

## A Bibliometric Analysis on Fraud in Accounting

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### Abstract

*The main objective of the research was to visualize and analyze complex datasets for the development of keyword maps and the identification of clusters of connected terms. In order to highlight thematic relationships between words, thus providing insight into the dynamics of the domains of interest, we used VOSviewer, a versatile digital tool. With this tool we detected sub-domains connected with fraud or various specialisations within the domain. The approach adopted for this study was the bibliometric analysis of a total volume of 1377 articles, which were indexed in the Scopus database over a nine-year period from 2015 to 2023. The primary topic of these articles was tax evasion, while secondary topics were accounting, forgery and legal issues. In addition, the keywords used, relevant by their frequency and impact, gave us the opportunity to identify dominant themes and uncover less explored areas of research, thus being able to guide future directions of study.*

**Key words:** frauds in accounting, bibliometric analysis

**J.E.L.:** H00, H32, K00

### 1. Introduction

Fraud is a complex phenomenon that cuts across many spheres of our lives, from accounting and economics to legal issues and even counterfeiting. In all these areas, the aim is the same: to prevent and punish fraudulent behaviour in order to protect the economy, consumers and the integrity of the legal system. While fraud may sometimes seem to be an intractable problem, by understanding and addressing it in a comprehensive and interdisciplinary way, important steps can be taken to reduce its negative impact.

Bibliometric analysis software allows complex data to be visualised and analysed in a graphical way, and can be used to develop keyword maps or analyse groups (clusters) of keywords. It can be used in various fields such as scientific research, innovation management, or social analysis. Clustering keywords can highlight thematic relationships between words, indicating which words are often used together in the same context. If the data analysed includes a temporal component, cluster analysis can show how themes evolve over time or certain keywords, depending on their frequency, suggesting changes in areas of interest.

Cluster analysis can also help to identify sub-domains or specialisations within a given field. VOSviewer, the software used in this research, can also show the popularity and impact of keywords. Keywords that appear in many articles, or are associated with frequently cited articles, may be considered more important. Last but not least, keyword cluster analysis can also help identify areas where there is little research or understanding, pointing to possible directions for future research.

This bibliometric study on fraud in accounting provides an extended view over a broad time horizon (Munteanu and Jakubowicz, 2022, p. 920), including the number of publications focused on this topic indexed in the Scopus database. Our intention is to highlight fraud in accounting as a research area. The main objective of the research is to assess the current situation and to identify

future perspectives of concerns in the field of fraud in accounting, the selected studies aiming at obtaining answers to the following research questions:

Q1 - What are the most relevant research topics related to fraud in accounting?

Q2 - In which research network are the secondary research topics related to the topic fraud in accounting integrated?

In order to answer the research questions we conducted an initial analysis with Microsoft Excel (Araya-Castillo et al., 2021, p. 1; Ribeiro-Navarrete et al., 2021, p. 1), then we conducted a bibliometric analysis. Bibliometric analysis uses mathematical and statistical methods to analyze scientific activities in a given research field (Callon et al., 1991, p. 195; Aparicio et al., 2019, p. 105). There are different programs that can perform this bibliometric analysis. In this study, we opted for VOSviewer 1.6.16 (Van Eck and Waltman, 2010, p. 523) due to the possibility to build and visualize bibliometric networks from scientific publications and researchers using keywords, bibliographic links, co-citation or author relationships.

## 2. Theoretical background

Fraud is an illegal activity that is closely linked to many aspects of economic and social life. The connection between fraud and accounting is mainly manifested through accounting fraud. This involves manipulating, hiding or distorting a company's financial information to mislead investors or tax regulations (Jakubowicz and Munteanu, 2022, p. 883). Examples of accounting fraud can include manipulating sales figures, hiding debts and misrepresenting the value of assets. The role of accountants is to keep a clear and accurate record of an entity's financial transactions. When this ethical standard is compromised, it can lead to serious legal consequences and loss of public trust.

Second, fraud is a central concept in economics, where it is considered a form of rational but unfair behaviour. People are motivated to commit fraud when the potential rewards outweigh the risk of being caught and punished. Economic fraud can have a significant impact on the economy by distorting markets, undermining fair competition and eroding public confidence in the economic system.

As far as the legal aspects are concerned, fraud is, of course, a criminal offence. Whether it is mail fraud, bank fraud or insurance fraud, all are punishable by law. Forgery is a form of fraud involving the fabrication or alteration of an object or document with the intention of making it appear genuine. This can include forging a signature on a cheque, creating a false document or even counterfeiting money. Forgery is also a serious crime, punishable in most jurisdictions around the world.

