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CONTEMPORARY ACCOUNTING PERSPECTIVES



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CONTENTS

Contemporary Accounting Perspectives (CAP) • Volume 1, Issue 1 • 2026

Title and Author	Pages
Cover	I–II
Foreword ***Özkan Sarısoy***	IV
Publisher's Message ***Ganite Kurt***	V
Acceptance of the e-Ledger Application in the Accounting Profession Within the Framework of the Theory of Planned Behavior: A Field Study on Accounting Professionals ***İlyas Turğay***	1–29
Comparative Financial Performance of Participation Banks in Türkiye and Islamic Banks in GCC Countries: Evidence from the MULTIMOORA Method ***Sherwan Younis Othman*** ***Mihriban Coşkun Arslan***	30-53
Integration of Data Analytics and Information Technologies in Graduate Accounting Education: A Curriculum Review in Türkiye ***Melek Şardağ Karabulut***	54-73
Challenges Encountered in the Implementation of Turkish Accounting and Financial Reporting Standards ***Sibel İlmin***	74-85
Beyond Detection: Explaining Greenwashing Risk through a Theory-Grounded Disclosure Quality Index ***Mehmet Günlük*** ***Murat Özcan*** ***Hakan Bilen***	86-105

Foreword

It is a pleasure to introduce the inaugural issue of Contemporary Accounting Perspectives (CAP), an open-access, peer-reviewed journal published by the Assurance Services Association (GHD). Volume 1, Issue 1 appears in September 2026 at a time when accounting, auditing, finance, taxation, and corporate reporting are being reshaped by digital technologies, sustainability requirements, and evolving governance practices. CAP provides an international forum for rigorous and interdisciplinary research on these developments and for scholarship that strengthens the relationship between academic inquiry and professional practice.

This issue brings together five studies addressing current questions in accounting and related fields. The contributions examine the acceptance of e-ledger applications among accounting professionals; compare the financial performance of participation banks in Türkiye and Islamic banks in GCC countries using a multi-criteria decision-making method; review the integration of data analytics and information technologies into graduate accounting education; analyze challenges in the implementation of Turkish Accounting and Financial Reporting Standards; and develop a theory-grounded approach to assessing greenwashing risk through disclosure quality. Together, these articles reflect the journal's commitment to methodologically sound research on contemporary issues. I thank the authors for entrusting their work to CAP.

Launching an academic journal depends on careful collaboration. I am grateful to the associate editors, editorial advisory board members, and independent reviewers whose expertise and diligent work have helped establish the journal's editorial and peer-review standards.

Our aim is to develop Contemporary Accounting Perspectives as a reliable venue for national and international scholarship. We will pursue this aim through transparent editorial procedures, rigorous peer review, responsible research and publication ethics, and openness to diverse methods and perspectives. I hope this inaugural issue will be useful to researchers, educators, practitioners, and students.

Assoc. Prof. Dr. Özkan Sarısoy
Editor-in-Chief

October 2026
Tekirdağ, Türkiye

Publisher's Message

The Assurance Services Association (GHD) is pleased to introduce Contemporary Accounting Perspectives (CAP), an open-access, peer-reviewed journal dedicated to the production and dissemination of high-quality research in accounting, auditing, finance, and sustainability. The journal has been established to support scholarly exchange and to strengthen dialogue between academic research and professional practice.

GHD and the Accounting Audit Employees Platform (MUDEP) work together to support the professional development and academic engagement of accounting scholars in Türkiye. Founded in 2016 as a legally recognized non-governmental organization, GHD brings academics and professionals together around shared educational and professional objectives. MUDEP, established as a voluntary platform in 2021, has developed into an inclusive academic network comprising more than 595 academics as of September 2026. This collaboration helps identify current technological, pedagogical, and standards-related needs and supports the development of responsive educational and scholarly activities.

Webinars, technical workshops, field visits, and participatory Accounting Search Conferences (MAK), organized jointly by GHD and MUDEP, create opportunities for knowledge exchange, professional dialogue, and collegial mentoring. One of the objectives of these activities is to develop accumulated knowledge into durable scholarly outputs, including books and articles, that can contribute to the literature.

In this context, Contemporary Accounting Perspectives provides a platform for preserving and disseminating research and practice-based insights through transparent editorial processes and independent peer review. The journal seeks to connect theory and practice, support both established and early-career researchers, and encourage work addressing current structural, technological, and pedagogical challenges. Although CAP has emerged from the collaborative environment created by GHD and MUDEP, its editorial decisions are governed by academic merit, publication ethics, and independent evaluation.

