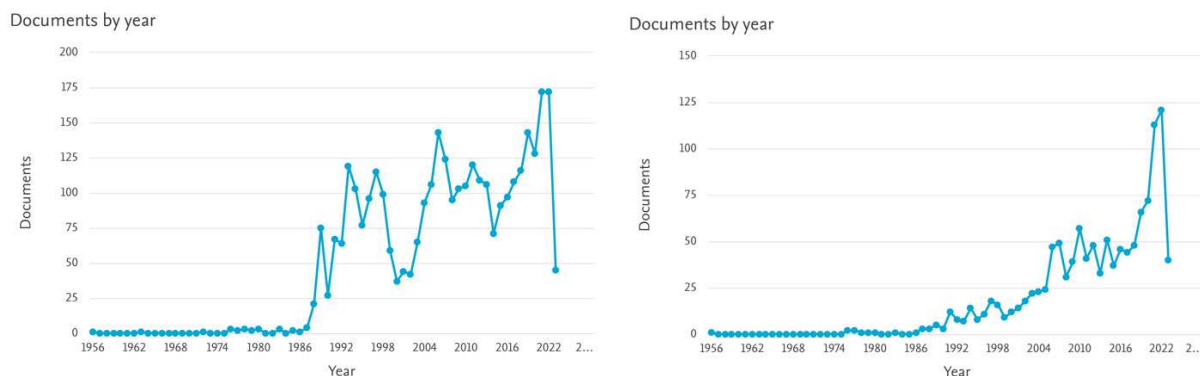


Figure 3. Development dynamics of scientific interest on information technology for financial control and accounting at the state and corporate level

The results obtained indicate that the number of publications for the business sector in China is higher than in the United States when compared to a country sector search. Furthermore, the difference can be observed in the keyword frequency, which underlines, among other things, the importance of individual research directions.

The obtained results were exported for further analysis.

3.2. Network analysis

The results of the data search conducted in the Scopus database were exported as “RIS” files with details such as the title of the publication, author name, publication year, source, affiliation (by author affiliation), keywords and references. The visualization tool VOS Viewer was applied for network analysis. VOS Viewer, as a tool for the effective visualization of clustering results, was chosen

Table 3. Key results of the survey of scientific interest in information technologies for financial control and accounting at the country and company level for the period 2019–2023

Comparison criteria	State level	Corporate level
Number of publications	1,377	909
Highest number of publications published in (year)	172 (2021, 2022)	121 (2022)
Most published authors (more than 5 publications)	Handoko, B. L. (6)	Handoko, B. L. (7) Faccia, A. (6)
Top-3 affiliations	Georgia Institute of Technology Bina Nusantara University Stanford University	Bina Nusantara University Financial University under the Government of the Russian Federation Macquarie Business School
Top-3 country or territory	United States (502) China (178) United Kingdom (111)	China (110) United States (107) United Kingdom (88)
Top-3 source titles	Accounting Auditing and Accountability Journal (39) Journal of Emerging Technologies in Accounting (34) ACM International Conference Proceeding Series (30)	Accounting Auditing and Accountability Journal (44) ACM International Conference Proceeding Series (30) Lecture Notes In Networks And Systems (26)
Top-10 key words	Accounting (74) Blockchain (63) Decision Making (55) Cost Accounting (50) Costs (40) Artificial Intelligence (45) Cost Benefit Analysis (38) Finance (37) Forecasting (30) Big Data (29)	Accounting (90) Finance (62) Blockchain (59) Big Data (47) Information Management (37) Artificial Intelligence (36) Management Accounting (33) Information Systems (37) Corporate Governance (29) Decision Making (27)

to provide network correlations of keywords. For better keyword visualization, in the Vos Viewer tool the number of keywords occurrences was limited to 5.

According to the network analysis results, the most common keyword is “accounting”, which indicates that the focus of research is on the application of technologies and tools for this. The relationships between the 20 keywords can be recognized and analyzed using network analysis. The results of this analysis showed that the focus of scientists is on decision-making processes, knowledge and information management, as well as on certain aspects of cost management. To identify the relationships between the main keywords, the VosViewer tool was used, which is an effective tool for identifying the evolution of scientific research, outlining new promising areas and building alternative forecasts in the development of the scientific landscape. The results of the analysis using VosViewer are shown in Figure 4, where different colors indicate clusters in which most keywords of the same group are used simultaneously, and the size of the node indicates the degree of keyword connection.

