MODERN APPROACHES TO ENVIRONMENTAL, SOCIAL, AND GOVERNANCE DIAGNOSTIC AUDIT

Václav Kupec *, Yusuf Kurt **, Alp Aytaç ***, Jakub Sieber ****

* *Corresponding author,* Prague University of Economics and Business, Prague, Czechia
Contact details: Prague University of Economics and Business, W. Churchilla 1938/4, 130 67 Prague, Czechia
** Van Yüzüncü Yıl University, Van, Türkiye
*** Bursa Uludag University, Bursa, Türkiye
**** Technical University of Liberec, Liberec, Czechia

OPEN ACCESS

How to cite this paper: Kupec, V., Kurt, Y., Aytaç, A., & Sieber, J. (2026). Modern approaches to environmental, social, and governance diagnostic audit. *Corporate Governance and Sustainability Review, 10*(3), 170–181.
https://doi.org/10.22495/cgsrv10i3p12

Copyright © 2026 The Authors

This work is licensed under a Creative Commons Attribution 4.0 International License (CC BY 4.0).
https://creativecommons.org/licenses/by/4.0/

ISSN Online: 2519-898X
ISSN Print: 2519-8971

Received: 17.11.2025
Revised: 30.01.2026; 09.02.2026; 07.04.2026
Accepted: 07.05.2026

JEL Classification: G32, G34, M10, M42
DOI: 10.22495/cgsrv10i3p12

Abstract

The study addresses the lack of a coherent methodological framework for systematically auditing environmental, social, and governance (ESG) topics in organisations. By shifting the focus from ESG reporting outcomes to diagnostic verification of ESG-related risks, the study contributes a methodological perspective that is largely absent from prior research. The aim is to propose a methodological audit model that verifies ESG topics diagnostically in organisations. A mixed-methods approach was employed, combining a literature review, content analysis of specialised sources, and a computer-assisted web interview (CAWI) based quantitative survey. The quantitative part of the research is based on responses from a statistical sample of 307 internal auditors who assessed the probability and financial impact of 29 ESG-related risks. A three-phase diagnostic audit model was developed, which categorises ESG risks, optimises their granularity, and defines universal diagnostic points for verification. The model was created to address growing regulatory and managerial demands for transparent, reliable, and risk-oriented ESG verification. The proposed model provides a modern, empirically validated approach that helps auditors determine which ESG risks to audit, how deeply to audit them, and how to verify them diagnostically.

Keywords: Administration, Audit, Diagnostics, ESG, Governance, Management

Authors' individual contribution: Conceptualization—V.K.; Methodology—V.K.; Software—J.S.; Validation—Y.K. and A.A.; Formal Analysis—J.S.; Investigation—J.S.; Resources—J.S.; Data Curation—J.S.; Writing—V.K., Y.K., and A.A.; Visualization—V.K., Y.K., and A.A.; Supervision—V.K.; Project Administration—Y.K. and A.A.; Funding Acquisition—Y.K. and A.A.

Declaration of conflicting interests: The Authors declare that there is no conflict of interest.

1. INTRODUCTION

In the last decade, the importance of the environmental, social, and governance (ESG) concept has grown significantly as a framework for the evaluation of the sustainability of an organisation (Gorzeń-Mitka, 2023). While ESG reporting has become common practice, auditing of ESG topics is a methodological challenge, mainly with respect to societal requirements, which puts pressure on transparent verification of ESG performance. In this context, the importance of audits that combine modern approaches to the verification of ESG topics has grown. Such approaches should not only verify the topics in a systematic way, but primarily, they should help the leadership of organisations in strategic management. Thus, the background and rationale of the study are to develop approaches to ESG auditing.

The aim of the study (hereinafter referred to as 'A1') is to propose an audit model that will diagnostically verify ESG topics in organisations. Together, these research questions (*RQ1* and *RQ2*) represent the major research questions of the study and frame the methodological and empirical focus of the proposed ESG diagnostic audit model:

RQ1: What approaches are suitable for auditing of ESG topics?

RQ2: Are there any differences between the auditing of traditional topics (Griffiths, 2016) and the auditing of ESG topics (Ilori et al., 2023)?

While the existing literature has substantially advanced the understanding of ESG reporting, performance measurement, and their implications for firm value and stakeholder decision-making (Kotsantonis & Serafeim, 2019; Huang, 2022; Khan, 2023), considerably less attention has been paid to the methodological foundations of ESG auditing as a diagnostic and risk-oriented verification process. Current studies predominantly approach ESG from the perspectives of disclosure quality, rating consistency, or assurance outcomes (Fernández-Feijóo-Souto et al., 2012; Ilori et al., 2023), leaving a gap regarding how ESG risks should be systematically identified, prioritised, and verified within internal audit practice. This study addresses that gap by integrating risk-based auditing principles (Mohammadi et al., 2014; Griffiths, 2016) with empirical evidence to develop a diagnostic ESG audit model, thereby shifting the focus from ESG performance assessment toward audit-oriented risk diagnostics with clear methodological relevance.

As an approach and methodology overview, the study applies a combined approach that uses both qualitative and quantitative methods. At a theoretical level, a literature review and a content analysis of approaches to ESG auditing in organisations have been performed. At a practical level, a systemic construction of a model of an ESG diagnostic audit approach in organisations has been realised. Both levels focus on testing the formulated hypotheses using descriptive statistics and the measurement of efficiency of the approaches. Emphasis has been placed on analysing the comparison between traditional auditing approaches and diagnostic auditing approaches from the point of view of their added value for management.

The present study provides a comprehensive view of a modern ESG audit, thus contributing to the development of verification methods that allow for the evaluation of the non-financial performance of organisations. The study should provide a proposal for an auditing model that combines audit principles and diagnostics and respects the need for better transparency, consistency, and relevance of the outcomes. The study supports the theoretical embedding of ESG auditing as an independent methodological approach, while at the same time, it provides concrete incentives for making the practice more efficient. The results can be used by the professional public, auditors, consultants, and management. The text contributes to the development of responsible evaluation of sustainability in organisations.

The remainder of the paper is structured as follows. Section 2 reviews the relevant literature and conceptual background of ESG auditing, risk-based auditing, and ESG-related risks. Section 3 describes the research methodology, including data collection, risk assessment, and risk analysis procedures. Section 4 presents the empirical results and the proposed ESG diagnostic audit model. Section 5 discusses the findings in relation to existing research. Section 6 concludes the paper by summarising the main contributions and outlining directions for future research.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

The literature review focuses on the definition of key terms in ESG audits, with emphasis being placed on methodological fundamentals, theoretical approaches, and subsequent practical applications. For the study to be systematic, a literature review (Paciarotti & Torregiani, 2021) was used, focused on academic texts, methodological reports, and professional standards in the field of ESG. The literature review was supplemented with a content analysis (Seuring & Gold, 2012) focused on the contents of texts, key concepts, and gaps in the current knowledge. The review presents starting points for processing the aims of the study, while at the same time comprehensively analysing the ESG audit; this will be further developed in the subsequent section of the study.

In the study, three hypotheses on technicalities have been formulated:

H1: The use of data triangulation (a combination of different data sources) increases the accuracy of the identification of ESG risks.

H2: Auditing of ESG topics is more time-consuming than auditing of traditional topics.

H3: Diagnostic verification approaches enhance the efficiency of an audit. Thus, the study combines current theoretical knowledge and practical recommendations.

In the literature review, the term ESG audit was searched for in Web of Science with the aim of identifying relevant specialised information. The search was limited to outcomes not older than five years to ensure capturing the current state of knowledge. The document type was limited to articles to ensure uniformity of sources. The search was further limited to the following thematic categories: business finance, business management, economics, and environmental studies (Table 1). In this way, interdisciplinary outcomes could be searched that link primarily sustainability and secondarily organisational management. The resulting data file served as an information basis for further analysis of the content.