Accounting fraud is a topic of great interest in the scientific literature. Florea and Aivaz (2022, p. 325) who conducted an exploratory analysis of the number of corruption offences in Romania from 2014 to 2020, approached this topic from a macroeconomic perspective. The authors focus their analysis on data on corruption offences in Romania, highlighting that corruption offences are not only violations of the law, but can also have significant effects on a country's economy. In parallel, Aivaz et al (2022) discussed the topic of fraud from a different angle, exploring the impact of non-compliance in transport businesses. The authors argue that non-compliance can have a domino effect, leading to financial fraud and potentially economic instability.

Another relevant study is that by Aivaz, Munteanu and Chiriac (2022, p. 337). It focuses its research on the work of the Directorate General for Anti-Fraud (DGAF), highlighting how it influences the accounting and tax environment in Romania. In addition to these approaches, fraud can be studied multidisciplinary, with a number of famous case study examples presented in a study by Chiriac, Nisulescu and Aivaz (2021, p. 989), these studies illustrate how it can affect different areas of the economy and society. Analysing these works, a common theme can be observed: accounting fraud has spillover effects in different sectors of the economy and society. From corruption that can destabilise national economies (Florea and Aivaz, 2022, p. 325), to non-compliance in transport businesses that can lead to financial fraud (Chiriac, Munteanu and Aivaz, 2022), the impact is significant and varied.

It is also important to note how institutions, such as the DGAF, are trying to counter these crimes and ensure the integrity of the tax system (Aivaz, Munteanu and Chiriac, 2022, p. 298). This effort not only helps to prevent and combat fraud, but also contributes to maintaining economic stability.

In conclusion, accounting fraud is a complex and multifaceted subject that requires multidisciplinary and cross-sectoral approaches. By studying cases of fraud and efforts to combat it, we can better understand its impact on our society and economy, and move towards creating more effective policies and mechanisms to prevent and combat it.

### 3. Research methodology

This section highlights the importance of bibliometric analysis as a research method for examining the most relevant aspects of fraud in accounting as a field of research.

The significant increase in scientific output in recent decades has increased the value of bibliometrics (Hernandez-Perlines, 2022, p. 428). In recent years, we have witnessed the indexing of publications in automated bibliographic databases that have allowed the generation of indicators to measure the results of scientific and technological activities. Most bibliographic databases contain titles, journals, authors, institutions, citations, keywords, abstracts, etc. With such information, it is possible to evaluate science using bibliometric techniques (Gutiérrez-Salcedo et al., 2018, p. 1275) in a systematic literature review (Toro-Jaramillo, 2017, pp.229; Kraus et al., 2020, p. 1023). Through bibliometric analysis, we can assess scientific activity, the impact of publications and the resources available to guide new research (Montero-Díaz et al., 2018). Researchers use it as a reference (Morales et al., 2017, p.329), as it provides a detailed and systematised source of information on scientific production in a particular discipline (Merigó et al., 2015). All these have made bibliometric analysis an emerging and cutting-edge field of research (Astro'm, 2007, p. 12; Miguel and Dimitri, 2013, p. 117; Araya-Castillo et al., 2021).

Prior to the bibliometric analysis in this paper, a preliminary analysis was conducted using Microsoft Excel software (Ribeiro-Navarrete et al., 2021; Araya-Castillo et al., 2021, p. 1). VOSviewer software, version 1.6.16 (Van Eck and Waltman, 2010, p. 523) was used for the bibliometric analysis. An advantage of this software is that it allows us to combine visual interpretation with tables and provide a map based on co-occurrence (Ribeiro-Navarrete et al., 2021, pp.1).

### 4. Findings

The analyses performed co-occurrence mapping. Co-occurrence, also known as semantic network, refers to the relationships between keywords.