A total of 19 clusters for the unseparated search were indexed with the following specifications:

- Cluster 1 (185 items): *cost aspects in the energetic sector*: cost analysis, sustainability, optimization, life circle assessment, energy, environmental impact, renewable energy, solar energy, carbon footprint.
- Cluster 2 (114 items): *cost specific computational modelling under reliability*: reliability, computer simulation, computer vision, finite element method, computational modelling.
- Cluster 3 (80 items): *management of accounting in context of organizational learning*: accounting, management accounting, accounting education, high education, e-learning, governance, information technology, organizational performance.
- Cluster 4 (77 items): *implementation of disruptive technologies in management of costs and accounting*: accounting information, activity-based costing, artificial intelligence, block chain, cost accounting, computer science, data mining, decision-making, hospital, product design, strategic management, transparency.
- Cluster 5 (73 items): *ontological models among other things for financial issues*: big data, computer, data analytic, decision, e-commerce, energy investing, financial reporting, manufacturing, ontology, process modeling, software engineering, web services.
- Cluster 6 (72 items): *accounting management in the enterprise system*: accounting data, business model, distributed ledger, erp (enterprise resource planning) systems, investment analysis, operations management, resource management.
- Cluster 7 (61 items): *mathematical models for software solutions for accounting and finance control issues*: Bayesian inference, management accounting, mathematical model, neural network, regression, robustness, software reliability, stochastic simulation, uncertainty.
- Cluster 8 (59 items): *asset management as an integrative part in specific researches*: authorization, asset management, energy accounting, models, technology innovation, matlab, bio-fuel, investment decision.
- Cluster 9 (56 items): *cryptocurrency and intellectual capital as intangible resources in accounting*: accounting information, bitcoin, blockchain, cryptocurrency, financial ratios, human capital, intellectual capital, it governance, knowledge sharing, triple-entry accounting, user experience.
- Cluster 10 (51 items): *artificial intelligence and respective mathematical models for accounting management*: accounting information, business intelligence, clustering, decision system, neural network, information extraction, Monte Carlo, performance evolution, traceability.
- Cluster 11 (47 items): *influencing criteria on financial efficiency*: economic efficiency, decomposition, bibliometric, efficiency, financial

- Cluster 11 (3 items): *some methods of internal control*: balanced scorecard, entrepreneurship, internal control.

This analysis showed that the keywords form clusters that illuminate scientific interests of individual publications. Figure 6 shows the distribution of the keyword clusters at the corporate level, which highlight: multifarious contemplation of technological aspects of financial information system as a part of enterprise resources planning, blockchain and cryptography in accounting and auditing, technologic supported financial reporting management as part of corporate reporting system, digital technology for accounting in sustainability management, technologies in knowledge related aspects in corporate social responsibility, impact on information technology for corporate financial performance, innovative insights on digital transformation in enterprises, audit and accounting basics overviews.

- Cluster 1 (44 items): *multifarious contemplation of technological aspects of financial information system as a part of enterprise resources planning*: accounting information system, artificial intelligence, balanced scorecard, big data, corporates, costs, data (acquisition, handling, mining), decision making, economics, enterprise resources planning, financial (accounting, analysis, management), internal control, information (management, system), machine learning, risk (assessment, management), profitability, performance.
- Cluster 2 (23 items): *blockchain and cryptography in accounting and auditing*: (forensic) accounting, auditing, blockchain, cryptography, governance, circular economy, financial statement, integration, management control system.
- Cluster 3 (15 items): *technologic supported financial reporting management as part of corporate reporting system*: corporate (government, reporting), financial (reporting, quality), earnings management, investments, (internal) audit (quality), resource-based view, data analytics, (creative) accounting (education).
- Cluster 4 (13 items): *digital technology for accounting in sustainability management*: sus-

tainability (accounting, reporting, management), cloud computing, digital technology, internet of things, (cost, environmental) accounting.

- Cluster 5 (11 items): *technologies in knowledge related aspects in corporate social responsibility*: corporate social responsibility, firm size, accounting firms, human capital, intellectual capital, knowledge management, emerging technologies, bibliometric.
- Cluster 6 (6 items): *impact on information technology for corporate financial performance*: (firm, financial) performance, commerce, productivity, information technology, quality of accounting.
- Cluster 7 (6 items): *innovative insights on digital transformation in enterprises*: automation, digitalization, innovation, management, material accounting, systematic literature review.
- Cluster 8 (5 items): *audit and accounting basics overviews*: audit, accounting profession, ais, literature review, taxation.