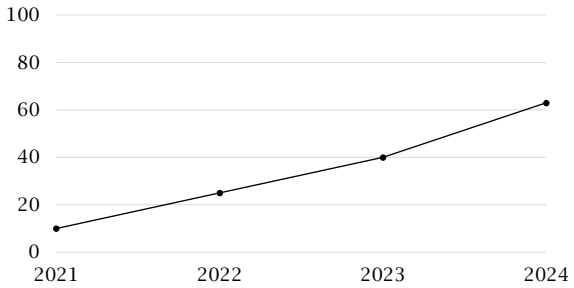
Table 1. Literature review

Web of Science core collection database				
Term	***Period***	***Document***	***Category***	Outcomes
ESG audit	*5 years*	*Articles*	*Business finance*, *business management*, *economics,* and *environmental studies*	

Source: Authors' elaboration.

A quantitative analysis of published articles has confirmed an increased scientific interest in the ESG audit. While in 2021 only 10 relevant articles were identified, there were 25 articles in 2022, 40 articles in 2023, and no fewer than 63 articles in 2024 (Figure 1). The thematic analysis has shown that the topic of ESG audit is most strongly represented in business finance (96 articles), followed by business (46 articles), management (42 articles), and economics (26 articles). The fact that the topic is less represented in environmental studies (22 articles) suggests that it is mostly studied through the lens of management (Figure 2). These trends also prove that there is space for a deeper interdisciplinary connection.

Figure 1. Development in published texts in the studied field



Source: Authors' elaboration.

Figure 2. Representation of published texts in the studied field



Source: Authors' elaboration.

The analysis of most cited articles has shown that ESG factors are most often studied in connection to innovation. The first article proves that efficient ESG strategies contribute to a lower cost of capital, thus supporting green innovation of organisations (Zhai et al., 2022). Another article then confirms that a higher ESG evaluation is related to a lower risk of organisational failure (Li et al., 2022). And yet another article, hopefully not the last one of its kind, explores the effect of the composition of the board on the scope and structure of ESG reporting (Suttipun, 2021). The common denominator of the above studies is the importance of ESG topics for strategic decision-making of the management. Next, the literature review moves on to the content analysis of the relevant terms (Table 2).

Table 2. Content analysis (selected articles)

Study	*Research focus*	*Methodology type*	*Key findings*
Singhania and Saini (2021)	Systems approach to ESG in the Indian context (Reliance Industries)	Qualitative (case study, systems approach)	A systems approach can benchmark ESG effectiveness
Shaikh (2022)	Impact of ESG practice and reporting on firm performance	Quantitative (panel data, regression)	ESG compliance varies by region/sector
Moalla and Dammak (2023)	Audit quality and media coverage effects on ESG transparency	Quantitative (panel data regression)	Audit quality directly improves ESG
Prabowo and Anggoro (2024)	Effectiveness of ESG performance evaluation strategies	Mixed methods (interviews, thematic analysis, analytic hierarchy process (AHP))	Integrated and stakeholder-based approaches are most effective

Source: Authors' elaboration.

2.1. Audit

The first topic of content management is internal audit (risk-based audit oriented on internal processes in organisations). "It is a process, an approach, a methodology, and an attitude of mind rolled into one" (Griffiths, 2016, p. 5). An internal audit (hereinafter also as 'audit') is a key component of governance and management focused on achieving the goals of an organisation (Dahivale, 2020). From its historical role of a watchdog, it has developed into having an advisory role that includes risk management, control, and compliance with regulations (Hazzaa & Abdullah, 2020). An audit in organisations evaluates the entire internal management and controlling system, risk management, and selected management processes, in this way contributing to accountability and an efficient use of resources (Kamara, 2023).

The process of internal auditing includes specific steps and reporting that uses the 5C framework: condition, criteria, cause, consequence, and corrective action (Dahivale, 2020). Methodologically, an audit primarily builds on verification of internal processes in organisations, focusing on areas of risk. It aims to enhance accountability through ensuring transparency and verification of selected control mechanisms. In this way, an audit has transformed from a directive activity to a consultancy activity that contributes to risk management and achieving broader aims (Mohammadi et al., 2014). With organisations becoming ever more complex, auditing has been adapting and absorbing a new generation of trends with the aim to increase the added value (Dahivale, 2020), which concerns especially ESG topics.

Advanced delimitation of audit theories takes on different forms. Some studies (Grzesiak & Kabalski, 2016) use the agency theory to describe the audit as a mechanism that aligns principal-agent interests, defines the role, and manages the reaction to organisational change. Another study (Elbardan et al., 2015) references the institutional theory to point at the interconnectedness of the audit, regulation, and governance in organisations.

In addition, the latest studies (Mihret & Grant, 2017) expand the discussion and use a Foucauldian perspective to portray the audit as a practical management tool that integrates concepts of management as a major competitive advantage (Drašček, 2024).

At the same time, audits ensure quality as they assess compliance of organisational processes with the defined standards, while at the same time identifying areas for improvement (Shu et al., 2010) in the environment of an organisation (Barboza et al., 2019). Quantitative approaches within these audits may provide valuable insights into process efficiency and effectiveness (Shu et al., 2010). Other audit techniques and methods have great potential to enhance the efficiency of organisational processes through analysis of a large amount of information and verification of compliance with process models (Barboza et al., 2019). In summary, audits have become fundamental tools in achieving improvement in various sectors and organisational processes.

2.2. Environmental, social, and governance

The second topic of this research and content analysis is the topic of ESG. Despite the legislative turbulence, this topic has been gaining importance for organisations. ESG is a business framework for investment in accordance with ESG criteria that include a wide range of inspirational management from carbon footprint management to setting the working environment and the surroundings to tackling corruption (Irigaray & Stocker, 2022). Recent review studies confirm the growing complexity and heterogeneity of ESG factors across sectors and decision-making contexts (Rubab et al., 2025). This term refers to three key areas (ESG) based on which the performance of organisations is evaluated. ESG approaches may be problematic as they mix the aspects of performance and organisational processes (Cundill & Wilson, 2020).

Different organisations use different metrics and tools to evaluate performance in ESG, including the Bloomberg Sustainability Report, the Thomson Reuters Eikon Report, and the Global Reporting Index Report. These tools evaluate factors such as ethical conduct, transparency, and environmental engagement (Peixoto et al., 2022), as well as their impact on other aspects (Gücenme Gençoğlu & Aytaç, 2016). Despite their limitations, considerations of ESG ever more affect the decision-making of organisations and the expectations of stakeholders (Irigaray & Stocker, 2022). Critics argue that ESG suffers from proxy indices and evaluation inconsistencies, though these issues also occur in traditional financial analysis (Khan, 2023).

From a management perspective, integrating ESG topics into an organisation requires careful planning (Ewert & Wagenhofer, 2025). The subsequent integration of all factors into an organisation is complex, and there is no single theory that fully explains this process. A well-designed, integrated approach to ESG that balances ESG factors can promote transparency and accountability in organisations. Given the primary fact that ESG continues to gain importance, further research is needed to understand how ESG areas affect the value of organisations and their relationships with their stakeholders (Huang, 2022).

Within the context of the study, the risk management perspective is absolutely crucial. From the perspective of risk management, ESG aspects are key to sustainable and responsible business (Gorzeń-Mitka, 2023). There are still a number of theoretical gaps in the understanding of how to incorporate ESG factors in the decision-making of the management, as well as risk management. Several perspectives have emerged that stress the complexities of ESG in the monitoring of company value (Huang, 2022). Standardised performance criteria of ESG are needed for efficient monitoring and comparability (Vasiu & Bratu, 2022) as well as auditing. As ESG topics are a central component in an organisation's strategy, more research is needed to further explore the issue.