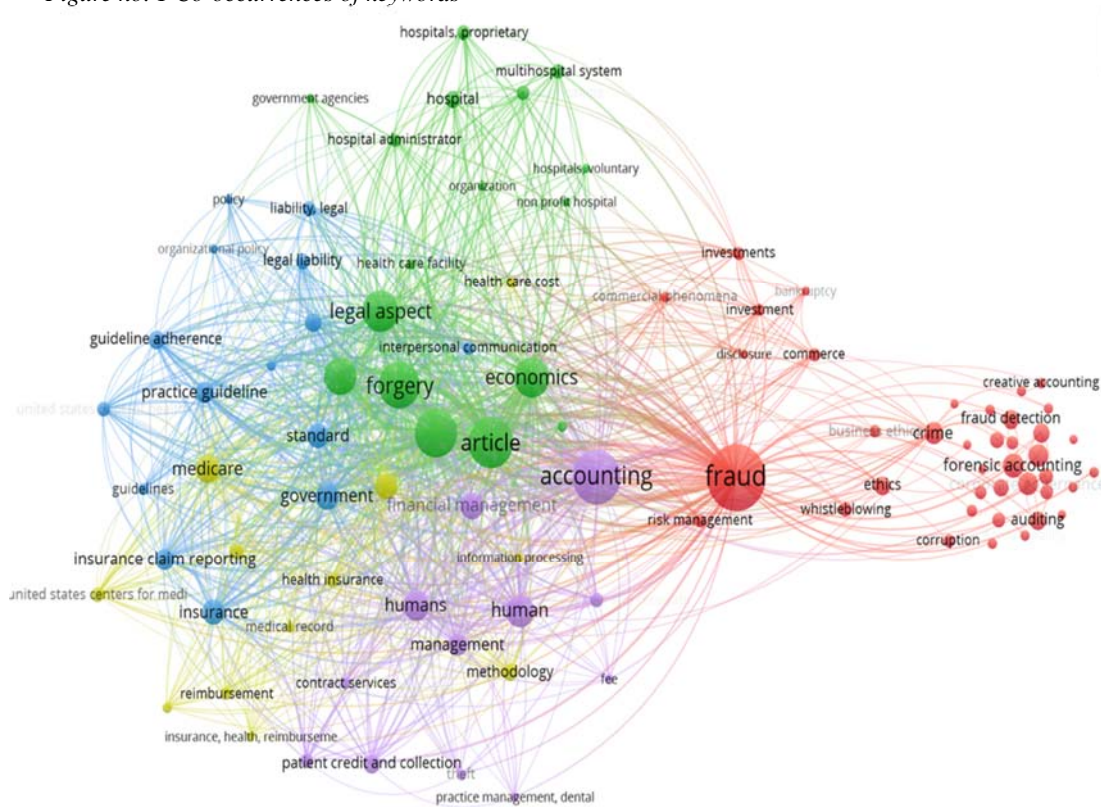
In co-occurrence mapping, all keywords were considered as a unit of analysis using the full count method. The study also established some limitations in the analysis. For example, a minimum of 12 occurrences of a keyword was set as a limiting factor. Thus, out of 1377 articles selected from the SCOPUS database, we obtained 3937 co-occurrences, with only 96 keywords passing the threshold number of occurrences.

Each keyword was analysed using software in which links, total link strength and co-occurrences of the keyword with other keywords were calculated. Link strength refers to the co-occurrence between one item (e.g. a keyword) and another, and total link strength corresponds to the total cited references between one item and the others. Also, occurrences represent the number of articles in which the keyword was found. Among the keywords with the highest co-occurrences we have: fraud 529(3682), accounting 355(3492), article 308(3429). The link strength is indicated in parentheses.

As can be seen in Figure 1, the co-occurrences of keywords were also illustrated by a network visualization. As can be seen in Figure 1 the 3937 keywords formed 5 clusters: cluster 1 (red), cluster 2 (green), cluster 3 (blue), cluster 4 (yellow) and cluster 5 (purple). The importance of the circles and texts in each cluster represents the strength of their co-occurrence with the other keywords, while the distance between items and the lines connecting them show the links and interdependencies of the keywords.

In addition, the keywords in each cluster were examined to establish the thematic distinctiveness of the cluster based on the distinctive topic of those keywords.