The publication analysis performed on the basis of modelling thematic keyword clusters revealed that both the publication groups delimited according to “state” and those according to “corporate” partly have the same thematic focus, which comprises new technologies (cryptocurrency, artificial intelligence, internet of things etc.), optimization algorithms and mathematical methods. Nevertheless, some clusters consider the special perspective on the financial control and accounting at the level under investigation.

Compared to the results of other bibliometric analyses, the current study provides evidence of the multifaceted implementation of information technologies for financial control and accounting at the state and corporate level. The differences with other literature analyses concern individual emerging trends, process-specific approaches and some specific perspectives (sustainability and environmental issues). The divergence refers to the difference between the authors’ own study and other literature reviews in the separation of thematic clusters and their focuses at the state

and corporate levels. Knowledge gained from this analysis could provide valuable information for the development of such technologies, either on separate levels or on a common basis with differentiated extensions for specific purposes. The main trends already defined in the bibliometric analysis highlight the differences in the consumption of technology due to sustainability, severity of technology implementation, and data security (due to different types of data and, in some cases, manipulation mechanisms at the country and company level). These focal points require better scientific analysis in light of the limited scientific knowledge available and thus represent the future challenges for technology development in financial controlling and accounting.

Digitalization of financial control and accounting forms a complex and dynamically growing construct that involves consideration of various aspects. Facing the research findings of the last decades the aspects of digitalization of financial control and accounting will facilitate not only the single processes but also the core mechanisms. Such changes will demand the rethinking of the value creation through/due to and principles of financial control and accounting at the state and corporate level as well as reorganizing of the structure and procedure of the financial control and accounting data flow for respective information technologies.

The emerging trend of technology mergers at state and corporate levels requires the establishment of regulations in the form of laws, industry or tech-

nology-specific guidelines, standards and norms to ensure the sustainability and resilience of financial and accounting systems, which is presently a general challenge at the state level. Furthermore, companies are encouraged to maintain a clear line of communication with the state. This allows stakeholders to engage in an open and collaborative dialogue and their concerns to be considered in the formulation of strategies for sustainable digital solutions.

Considering commonalities at technology focal points to the state and enterprise levels, the following recommendations can be ascertained:

- adoption of shared technology conventions for financial control and accounting for the interlevels interfaces;
- separate consideration of privacy policies due to the diversity of financial control and accounting data quality at different levels;
- algorithmized unification of technologies of different severity for the same purposes for financial control and accounting.

Although the analysis has information from thematic perspectives on the topic of digital financial control and accounting technologies, it could be enriched by the data from other databases. Furthermore, there is a potential of extended citation analysis, which could be investigated in further research.

CONCLUSION

The study presents empirical research on information technologies for financial control and accounting in general, at the state and global levels. Bibliometric and network analyses have been conducted to gather the latest findings in the field of digitalization of financial control and accounting and reveal that the topic under investigation is proving to be a positive trend. This trend is particularly striking due to paradigm shifts in the 2020s.

Based on the multistage bibliometric analysis, for the subject area of information technologies for financial control and accounting, a cumulative total of 19 thematic clusters were defined, 11 at the state level, and 8 at the corporate level. Scientific findings in recent years indicate that researchers raised a wide variety of topics ranging from technological aspects of the financial information system at both levels, intelligent accounting and auditing processes, mathematical methods and methods of technologies for financial information systems. Technologies that are gaining on importance for financial control and accounting since 2019 include cryptocurrency, blockchain, big data, 5g, artificial intelligence, etc. The

results of the analysis show that researchers emphasize the connection between e-commerce and finance, reporting, among other things, reflected a special role in the topics of handling large amounts of data, such as Big Data, data analysis and process modelling.

It is characteristic that this perspective is considered from different points of view at the state and corporate level: as an optimization of processes at a country and targeted with a focus on integration of cryptography, in enterprise finance, as well as working with big data at the corporate level. In addition, the results of the analysis highlight the importance of different methods of artificial intelligence for optimizing data handling, decision-making and forecasting at both considered levels. Furthermore, it can be stated that the purpose of scientific applications of new technologies is to integrate them into existing enterprise systems. Integration of these into existing systems of enterprise resources, planning or creation of new ones, separately or as part of a digital management system.

In conclusion, it should be noted that this study extends the previous ones due to the accuracy of level-specific perspectives and refined focus on the technologies and their relationships within the clusters. The limitations of a database, network analysis based only on keywords can serve as a basis for future research and extend the potential knowledge in the research field of information technologies for financial control and accounting at the state and corporate level.

These results can be used by other scholars and practitioners to expand existing sets of accounting and financial control solutions at the country and enterprise level.