2.3. Audit environmental, social, and governance

This section focuses on a synthesis of the terms audit and ESG from the point of view of their content. An ESG audit is a reporting methodology that focuses on ESG aspects and processes of an organisation. It serves as a tool for the development of business, solves problems in an organisation, while tackling risk management (Prodanova et al., 2023). The need for such audits has arisen mainly due to the differences in global standards in submitting ESG reports and fragmented approaches to information disclosure (Ilori et al., 2023). Empirical evidence shows that audit quality is significantly associated with ESG performance outcomes (Sihombing & Nurhaliza, 2025). The aim of the ESG audit concept is to bridge the gap between a rapid transformation of the ESG information ecosystem and a slower development of audit methodology (Bulyga & Safonova, 2023).

ESG audits vary in methodology across countries, with international practice being more advanced and integrated into the strategic planning of organisations. Successful implementation of ESG auditing faces challenges such as limited auditor expertise and regulatory inconsistencies (Ilori et al., 2023). The primary methodology involves verifying information from non-financial reporting and formulating methodological approaches for organisations in selected sectors (Bulyga & Safonova, 2023). Recent systematic reviews indicate that ESG research predominantly focuses on performance and disclosure rather than audit-oriented verification (Yan et al., 2025). However, these audits face challenges in achieving sufficient objectivity due to unclear evaluation criteria, questionable parameters, and opaque evaluation processes (Buchinskaia, 2023).

These audits differ methodologically from traditional risk-based audits, primarily in that they focus on specific environmental, social, and governance factors of organisations. ESG audits do not address comprehensive risk identification, but they tackle risks from a sustainability perspective, which leads to a narrower focus of the audit and more targeted testing (Li & Huang, 2025). This methodological orientation is addressed through the triangle of implications: implications for audit clients, implications for financial statements, and implications for audit firms. ESG verification and assurance differ from many other audits, but it is gaining importance in the audit environment (Indyk, 2022).

As a rule, the methodological process of ESG auditing involves several steps: the definition of the scope of the entire audit, data collection, analysis of the organisation's performance compared to ESG standards, and reporting of the audit findings (Prodanova & Tarasova, 2023). Other approaches also include mapping the significance level, evaluation of indices in the given sector, and evaluation of the level of process risks. The audit framework should comply with international standards for auditing and ESG (Ilori et al., 2023). In summary, the aim of an ESG audit is to maximally increase the accountability of organisations, minimise the risks of ESG processes, and improve compliance with the evolving sustainability criteria (Prodanova et al. 2023).

2.4. Risk

The final part of the content analysis concerns the notion of risk, which is closely connected to ESG and audit methodology. Risk is an inseparable part of any activity of an organisation, and it directly affects its results (Thlon, 2015). It is characterised by uncertainty and may lead to opportunities for profit as well as to a potential loss (Ducu & Mărcăcine, 2011). Risk management (Ključnikov et al., 2025) includes the assessment and balancing of potential risks and profits, often with the use of information technology to improve decision-making. There are several classifications of risks that help organisations identify the causes of risks (Thlon, 2015). The business environment is highly competitive; therefore, risk management is key for any organisation (Ducu & Mărcăcine, 2011).

Research indicates that there are risks linked to ESG, including total, idiosyncratic, and systematic risks (Lee & Koh, 2024). Integration of ESG into business brings about new risk components outside of the scope of traditional risks, which require their thorough mitigation (Bertolotti, 2020). Construction of ESG risk factors may improve the models of asset evaluation. However, investors may potentially compose a portfolio with lower ESG risks while maintaining a comparable risk-adjusted performance (Hübel & Scholz, 2020). Efficient mitigation of ESG risks may be beneficial to investors, but measurements and reporting of these risks are methodologically problematic (Bertolotti, 2020).

Risk-based auditing deals with risk mitigation and its technical management. Risk-based auditing has become a key approach in modern auditing practice that focuses on identifying and assessing risks in selected business processes (Mohammadi et al., 2014). Auditing faces challenges in risk assessment, including the lack of standardised procedures, especially in relation to ESG, and the need to adapt to the evolving risk environment in business (Susilo, 2023). Some research therefore recommends conducting audits with the involvement of independent consulting firms with a better know-how in risk management and mitigation (Ismail, 2012), especially ESG risks.

A risk-based audit may be applied to mitigate ESG risks. This is an audit approach that focuses on high-risk areas in organisations, based on which the focus of the audit is determined (Achmad, 2018). This method aims to improve audit efficiency and effectiveness by adjusting the strategic aims and risk profile of the organisation (Mohammadi et al., 2014). The application of audit is recommended by regulatory requirements and, in particular, the need to efficiently manage risks. In summary, a risk-based audit is considered a comprehensive process that offers advantages in the form of better risk management. This method is developing intensely and may be supplemented with data analytics, in particular. However, the risk-based approach remains its basis.

3. RESEARCH METHODOLOGY

The research is devised as applied research using a mixed methodological approach that combines qualitative and quantitative elements. This type of research is related to the aim of the study (A1), i.e., to devise an audit model that will diagnostically verify ESG topics in organisations. The qualitative part of the research will be used to understand the current approaches through an analysis of academic sources and expert opinions. The quantitative part of the research will allow us to test the hypotheses and identify relations between the used techniques and audit outcomes. The combination of the two approaches ensures contextually rich and generalisable findings.

Artificial intelligence (AI) has been used responsibly in this research (AI disclaimer) as a support tool in various phases of data processing. More specifically, AI was used for preliminary sorting of literature sources, for the identification of thematic categories in content analysis, in assisting the verification of the relevance of the used materials, and in big data processing. In all cases, AI was used only as a tool to support the work, not as a generator of content or conclusions. The starting point has always been the authors' own thoughts formulated based on an analytical and independent critical approach. Emphasis was put on compliance with ethical research principles, including transparency and appropriate interpretation of results.

For all parts of the research, the methodological priority was literary research and legislative research with a focus on defining the theoretical and methodological foundations of ESG. By combining a systematic search for academic sources and content analysis, the main directions of current research and professional direction were identified. The resulting set served as a basic information base for further analysis. Subsequently, a detailed content analysis of academic sources (academic texts, relevant legislation, professional standards, and practical guidelines) was performed, focusing on key concepts, the structure of the argument, and the occurrence of irrelevant, recurring topics.

In research, emphasis was put on ensuring the validity and reliability of the applied methods. This was ensured by a combination of multiple sources, i.e., the so-called methodological triangulation that allowed for verification of the consistency of findings of the qualitative and quantitative parts. Pilot testing, tools verification, and validation of interviews helped to make the formulations more precise and increase internal consistency. Content analysis was performed in accordance with predefined categories (see Section 2) and was regularly discussed with experts.

Regarding ethics, the principle of informed consent, anonymity of respondents, and transparency of work with the used sources were observed. The entire approach was aimed at ensuring credibility, openness, and methodological integrity.

3.1. Data collection

The initial phase of the scientific process concerns the acquisition of empirical data. In line with this claim, it is necessary to precisely define the methodology of the field survey in this stage (Martin & Bateson, 2009). The accumulation of data forms the critical hub of the entire research process. If the information is gathered responsibly through appropriately selected instruments, it forms a reliable basis for valid conclusions. On the other hand, mistakes made in this phase cannot be removed (Trampota & Vojtěchovská, 2010). Thus, this stage of research often displays the biggest proneness to error in methodology (Kotler & Keller, 2007). It ensues from the above that maximum attention must be given to data collection.

The main research approach was interviews. A total of 307 internal auditors participated in the computer-assisted web interview (CAWI) based structured interviews (see below). Interviews are a tool for collecting primary data, based on direct or indirect communication between the researcher and the respondent, guided by a predetermined protocol (Kozel et al., 2011). In the framework of the implementation of the given research, indirect interviewing was applied (Staniec et al., 2022) in the form of a structured questionnaire. As confirmed by other theories, structured interviewing consists of using a standardised set of questions that are presented to all respondents in the same form (Kotler et al., 2007).