Figure no. 1 Co-occurrences of keywords



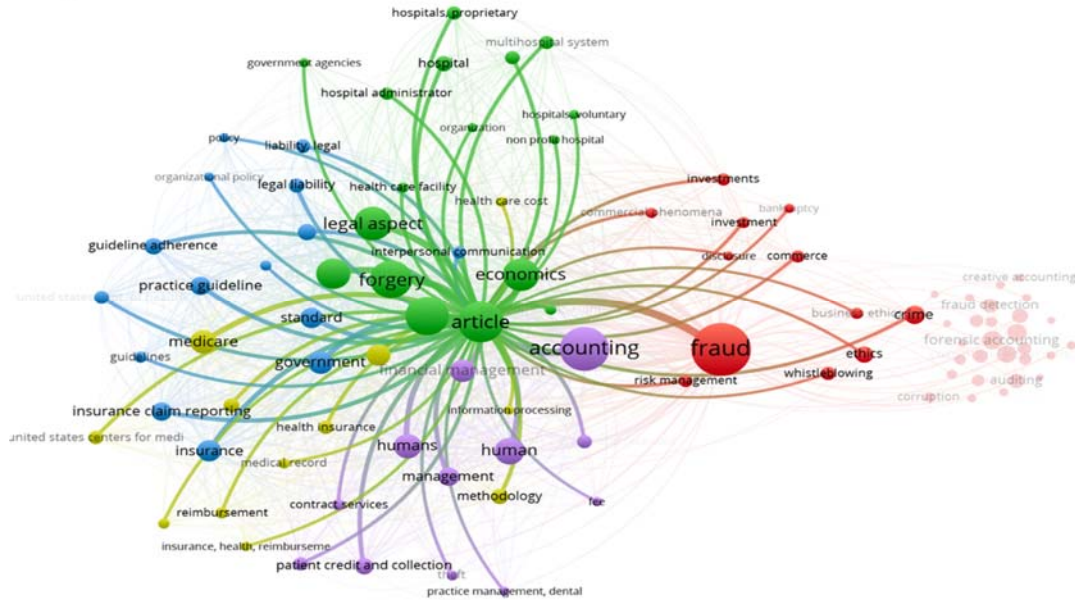
Source: Authors' work

*Cluster 1*, consisting of the keywords Fraud, forensic accounting, fraud detection, auditing, corruption, ethics, risk management is illustrated in Figure 2. Fraud is an illegal act involving deception for financial gain. Forensic accounting is a specialised field dealing with the investigation of financial fraud, using various auditing methods and techniques to detect and understand the nature and extent of fraud. Fraud detection is a key element of forensic accounting and auditing, which focuses on identifying and preventing illicit activities, including corruption (Rus, 2019, p. 144). Corruption is a form of fraud that involves the abuse of power for personal or third-party gain. Ethics refers to the moral principles that guide the behaviour and decisions of individuals and organisations. In the context of auditing and forensic accounting, ethics is crucial for maintaining integrity, objectivity and transparency in detecting and preventing fraud and corruption. Risk management is an essential component of the audit and forensic accounting process. It involves identifying, assessing and managing the risks of fraud and corruption within an organisation to minimise the possibility of such incidents occurring and to ensure compliance with ethical codes and legal regulations.





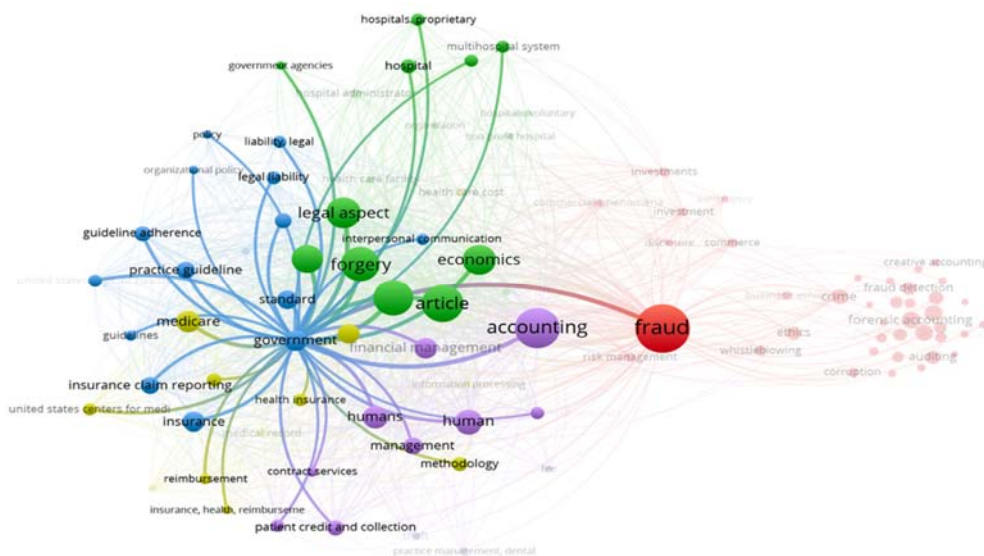
Figure no. 3 Article co-occurrences



Source: Authors' work

Cluster 3 in Figure 4 links the following topics: government, insurance, standard, insurance claim reporting, practice guideline. These concepts can be interlinked into a unified cluster centred on the theme of Managing and regulating insurance claims reporting practices. Government plays a key role in regulating and overseeing the insurance industry, including insurance claim reporting practices (Stan and Cojocaru, 2022). It can also set standards and rules that insurance companies must follow (Apostol and Stan, 2021).