AUTHOR CONTRIBUTIONS

Conceptualization: Olena Skrynnyk, Serhiy Lyeonov.

Data curation: Olena Skrynnyk.

Formal analysis: Olena Skrynnyk, Serhiy Lyeonov.

Investigation: Olena Skrynnyk.

Methodology: Olena Skrynnyk.

Project administration: Olena Skrynnyk, Serhiy Lyeonov.

Supervision: Olena Skrynnyk.

Validation: Olena Skrynnyk, Serhiy Lyeonov.

Visualization: Olena Skrynnyk.

Writing – original draft: Olena Skrynnyk.

Writing – reviewing & editing: Serhiy Lyeonov.

REFERENCES

1. Abad-Segura, E., & González-Zamar, M.-D. (2020). Research analysis on emerging technologies in corporate accounting. *Mathematics*, 8(9), 1589. <https://doi.org/10.3390/math8091589>
2. Adebayo, A. V., & Ilesanmi, K. D. (2020). Financial resource management in the Nigerian public sector: policy measures to address loopholes. *Problems and Perspectives in Management*, 18(2), 329-339. [https://doi.org/10.21511/ppm.18\(2\).2020.27](https://doi.org/10.21511/ppm.18(2).2020.27)
3. Afaishat, T. AL., Khraim, H. and Al-Maadhede, M. (2022). Effect of network strategic capabilities on digital transformation in Jordanian universities. *Problems and Perspectives in Management*, 20(3), 247-257. [https://doi.org/10.21511/ppm.20\(3\).2022.20](https://doi.org/10.21511/ppm.20(3).2022.20)
4. Alshater, M. M., Hassan, M. K., Sarea, A., & Samhan, H. M. (2022). Islamic accounting research between 1982 and 2020: a hybrid review. *Journal of Islamic Accounting and Business Research*, 13(8), 1176-1196. <https://doi.org/10.1108/JIABR-04-2021-0132>
5. Amirul, S. M., Jaafar, N. I., & Azmi, A. A. C. (2022). Two decades of XBRL: a science mapping of research trends and future research agenda. *Quality and Quantity*, 56(4), 2301-2324. <https://doi.org/10.1007/s11135-021-01225-4>
6. Baker, H. K., Kumar, S., & Pandey, N. (2020). A bibliometric analysis of managerial finance: a retrospective.