The information for interviews regarding risk analysis, risk assessment, and other methods was gathered, following the literature search and content analysis, using CAWI. The CAWI method is a tried and tested method of data collection for surveys, and its main advantage is cost efficiency (Barbu & Isaic-Maniu, 2011). It uses online platforms for collecting data on the internet. CAWI has been used successfully in different data collection contexts (Gerhardt & Pricking, 2004). The choice of this method of survey may affect the number of responses and quality of data; therefore, the target population and research goals must be considered when selecting it.

The CAWI method was used to approach the sample set (Neubauer et al., 2012) of internal auditors. The data collection was conducted between January and March 2025 using a CAWI-based structured questionnaire. Based on the territorial relevance of the population set, the sample set was set at 307 respondents. These respondents then received a CAWI questionnaire, processed on the Startquestion platform. The questionnaire contained a list of risks compiled in accordance with ESG. Respondents were to comment on the probability of occurrence (in time) and the estimated level of impact (in euros), both quantitatively and, if necessary, qualitatively. The Microsoft Excel spreadsheet application was chosen for the subsequent transformation of data from the Startquestion application.

3.2. Risk assessment

The primary task in the study was risk assessment. Risk assessment is a process of identifying potential adverse effects of hazard exposure, including the assessment of the amount of risk and the seriousness of the consequences (Potter, 1996). It includes the detection and analysis of threat stimuli with the aim of determining optimal defence responses (Blanchard et al., 2011). The quality of risk assessment depends on the data used; thus, the results are affected by different sources (Potter, 1996). The concept of risk involves uncertainty and probability. Risk assessment is linked, in particular, to the ambiguity of threat stimuli and the outcomes of behaviours, and it is crucially important for further operations of the organisation (Blanchard et al., 2011).

The study methodically applies risk assessment in the first part, i.e., the characteristic or selection of potential risks (Potter, 1996) in ESG. Other parts of risk assessment, such as action steps for the mitigation of potential risks to an acceptable level (Blanchard et al., 2011), will be methodically applied already in the risk analysis phase. The applied part involves only selected key steps that include threat identification, dose-response assessment, exposure assessment, and risk characterisation (Gentry et al., 2020). These steps also involve the identification of potential threats linked to ESG processes in organisations.

Draft European Financial Reporting Advisory Group (EFRAG) IG 3—List of European Sustainability Reporting Standards (ESRS) data points (Del Prete & Ferreira, n.d.) was used to identify the main non-financial risks; the document puts the requirements of the ESRS in specific data points. Methodologically, the process was carried out by targeted filtering of the main disclosure requirements (DRs) in each thematic group of risks (environmental, social, governance). Subsequently, for these groups, or the individual standards (e.g., E1, S1, G1), parent lines without duplicities were selected. Data points marked as mandatory were then given preference in the selection regardless of the next phase-in stages.

Since Draft EFRAG IG 3—List of ESRS data points (Del Prete & Ferreira, n.d.) has 100 lines and areas (DRs), the main areas were further reduced. On the one hand, this decreased the granularity of topics, but on the other hand, the user-friendliness of the interviews and potentially the response rate increased. This derived, prepared, and reduced set of generalised DRs (Table 3) represents an initial framework for the creation of an ESG risk map, which is described below. In this way, we have built a methodologically sound base of potential ESG risks of an organisation, the initial documents of which are verified by outside experts.

3.3. Risk analysis

Similar to an audit methodology, the next step in the study was a risk analysis following the risk assessment. A risk analysis and a risk assessment are two different approaches that include related methods. A risk analysis includes identification, assessment, and reduction of risks to an acceptable level (Sankhwar & Pandey, 2014). This step is part of a broader process of risk assessment, which focuses

on the determination of characteristics and evaluation of individual risks (Okeukwu et al., 2023). On the other hand, risk assessment determines the existence of risks and aims at achieving the project goals while minimising threats (Sankhwar & Pandey, 2014).

In this study, a risk analysis with a potential venture into risk assessment has been used. A risk assessment is key for the management and is defined as a technical determination of the probability of occurrence of undesired events as a result of exposure to hazard (Tenorio, 2022). It includes identification, estimation, and evaluation of risks (Frosdick, 1997). The method involves hazard identification, risk assessment, and risk management to reduce harmful effects while considering the benefits of the realised effort (Tenorio, 2022). However, risk analysis theories have been continuously evolving, which leads to uncertainty in their interpretation. Despite this, it remains an important management tool.

The risk analysis has been carried out in accordance with the following theories. A risk analysis is a systematic process used for the evaluation and management of potential adverse effects in various areas. As a rule, this process includes three interconnected components: risk assessment, risk management, and risk communication. Specifically, it begins with hazard identification, followed by risk assessment, the aim of which is to determine the probability and seriousness of the potential effects of risks. In risk management, risk analysis focuses on the identification and analysis of factors that may adversely affect project outcomes (Sarkheyli & Ithnin, 2010), in this case, ESG.

In practice, risk analysis is conceived as a combined analysis, using both qualitative and quantitative methods. First, the context of the system under study was defined, and risks were identified using a content analysis of selected specialised documents and a synthesis of theoretical knowledge from the literature. The identified risks were further classified into thematic categories (environmental, social, governance = ESG) and evaluated in terms of probability of occurrence (time = t) and in terms of impact (currency = c). A risk matrix (heat map) combining both dimensions on a multi-point scale was used for quantification. The results are then visualised and interpreted.

3.4. Research progress

To facilitate a better understanding and methodological precision, the progress of research is recapitulated, simplified, and summarised in this section. Its initial phase is data collection, which is key for the validity of subsequent analyses and conclusions. The primary tool is a structured questionnaire applied through CAWI, which uses the Startquestion online platform. The sample included 307 internal auditors who evaluated the probability and impact of risks related to ESG. The data were processed in MS Excel, which allowed for an efficient analysis of quantitative and qualitative aspects. The selected method complied with the target population and the character of the issue under study, ensuring scientific reliability of the results.

The second phase of the research involves risk assessment. This is a key process for identifying and characterising potential risks. Here, the research focuses on the first phase of risk assessment, i.e., the selection and description of the main risks in ESG. The requirements of draft EFRAG IG 3—List of ESRS data points, which systematically structures environmental, social, and governance indicators, were used to identify non-financial risks. Key data points marked as mandatory were selected using the selection method, while the scope was reduced, which increased the user-friendliness and response rate of the questionnaire survey. This simplified framework forms the basis for creating an ESG risk map.

The third phase of the research deals with risk analysis. This is a key step that builds on risk assessment. A risk analysis includes the assessment of the probability of occurrence and the seriousness of impacts of adverse events, risk communication, and risk management within the context of ESG. A risk matrix (heat map), which evaluates the probability and impact on a multi-point scale, was used for quantification. The resulting visualisation and interpretation allow for a comprehensive understanding of the risk profile and provide a background for efficient risk management in organisations. Thanks to the development of theoretical approaches, risk analysis remains a key tool for sustainability management.

Risk analysis is associated with the Monte Carlo method. This method helps identify critical risks (Agarwal & Virine, 2017). At the same time, it allows for a more comprehensive risk analysis by including uncertainties and generating statistical distributions of possible outcomes in different areas (Guo & Thompson, 1992). It is primarily a computing technique that uses random sampling to solve complex problems and calculate statistical averages (Berlinsky & Harris, 2019). This simulation was used in the research in the Microsoft Excel spreadsheet app, where data from the survey were manually entered, and a simulation of impacts and simulated losses was automatically generated (the so-called triangular distribution, see Equation (1)).

Eq. (1): Triangular distribution (Berlinsky & Harris, 2019, p. 477):

$$x \sim Tri(a, b, c) \tag{1}$$

where:

- x: risk impact;
- Tri: abbreviation of triangular distribution;
- a: minimum possible value;
- b: most probable value (mode);
- c: maximum possible value.