Figure no. 4 Government co-occurrences



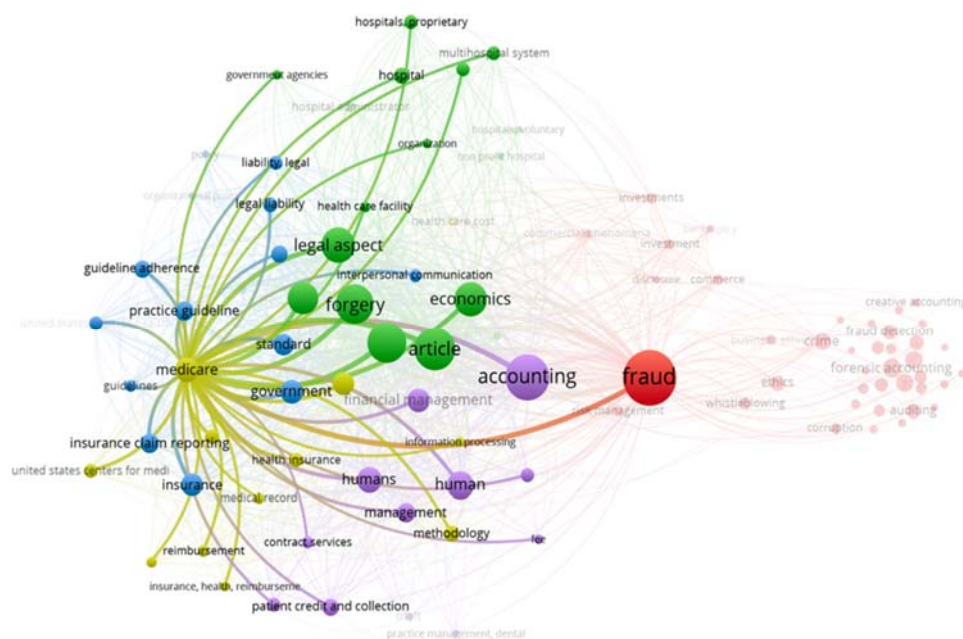
Source: Authors' work

Insurance is the core concept of the cluster. It is a key financial practice involving the transfer of risk from one entity to another in return for the payment of a premium. The standard in this context could be interpreted as a set of rules or standards set by government or a regulatory organisation that guide how insurance claims are reported and processed. The reporting of insurance claims is an essential aspect of the insurance process. It refers to how insurance claims are communicated and documented by policyholders. The Practice Guide could be a document or resource that provides guidance and recommendations on how claims reporting should be carried out in accordance with established standards.

As can be seen, all of these concept's interconnect and create a unified cluster that addresses the management and regulation of insurance claims reporting practices.

Cluster 4 in Figure 5 focuses on problems: *Medicare, organization and management, health care cost, health insurance*. Fraud is a significant problem in health insurance, including health care systems such as Medicare. As a government-funded health insurance program, Medicare is often a target for fraud. For example, a healthcare provider may fraudulently bill Medicare for services that were not provided or for services that were not needed. Effective organization and management practices can help detect and prevent fraud. Using advanced data analysis tools can help identify complex fraud schemes. Fraud can also contribute to increased healthcare costs. Fraudulent billing for services that have not been provided or for inappropriate or excessive services can lead to additional costs for insurers and ultimately patients. Health insurance fraud can take many forms, including fraud by policyholders, providers or intermediaries. This can include anything from submitting false or exaggerated claims for reimbursement, to selling fake insurance policies or identity theft.

Figure no. 5 Medical co-occurrences



Source: Authors' work

Preventing, detecting, and combating fraud are therefore key issues in the administration of health insurance programs such as Medicare, with significant implications for both the cost of health care and the overall efficiency of the health insurance system.

Cluster 5 consisting of the keywords Accounting, human, management, patient credit and collection, contract services is shown in Figure 6.

As we know, accounting is the process by which an organisation's financial transactions are recorded, analysed, interpreted and reported. In this context, accounting fraud can take various forms, such as manipulation of financial data, falsification of records or non-declaration of transactions. At





Also, a valuable aspect of using the VOSviewer was the possibility to discover less explored areas of research. Keyword cluster analysis allowed us to identify not only central research themes, but also areas where there is a knowledge or research gap. These may represent future directions of study, offering significant opportunities for advancing our understanding of tax evasion.

In conclusion, our study has been able to provide a detailed picture of the field of tax evasion and related topics by analysing a significant number of scientific papers indexed in the Scopus database over the last nine years. The results revealed both dominant themes and less explored areas of research, providing valuable directions for future research in this area.

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