- Managerial Finance*, 46(11), 1495-1517. <https://doi.org/10.1108/mf-06-2019-0277>
7. Behrend, J., & Eulerich, M. (2019). The evolution of internal audit research: a bibliometric analysis of published documents (1926–2016). *Accounting History Review*, 29(1), 103-139. <https://doi.org/10.1080/21552851.2019.1606721>
 8. Bellucci, M., Cesa Bianchi, D., & Manetti, G. (2022). Blockchain in accounting practice and research: systematic literature review. *Meditari Accountancy Research*, 30(7), 121-146. <https://doi.org/10.1108/MEDAR-10-2021-1477>
 9. Benameur, K. B., Mostafa, M. M., Hassanein, A., Shariff, M. Z., & Al-Shattarat, W. (2023). Sustainability reporting scholarly research: a bibliometric review and a future research agenda. *Management Review Quarterly*. <https://doi.org/10.1007/s11301-023-00319-7>
 10. Di Vaio, A., Hassan, R., & Palladino, R. (2020). Digital Innovation and Disruptive Technologies in the Intellectual Capital (IC) and Knowledge Management Systems (KMS) Disclosure: A Bibliometric Analysis. *2020 IEEE International Conference on Technology Management, Operations and Decisions (ICTMOD)*. <https://doi.org/10.1109/ICTMOD49425.2020.9380581>
 11. Esteban, S. A., Urquía-Grande, E., de Silva, A. M., & Pérez-Estébanez, R. (2022). Big Data, Accounting and International Development: Trends and challenges. *Cuadernos de Gestión*, 22(1), 193-213. <https://doi.org/10.5295/CDG.211513SA>
 12. Frizon, J. A., & Eugénio, T. (2022). Recent developments on research in sustainability in higher education management and accounting areas. *International Journal of Management Education*, 20(3), 100709. <https://doi.org/10.1016/j.ijme.2022.100709>
 13. Gonçalves, B. S. M., de Carvalho, F. L., & Fiorini, P.C. (2022). Circular Economy and Financial Aspects: A Systematic Review of the Literature. *Sustainability (Switzerland)* 14(5), 3023. <https://doi.org/10.3390/su14053023>
 14. İyibildiren, M., Eren, T., & Ceran, M. B. (2023). Bibliometric analysis of publications on web of science database related to accounting information system with mapping technique. *Cogent Business and Management*, 10(1), 2160584. <https://doi.org/10.1080/23311975.2022.2160584>
 15. Lombardi, R., de Villiers, C., Moscardiello, N., & Pizzo, M. (2022). The disruption of blockchain in auditing – a systematic literature review and an agenda for future research. *Accounting, Auditing and Accountability Journal*, 35(7), 1534-1565. <https://doi.org/10.1108/AAAJ-10-2020-4992>
 16. Mishchenko, S., Naumenkova, S., Mishchenko, V., & Dorofiev, D. (2021). Innovation risk management in financial institutions. *Investment Management and Financial Innovations*, 18(1), 190-202. [https://doi.org/10.21511/imfi.18\(1\).2021.16](https://doi.org/10.21511/imfi.18(1).2021.16)
 17. Monteiro, A., & Cepêda, C. (2021). Accounting information systems: Scientific production and trends in research. *Systems*, 9(3), 67. <https://doi.org/10.3390/systems9030067>
 18. Owusu, G. M. Y., & Korankye, G. (2023). The state of ethical decision-making research in accounting: A retrospective assessment from 1987 to 2022. *Business Ethics, the Environment and Responsibility*, 32(2), 419-434. <https://doi.org/10.1111/beer.12519>
 19. Pererva, P., & Maslak, M. (2022). Commercialization of intellectual property objects in industrial enterprises. *Problems and Perspectives in Management*, 20(3), 465-477. [https://doi.org/10.21511/ppm.20\(3\).2022.37](https://doi.org/10.21511/ppm.20(3).2022.37)
 20. Poje, T., & Groff, M. Z. (2022). Mapping Ethics Education in Accounting Research: A Bibliometric Analysis. *Journal of Business Ethics*, 179(2), 451-472. <https://doi.org/10.1007/s10551-021-04846-9>
 21. Polinkevych, O., Glonti, V., Baranova, V., Levchenko, V., & Yermoshenko, A. (2021). Change of business models of Ukrainian insurance companies in the conditions of COVID-19. *Insurance Markets and Companies*, 12(1), 83-98. [https://doi.org/10.21511/ins.12\(1\).2021.08](https://doi.org/10.21511/ins.12(1).2021.08)
 22. Savchuk, N., Bludova, T., Leonov, D., Murashko, O., & Shelud'ko, N. (2021). Innovation imperatives of global financial innovation and development of their matrix models. *Investment Management and Financial Innovations*, 18(3), 312-326. [https://doi.org/10.21511/imfi.18\(3\).2021.26](https://doi.org/10.21511/imfi.18(3).2021.26)
 23. Secinaro, S., Dal Mas, F., Brescia, V., & Calandra, D. (2021). Blockchain in the accounting, auditing and accountability fields: a bibliometric and coding analysis. *Accounting, Auditing and Accountability Journal*, 35(9), 168-203. <https://doi.org/10.1108/AAAJ-10-2020-4987>
 24. Thottoli, M. M. (2022). Two Decades of Environmental Accounting: A Bibliometric Analysis. *Institutions and Economics*, 14(4), 83-113. <https://doi.org/10.22452/IJIE.vol14no4.4>
 25. Varma, A., Piedepalumbo, P., & Mancini, D. (2021). Big data and accounting: A bibliometric study. *International Journal of Digital Accounting Research*, 21, 203-238. https://doi.org/10.4192/1577-8517-v21_8
 26. Verhun, V., Pryiatelchuk O., & Zayats, O. (2020). Competitive features of country associations based on the Global Competitiveness Index: the case of the United States – Mexico – Canada Agreement. *Problems and Perspectives in Management*, 18(4), 181-190. [https://doi.org/10.21511/ppm.18\(4\).2020.16](https://doi.org/10.21511/ppm.18(4).2020.16)
 27. Vysochan, O., Hyk, V., Vysochan, O., & Olshanska, M. (2022). Sustainability Accounting: A Systematic Literature Review and Bibliometric Analysis. *Quality – Access to Success*, 22(185), 95-102. <https://doi.org/10.47750/qas/22.185.14>
 28. Yu, H., Wang, Y., Li, X., Wang, Ch., Sun, M., & Du, A. (2019). Measuring ecological capital: State of the art, trends, and challenges. *Journal of Cleaner Production*, 219, 833-845. <https://doi.org/10.1016/j.jclepro.2019.02.014>