4. RESEARCH RESULTS

The empirical part of the research was carried out in the form of an online questionnaire (CAWI) that was based on a previous literature review and content analysis of risks in ESG. The questionnaire was distributed among internal auditors using the Startquestion platform. The respondents assessed the presented risks from the point of view of the probability of occurrence and estimated financial impact; they also had the possibility to add qualitative comments. The response rate

was 17.26%. The use of a standardised structure of questions ensured comparability of responses across the sample. The data were exported to Microsoft Excel, where they were preprocessed, their consistency checked, and they were prepared for further statistical tests and interpretation within the context of an ESG audit.

The research part focused on risk analysis built on the first phase of the risk assessment process, i.e., the identification and characterisation of the main non-financial risks. Draft EFRAG IG 3—List of ESRS data points was used for methodological support. Only key DRs, preferably marked as mandatory, were selected using targeted filtering. These DRs were further aggregated and reduced, creating a comprehensible and representative set of 29 potential risks. The responses from the questionnaires included estimates of the minimum estimated impact (€ million), average estimated impact (€ million), maximum estimated impact (€ million), and estimated probability (%).

The subsequent results from the research on risk analysis represent the first part of the research results. The risk analysis uses a calculation of the expected loss as a product of impact and probability. This approach provides an average point estimate regardless of the possible value dispersion. Subsequently, the Monte Carlo method introduces the second part of the results using the simulation of thousands of different scenarios that reflect variability in the impacts and occurrence of risks. This represents a realistic distribution of potential losses instead of a single number in risk analysis. Thus, the result is a more robust, data-based risk management since the Monte Carlo method provides a more accurate, better-informed, and more flexible prediction tool (Table 3).

Table 3. Risk analysis

Risk (DR)	*Minimum estimated impact (€ million)*	*Average estimated impact (€ million)*	*Maximum estimated impact (€ million)*	*Average estimated impact (€ million)*	*Estimated probability (%)*	*Risk analysis*	*Simulated impact (€ million)*	*Simulated loss (€ million)*
S4-4	0,05	0,11	0,18	0,11	45,2	5,12	0,1661	0,0751
S3-1	0,04	0,1	0,18	0,11	45,1	4,81	0,1476	0,0666
E3-2	0,02	0,08	0,2	0,1	49,1	4,91	0,1314	0,0645
E1-3	0,06	0,11	0,14	0,1	37,1	3,83	0,0963	0,0357
S3-5	0,04	0,08	0,17	0,1	45,9	4,44	0,0772	0,0354
S3-4	0,03	0,12	0,17	0,11	38,1	4,06	0,0892	0,034
G1-4	0,05	0,11	0,15	0,1	44,7	4,62	0,0716	0,032
S2-1	0,03	0,1	0,16	0,1	35,9	3,47	0,0884	0,0317
E2-1	0,04	0,07	0,16	0,09	32	2,88	0,0904	0,0289
S1-5	0,04	0,1	0,18	0,11	35,1	3,74	0,0791	0,0278
E4-2	0,03	0,07	0,19	0,1	31,4	3,04	0,088	0,0276
E3-1	0,05	0,11	0,17	0,11	28,9	3,18	0,0932	0,0269
E1-2	0,05	0,06	0,18	0,1	30,3	2,93	0,0855	0,0259
E5-1	0,06	0,08	0,12	0,09	32,8	2,84	0,0765	0,0251
E4-4	0,04	0,1	0,16	0,1	28,7	2,87	0,0797	0,0229
S4-1	0,03	0,11	0,14	0,09	22,6	2,11	0,0969	0,0219
E2-3	0,04	0,08	0,15	0,09	26,2	2,36	0,0829	0,0217
E4-3	0,04	0,11	0,19	0,11	16,7	1,89	0,1221	0,0204
S1-1	0,04	0,07	0,16	0,09	22,4	2,02	0,0906	0,0203
G1-1	0,02	0,07	0,12	0,07	23,1	1,62	0,0875	0,0202
E5-3	0,03	0,11	0,18	0,11	20,6	2,2	0,0782	0,0161
E5-2	0,03	0,1	0,17	0,1	13,2	1,32	0,0995	0,0131
E2-2	0,04	0,06	0,19	0,1	17,3	1,67	0,0663	0,0115
S2-4	0,02	0,07	0,14	0,08	13,7	1,05	0,0791	0,0108
S1-4	0,04	0,1	0,17	0,1	9,1	0,94	0,0958	0,0087
E1-4	0,05	0,11	0,18	0,11	7,9	0,9	0,1103	0,0087
S4-5	0,03	0,1	0,14	0,09	13,9	1,25	0,0614	0,0085
E3-3	0,06	0,09	0,13	0,09	8	0,75	0,0816	0,0065
S2-5	0,05	0,06	0,2	0,1	8,4	0,87	0,0708	0,0059

Source: Authors' elaboration.

The results show that internal auditors perceive the most significant risks as those related to climate change, specifically to the setting of internal policies and their application in practice. Respondents assigned the highest importance to the area of managing impacts, risks, and opportunities associated with mitigating and adapting to climate change, followed by specific measures and resources, and monitoring the effectiveness of these interventions through set objectives. A similar structure of significance is then repeated for areas related to pollution and water resources. Biodiversity and ecosystems were included in the list, but they received a lower relative weight. The risks associated with climate change and pollution are therefore perceived as a priority.

Medium significance risks are related mainly to biodiversity, circular economy, and human capital aspects, with respondents giving these areas importance, but not the highest priority. The area of biodiversity is perceived as relevant, but measures and their monitoring already show lower audit significance compared to climate or emissions. The same is true for resource consumption and the transition to a circular economy, where the emphasis is not primarily on policies, but rather on specific actions and targets. The social dimension of ESG, specifically topics related to own employees and workers in the supply chain, shows a balanced assessment.

The risks with the lowest significance are mainly related to social aspects of ESG, specifically to relations with the community, end users, and workers in the supply chain. The respondents assigned the lowest significance to these areas, primarily concerning their setting and monitoring of

concrete goals. Also, topics related to customer relations and community impact are often perceived as removed from the main operational processes of an organisation. This does not mean that these risks are irrelevant; more likely, they represent areas that pose a lower direct threat. Within the ESG audit context, they rather represent future challenges, the importance of which may increase with regulatory requirements and the evolution of societal expectations.

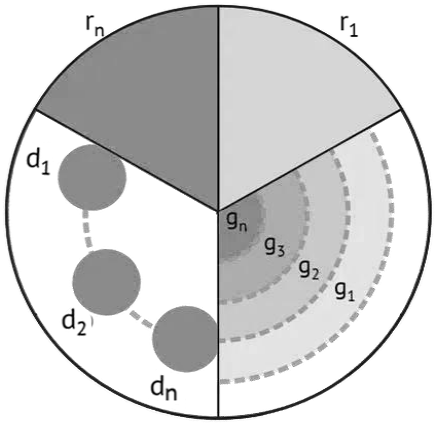
The results may be embedded in the first part of the methodological framework of diagnostic audit (Kupec, 2023). The first part recommends focusing on categorisation of risks (see Model 1 below, part r_1—r_n in the ESG context). Subsequently, the granularity of the categorised risks should be set. The proposed categorisation of ESG risks according to their significance has three basic categories. This categorisation represents the first segment in the entire model that is used as the initial framework for verification. In this way, the model can be used in practice in auditors' controlling activity and as a methodological support for strategic decision-making, so that internal auditors know what risks should be audited.

The results can also be embedded in the second part of the methodological framework of diagnostic auditing (Kupec, 2023). The second part recommends focusing on risk granularity (see Model 1 below, part g_1–g_n in the ESG context). That is, to methodologically focus on optimising the level of detail to which ESG risks can be broken down. This approach is based on the principle of fractality and self-similarity of risk structures, which reflects the fact that even smaller parts of the system can carry similar risks as a whole. The model works with a balance between the cost of risk impact and the cost of risk identification. This methodological rationality allows for a targeted increase in granularity where it brings the greatest benefit, so that internal auditors know to what depth the risk should be audited.

The results can also be embedded in the third part of the methodological framework of diagnostic auditing (Kupec, 2023). The third part recommends focusing on risk diagnostics (see Model 1 below, part d_1–d_n in the ESG context). For these risks, universal diagnostic points are defined that allow for verification of the 'life functions' of processes. The main diagnostic sets include time, assessment, realisation, and workers. Each of these areas can be subdivided into specific diagnostic points that are verifiable, measurable, and repeatable. It is their auditability that ensures an objective control of risk areas and allows for a timely detection of potential failures, so that internal auditors know what to audit in case of each risk.

The resulting proposed diagnostic model for auditing of ESG risks progresses in three phases (see Model 1, in the ESG context). First, it categorises risks according to significance into three levels, thus indicating to internal auditors which risks have the highest priority. The second part of the model deals with granularity, thus indicating to internal auditors how deeply individual risks should be broken down. The third phase recommends universal diagnostic points (time, assessment, realisation, workers), thus indicating to internal auditors what to audit in case of each risk. Together, these three phases create a model that can be used in practice and which provides an answer to three key questions that auditors have: what risks to audit, how deeply to audit them, and what to audit in case of each risk.

Figure 3. Model 1: ESG diagnostic audit model



Source: Kupec (2023, p. 114).

Unlike much of the existing ESG-related research, which predominantly reports associations between ESG indicators and firm performance or disclosure quality, the results of this study provide an audit-oriented and diagnostic perspective on ESG risks. Rather than focusing on outcome-based ESG scores, the findings operationalise ESG risks through their probability, financial impact, and diagnostic verifiability, enabling their direct integration into internal audit processes. The proposed three-phase diagnostic audit model, therefore, extends prior research by translating ESG concepts into structured audit categories, optimising risk granularity, and verifiable diagnostic points. This distinction allows the results to move beyond descriptive assessment and offer a practically applicable framework for determining audit priorities, audit depth, and diagnostic testing of ESG-related risks.

5. DISCUSSION OF THE RESULTS

Discussion represents the interpretation stage of scientific work, the aim of which is to critically assess the research results in the light of goals, research questions, and the literature. This is not a repetition of what has been found, but a deeper understanding of the significance of the results, their context, impacts, and potential limitations. This discussion allows for placing the findings in a broader context, identification of the benefits and limitations, and suggesting implications for practice and further research. Within the context of this study, the discussion is focused on a reflection of the proposed model of diagnostic audit of ESG. Thus, the following part concerns the interpretation of the individual parts of the model, their validation, and a potential interpretation context.

The aim of the study (A1) was to propose an audit model that diagnostically verifies the ESG topics of organisations. This aim was achieved. The literature emphasises that information gains credibility only when it is audited according to a clear methodological framework (Buchinskaia, 2023).

The proposed model responds to this challenge by providing a methodological approach from the design of risk categorisation to optimisation of risk granularity to universal diagnostic risk points, which corresponds to the requirements for ESG verification (Fernández-Feijóo-Souto et al., 2012). By clearly defining what and how to audit, the model fundamentally contributes to bridging the gap between descriptive ESG reporting and its verifiable, risk-oriented practice.

Also, the research questions must be discussed. The answer to *RQ1* claims that methods based on risk assessment (risk-based audits) remain appropriate for auditing of ESG topics, which corresponds to the professional frameworks for non-financial verification (Kotsantonis & Serafeim, 2019). The current trend suggests a complementary development rather than replacement. The answer to *RQ2* confirms that the ESG audit differs from the traditional audit topics by a higher level of uncertainty, lower standardisation, and a greater emphasis on long-term effects (Ilori et al., 2023). While auditing of traditional topics builds on verifiability and evidence, ESG auditing often requires a combination of judgment, soft indicators, and an interdisciplinary perspective.

The hypotheses were assessed as follows. *H1* was fully confirmed: both the results above and recent studies emphasise that supplementing traditional reports with additional data improves the reliability and validity of scoring systems and audit conclusions (Liu et al., 2023). *H2* was partially confirmed: time measurements based on the results above showed higher average labour intensity due to higher complexity and diversity of data (Gipper et al., 2025); however, the differences are reduced for entities with advanced data systems. *H3* was fully confirmed: the results above and studies based on audit latency show that structured approaches to ESG metrics shorten audit delays and reduce the necessary procedures without decreasing the quality of the output (Zhang & Guo, 2024).

6. CONCLUSION

The study has met its aim, which was to devise a model of diagnostic audit that would systematically verify ESG topics in organisations. The proposed three-segment model combines risk categorisation, granularity optimisation, and application of universal diagnostic points, thus creating a modern approach for auditors. Discussion has shown that today, a risk-based approach to auditing plays a primary role; however, the growing usability of big data and especially AI suggests a shift to data-driven methods, with risk assessment remaining as its central element. Empirical tests also confirmed that data triangulation increases the accuracy of identification of ESG risks and that diagnostic indicators improve the ratio between achieved information value and time-demandingness of the audit. However, the time-demandingness of an ESG audit varies and depends on the level of digitisation of processes. The theoretical contribution of the study is to broaden the discourse on ESG audit approaches. The practical contribution is a model that can help auditors more easily determine which risks can be audited, how intensively to audit them, and how to audit them diagnostically. The application of the model can be recommended in particular to organisations with a high ESG regulatory burden. The study is limited by its reliance on survey-based expert judgement and by its focus on selected ESG-related risks. Further research should focus on automating diagnostic points using AI and broadening the framework to a wider range of non-financial standards, which will further help organisations.

REFERENCES

Achmad, D. A. S. (2018). Risk based audit oleh satuan kerja audit intern pada PT. Bank JAT [Risk-based audit by the internal audit work unit at PT. Bank JAT]. *Jurnal Ekonomi Akuntansi dan Manajemen, 17*(2), 137–150. https://garuda.kemdiktisaintek.go.id/documents/detail/1712784

Agarwal, R., & Virine, L. (2017). Monte Carlo project risk analysis. In Y. Raydugin (Ed.), *Handbook of research on leveraging risk and uncertainties for effective project management* (pp. 109–129). IGI Global Scientific Publishing. https://doi.org/10.4018/978-1-5225-1790-0.ch005

Barboza, T. M., Santoro, F. M., Revoredo, K. C., & Costa, R. M. M. (2019). A case study of process mining in auditing. In *Proceedings of the XV Brazilian Symposium on Information Systems* (pp. 1–8). Association for Computing Machinery. https://doi.org/10.1145/3330204.3330241

Barbu, A., & Isaic-Maniu, A. (2011). Data collection in Romanian market research: A comparison between prices of PAPI, CATI and CAWI. *Management & Marketing. Challenges for the Knowledge Society, 6*(3), 349–364. https://surl.li/iupief

Berlinsky, A. J., & Harris, A. B. (2019). *Statistical mechanics: An introductory graduate course*. Springer. https://doi.org/10.1007/978-3-030-28187-8

Bertolotti, A. (2020). Effectively managing risks in an ESG portfolio. *Journal of Risk Management in Financial Institutions, 13*(3), 202–211. https://doi.org/10.69554/TQVN4497

Blanchard, D. C., Griebel, G., Pobbe, R., & Blanchard, R. J. (2011). Risk assessment as an evolved threat detection and analysis process. *Neuroscience & Biobehavioral Reviews, 35*(4), 991–998. https://doi.org/10.1016/j.neubiorev.2010.10.016

Buchinskaia, O. N. (2023). Issues of methodology and objectivity of ESG rating. *Economics and Management, 29*(7), 783–793. https://doi.org/10.35854/1998-1627-2023-7-783-793

Bulyga, R. P., & Safonova, I. V. (2023). Concept of ESG-audit of organizations in the public and corporate sector. *Auditor, 9*(7), 25–36. https://doi.org/10.12737/1998-0701-2023-9-7-25-36

Cundill, G. J., & Wilson, H. (2020). ESG? A framework for corporate governance and its environmental, social, and financial outcomes. *Academy of Management Proceedings, 2020*(1). https://doi.org/10.5465/AMBPP.2020.18896abstract

Dahivale, R. P. (2020). Internal audit: Fundamentals and next-gen trends. *The Management Accountant, 55*(4), 46–48. https://doi.org/10.33516/maj.v55i4.46-48p

Del Prete, C., & Ferreira, F. (n.d.). *ESRS implementation guidance documents*. European Financial Reporting Advisory Group (EFRAG). https://www.efrag.org/en/projects/esrs-implementation-guidance-documents

Drašček, M. (2024). The theory of internal audit—The purpose driven internal audit. *EDPACS, 69*(2), 12–21. https://doi.org/10.1080/07366981.2024.2314798
Ducu, C., & Mărcăcine, M. (2011). Risk management in business. *Revista Tinerilor, 1*(16), 97–103. https://feaa.ucv.ro/RTE/016-12.pdf
Elbardan, H., Ali, M., & Ghoneim, A. (2015). The dilemma of internal audit function adaptation: The impact of ERP and corporate governance pressures. *Journal of Enterprise Information Management, 28*(1), 93–106. https://doi.org/10.1108/JEIM-10-2013-0074
Ewert, R., & Wagenhofer, A. (2025). ESG metrics in management compensation systems: An agency theory perspective. *Swiss Journal of Business, 79*(1), 13–26. https://doi.org/10.5771/2944-3741-2025-1-13
Fernández-Feijóo-Souto, B., Romero, S., & Ruiz-Blanco, S. (2012). Measuring quality of sustainability reports and assurance statements: Characteristics of the high quality reporting companies. *International Journal of Society Systems Science, 4*(1), 5–27. https://doi.org/10.1504/IJSSS.2012.045371
Frosdick, S. (1997). The techniques of risk analysis are insufficient in themselves. *Disaster Prevention and Management, 6*(3), 165–177. https://doi.org/10.1108/09653569710172937
Gentry, R., Franzen, A., & Greene, T. (2020). Principles of risk assessment. In C. N. Pope & J. Liu (Eds.), *An introduction to interdisciplinary toxicology: From molecules to man* (pp. 545–558). Academic Press. https://doi.org/10.1016/B978-0-12-813602-7.00039-9
Gerhardt, A., & Pricking, T. (2004). Using CAWI in household surveys: Findings from official German statistics. In *Proceedings of the 9th International Blaise Users Conference* (pp. 1–17). The Blaise Users Group. https://www.blaiseusers.org/2004/papers/27.pdf
Gipper, B., Ross, S., & Shi, S. X. (2025). ESG assurance in the United States. *Review of Accounting Studies, 30*(2), 1753–1803. https://doi.org/10.1007/s11142-024-09856-2
Gorzeń-Mitka, I. (2023). ESG risk management: Some observations from an academic perspective. *Problems of Management in the 21st Century, 18*(1), 4–6. https://doi.org/10.33225/pmc/23.18.04
Griffiths, P. (2016). *Risk-based auditing* (1st ed.). Routledge. https://doi.org/10.4324/9781315606545
Grzesiak, L., & Kabalski, P. (2016). A review of internal audit theories. *The Theoretical Journal of Accounting, 87*(143), 19–28. https://doi.org/10.5604/16414381.1207430
Gücenme Gençoğlu, Ü., & Aytaç, A. (2016). Kurumsal sürdürülebilirlik açısından entegre raporlamanın önemi ve BIST uygulamaları [The importance of integrated reporting in terms of corporate sustainability and BIST applications]. *Muhasebe ve Finansman Dergisi, 72*, 51–66. https://doi.org/10.25095/mufad.396719
Guo, S. W., & Thompson, E. A. (1992). A Monte Carlo method for combined segregation and linkage analysis. *American Journal of Human Genetics, 51*(5), 1111–1126. https://pmc.ncbi.nlm.nih.gov/articles/instance/1682838/pdf/ajhg00069-0177.pdf
Hazzaa, O. T., & Abdullah, D. F. (2020). The influence of audit team and inner audit features on inner audit quality and audit fees. *International Journal of Research in Social Sciences and Humanities, 10*(4), 65–75. https://doi.org/10.37648/ijrssh.v10i04.007
Huang, D. Z.-X. (2022). Environmental, social and governance factors and assessing firm value: Valuation, signalling and stakeholder perspectives. *Accounting & Finance, 62*(1), 1983–2010. https://doi.org/10.1111/acfi.12849
Hübel, B., & Scholz, H. (2020). Integrating sustainability risks in asset management: The role of ESG exposures and ESG ratings. *Journal of Asset Management, 21*, 52–69. https://doi.org/10.1057/s41260-019-00139-z
Ilori, O., Lawal, C. I., Friday, S. C., Isibor, N. J., & Chukwuma-Eke, E. C. (2023). A framework for environmental, social, and governance (ESG) auditing: Bridging gaps in global reporting standards. *International Journal of Social Science Exceptional Research, 2*(1), 231–248. https://doi.org/10.54660/IJSSER.2023.2.1.231-248
Indyk, M. (2022). The importance of the ESG factors and their potential impact on an audit of a financial statement. *International Business & Economics Studies, 4*(3), 1–15. https://doi.org/10.22158/ibes.v4n3p1
Irigaray, H. A. R., & Stocker, F. (2022). ESG: Novo conceito para velhos problemas [ESG: A new concept for old problems]. *Cadernos EBAPE.BR, 20*(4), 1–4. https://doi.org/10.1590/1679-395186096
Ismail, T. H. (2012). Internal auditors' perception about their role in risk management audit in Egyptian banking sector. *International Journal of Economics and Accounting, 3*(2), 196–220. https://doi.org/10.1504/IJEA.2012.048052
Kamara, A. K. (2023). *The study on effectiveness of internal audit on the performance of the public sector in Sierra Leone: Case study of the national social security insurance trust*. https://doi.org/10.2139/ssrn.4492858
Khan, M. (2023). ESG misconceptions: Putting problems in perspective can lead to better solutions. *The Journal of Impact and ESG Investing, 4*(1), 82–86. https://doi.org/10.3905/jesg.2023.1.077
Ključnikov, A., Civelek, M., Kupec, V., & Bruder Badie, N. (2025). Breaking down entrepreneurial barriers: Exploring the nexus of entrepreneurial behavior, innovation, and bank credit access through the lens of the theory of planned behavior. *International Entrepreneurship and Management Journal, 21*, Article 13. https://doi.org/10.1007/s11365-024-01025-w
Kotler, P., & Keller, K. L. (2007). *Marketing management* (1st ed.). Grada Publishing.
Kotler, P., Wong, V., Saunders, J., & Armstrong, G. (2007). *Moderní marketing* [Modern marketing]. Grada Publishing.
Kotsantonis, S., & Serafeim, G. (2019). Four things no one will tell you about ESG data. *Journal of Applied Corporate Finance, 31*(2), 50–58. https://doi.org/10.1111/jacf.12346
Kozel, R., Mynářová, L., & Svobodová, H. (2011). *Moderní metody a techniky marketingového výzkumu* [Modern methodology for marketing technology]. Grada Publishing.
Kupec, V. (2023). *Moderní kontrola veřejné správy* [Modern control of public administration]. Wolters Kluwer.
Lee, J., & Koh, K. (2024). ESG performance and firm risk in the U.S. financial firms. *Review of Financial Economics, 42*(3), 328–344. https://doi.org/10.1002/rfe.1208
Li, H., Zhang, X., & Zhao, Y. (2022). ESG and firm's default risk. *Finance Research Letters, 47*(Part B), Article 102713. https://doi.org/10.1016/j.frl.2022.102713
Li, J., & Huang, M. (2025). The impact of ESG disclosure on audit processes: Optimizing risk identification from a sustainability perspective. *Journal of Information Systems Engineering and Management, 10*(4), 524–536. https://doi.org/10.52783/jisem.v10i4.9653
Liu, Y., Osterrieder, J., Hadji Misheva, B., Koenigstein, N., & Baals, L. (2023). Navigating the environmental, social, and governance (ESG) landscape: Constructing a robust and reliable scoring engine—Insights into data source selection, indicator determination, weighting and aggregation techniques, and validation processes for comprehensive ESG scoring systems. *Open Research Europe, 3*(119). https://doi.org/10.12688/openreseurope.16278.1

Martin, P., & Bateson, P. (2009). *Úvod do teorie a metodologie měření chování* [Introduction to the theory and methodology of behavioral measurement]. Portál.

Mihret, D. G., & Grant, B. (2017). The role of internal auditing in corporate governance: A Foucauldian analysis. *Accounting, Auditing & Accountability Journal, 30*(3), 699–719. https://doi.org/10.1108/AAAJ-10-2012-1134

Moalla, M., & Dammak, S. (2023). Do media coverage and audit quality of US companies affect their environmental, social and governance transparency? *Journal of Financial Reporting and Accounting, 23*(5), 2007–2026. https://doi.org/10.1108/JFRA-09-2022-0353

Mohammadi, J., Kalali, A., & Najafzadeh, A. (2014). Risk-based auditing. *Asian Journal of Research in Business Economics and Management, 4*(11), 366–372. https://doi.org/10.5958/2249-7307.2014.01000.7

Neubauer, J., Sedlačík, M., & Kříž, O. (2012). *Základy statistiky* [Basics of statistics]. Grada Publishing.

Okeukwu, E. K., Okeke, O. C., Irefin, M. O., Ezeala, H. I., & Amadi, C. C. (2023). Environmental impact assessment and environmental risk assessment: Review of concepts, steps and significance. *IIARD International Journal of Geography & Environmental Management, 9*(2), 25–51. https://doi.org/10.56201/ijgem.v9.no2.2023.pg25.51

Paciarotti, C., & Torregiani, F. (2021). The logistics of the short food supply chain: A literature review. *Sustainable Production and Consumption, 26*, 428–442. https://doi.org/10.1016/j.spc.2020.10.002

Peixoto, J. A., Machado, A. B., & Richter, M. F. (2022). ESG indicator metrics used by organisations to assess the degree of sustainability in companies. *International Journal of Advanced Engineering Research and Science, 9*(9), 589–600. https://doi.org/10.22161/ijaers.99.64

Potter, M. E. (1996). Risk assessment terms and definitions. *Journal of Food Protection, 59*(13), 6–9. https://doi.org/10.4315/0362-028X-59.13.6

Prabowo, A., & Anggoro, Y. (2024). Effectiveness of ESG performance evaluation in improving corporate sustainability: A mixed method approach. *International Journal of Entrepreneurship and Sustainability Studies, 4*(1), 73–93. https://doi.org/10.31098/ijeass.v4i1.2366

Prodanova, N. A., & Tarasova, O. N. (2023). Basic principles for organizing and conducting an ESG audit. *Accounting in Healthcare, 7*. https://doi.org/10.33920/med-17-2307-05

Prodanova, N. A., Tarasova, O. N., & Sotnikova, L. (2023). ESG audit and its fundamental concepts. *E3S Web of Conferences, 402*, Article 13025. https://doi.org/10.1051/e3sconf/202340213025

Rubab, A., Alam, A., Haque, E., Saghir, V., Siddiqui, F., Khan, H., & Tasneem, N. (2025). A critical review of environmental, social, and governance factors influencing sustainable investment decisions. *Corporate Governance and Sustainability Review, 9*(1), 68–85. https://doi.org/10.22495/cgsrv9i1p6

Sankhwar, S., & Pandey, D. (2014). Software project risk analysis and assessment: A survey. *Global Journal of Multidisciplinary Studies, 3*(5), 144–160. https://surl.li/jqaghk

Sarkheyli, A., & Ithnin, N. B. (2010). Improving the current risk analysis techniques by study of their process and using the human body's immune system. In *2010 5th International Symposium on Telecommunications* (pp. 651–656). Institute of Electrical and Electronics Engineers (IEEE). https://doi.org/10.1109/ISTEL.2010.5734104

Seuring, S., & Gold, S. (2012). Conducting content-analysis based literature reviews in supply chain management. *Supply Chain Management: An International Journal, 17*(5), 544–555. https://doi.org/10.1108/13598541211258609

Shaikh, I. (2022). Environmental, social, and governance (ESG) practice and firm performance: An international evidence. *Journal of Business Economics & Management, 23*(1), 218–237. https://doi.org/10.3846/jbem.2022.16202

Shu, F., Li, Q., Wang, Q., & Zhang, H. (2010). Measurement and analysis of process audit: A case study. In J. Münch, Y. Yang, & W. Schäfer (Eds.), *Lecture notes in computer science: Vol. 6195. New modeling concepts for today's software processes* (pp. 285–296). Springer. https://doi.org/10.1007/978-3-642-14347-2_25

Sihombing, T., & Nurhaliza, H. K. (2025). The influence of audit committee characteristics and audit quality on ESG performance with sustainable growth rate as a moderation variable. *Corporate Governance and Sustainability Review, 9*(3), 45–54. https://doi.org/10.22495/cgsrv9i3p3

Singhania, M., & Saini, N. (2022). Systems approach to environment, social and governance (ESG): Case of Reliance Industries. *Sustainable Operations and Computers, 3*, 103–117. https://doi.org/10.1016/j.susoc.2021.11.003

Staniec, I., Kaczorowska-Spychalska, D., Kalinska-Kula, M., & Szczygiel, N. (2022). The study of emotional effects of digitalised work: The case of higher education in the sustainable development. *International Journal of Environmental Research and Public Health, 19*(1), Article 576. https://doi.org/10.3390/ijerph19010576

Susilo, J. (2023). A critical analysis of risk auditing: An auditor's approach. *Golden Ratio of Auditing Research, 3*(2), 94–106. https://doi.org/10.52970/grar.v3i2.381

Suttipun, M. (2021). The influence of board composition on environmental, social and governance (ESG) disclosure of Thai listed companies. *International Journal of Disclosure and Governance, 18*, 391–402. https://doi.org/10.1057/s41310-021-00120-6

Tenorio, J. C. B. (2022). Risks, hazards, harm and risk analysis: A brief introductory overview for veterinarians. *Journal of Livestock Science, 13*, 159–163. https://doi.org/10.33259/JLivestSci.2022.159-163

Thlon, M. (2015). Risk in economic activity. *Krakow Review of Economics and Management Zeszyty Naukowe Uniwersytetu Ekonomicznego w Krakowie,* 902, 17–36. https://doi.org/10.15678/krem.830

Trampota, T., & Vojtěchovská, M. (2010). *Metody výzkumu médií* [Media research methods]. Portál.

Vasiu, D. E., & Bratu, R. (2022). An overview on environmental social and governance—ESG topics from the financial markets' perspective. *Management of Sustainable Development, 14*(2), 76–82. https://doi.org/10.54989/msd-2022-0021

Yan, H., Ong, S. T., & Ruza, N. B. (2025). Impact of ESG practices and intellectual capital on competitiveness and internationalization: A systematic literature review [Special issue]. *Corporate Governance and Sustainability Review, 9*(3), 297–308. https://doi.org/10.22495/cgsrv9i3sip10

Zhai, Y., Cai, Z., Lin, H., Yuan, M., Mao, Y., & Yu, M. (2022). Does better environmental, social, and governance induce better corporate green innovation: The mediating role of financing constraints. *Corporate Social Responsibility and Environmental Management, 29*(5), 1513–1526. https://doi.org/10.1002/csr.2288

Zhang, L., & Guo, C. (2024). Can corporate ESG performance improve audit efficiency?: Empirical evidence based on audit latency perspective. *PLoS ONE, 19*(3), Article e0299184. https://doi.org/10.1371/journal.pone.0299184