I sincerely thank the Editor-in-Chief, the editorial team, and the reviewers whose work made this inaugural issue possible. I also thank the authors who contributed their research and the academic community that has supported the journal's development. I hope CAP will make a sustained contribution to both academic scholarship and professional practice.

Prof. Dr. Ganite Kurt
President, Assurance Services
Association (GHD) and MUDEP Platform

October 2026
Ankara, Türkiye

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Acceptance of the e-Ledger Application in the Accounting Profession Within the Framework of the Theory of Planned Behavior: A Field Study on Accounting Professionals*

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Abstract

Purpose: *This study examines accounting professionals' intentions toward the e-Ledger application, implemented by the Turkish Revenue Administration (TRA) during the digital transformation process, using the Theory of Planned Behavior (TPB) framework.*

Methodology: *The research sample comprises accounting professionals working in Istanbul. The study collected data from 646 participants using both online and face-to-face surveys. The data were analyzed using partial least squares structural equation modeling (PLS-SEM) in SmartPLS 4, and seven research hypotheses were tested. Reliability and validity analyses (Cronbach's Alpha, composite reliability, AVE, Fornell–Larcker criterion, and HTMT) were conducted to confirm the model's robustness.*

Findings: *The results indicate that six hypotheses were supported, while one was rejected. All variables, except perceived behavioral control, have a significant direct effect on intention, with attitude toward use exerting the strongest influence. Perceived behavioral control was also found to indirectly and positively affect intention through attitude toward use.*

Scope and Limitations: *Due to time and population constraints, the field research is limited to accounting professionals operating in Istanbul and focuses exclusively on the E-Ledger application.*

Originality / Value: *The study contributes to the literature by revealing the direct and indirect mechanisms driving the adoption and acceptance of the e-Ledger application in the accounting profession.*

Keywords: Theory of Planned Behavior; e-Ledger; Intention; Intention to Use the e-Ledger Application

JEL Codes: C44; M15; M48; M49; O33

* An earlier version of this study was presented at the 9th IERFM Economic Research and Financial Markets Congress, and its abstract was published in the conference proceedings book.

1. Introduction

Today, the accounting profession is undergoing a significant digital transformation process. As part of this transformation, numerous software and web-based applications are being integrated into business and operational processes. Some of these applications are integrated into business processes through mandatory use by accounting professionals and taxpayers. In contrast, others are adopted by users for reasons such as "increasing job performance, being perceived as useful, the influence of the social environment, and individuals' beliefs in their ability to use the application". Digital applications such as "e-declaration, e-invoice, e-archive invoice, e-ledger, e-waybill, e-ticket, e-PR, e-expense note, e-insurance policy, e-insurance commission expense document, and e-notification" have significant areas of usage today (Akın Turğay, 2024, p. 28). For this reason, this study will identify and examine the factors affecting the intention to use the E-Ledger application, which the Turkish Revenue Administration (TRA) implemented as a digital accounting application.

Unlike technologies that are adopted on a fully voluntary basis, the e-Ledger operates within a regulation-constrained environment in Türkiye, as its use is legally mandatory for specified taxpayer groups. Accordingly, in the present study, behavioral intention is not conceptualized solely as an unrestricted decision to adopt or reject the system. Rather, it also reflects accounting professionals' willingness and psychological acceptance to use the e-Ledger in the performance of their professional activities. This distinction is theoretically significant because the Theory of Planned Behavior (TPB) extends the Theory of Reasoned Action by incorporating perceived behavioral control, thereby enabling the explanation of behaviors that are not entirely under an individual's volitional control. Therefore, the principal research question addressed in this study can be formulated as follows:

"To what extent do the TPB variables—attitude toward behavior, subjective norm, and perceived behavioral control—directly and indirectly explain accounting professionals' intention to use the e-Ledger application in a regulation-constrained digital accounting environment?"

Within the scope of this research, we first present explanatory information on the e-ledger application. Next, the second section explains the TPB, which forms the theoretical foundation of the research model, and the theory's development process.

In the third section, the scope, limitations, data collection method, and sampling method of the study will be described. Subsequently, the research model will be introduced, and the research findings will be analyzed and evaluated within the scope of the research question. Specifically, in the structural model section, the study will present model fit values and hypothesis test results.

2. Literature Review

2.1. The e-Ledger Application and Basic Explanatory Information

In this section, the e-ledger application will be explained in general terms. Additionally, it is appropriate first to outline the legal foundations of the e-ledger application.

Pursuant to Article 172 of the Turkish Tax Procedure Law (TPL) No. 213, taxpayers obliged to keep ledgers can be listed as follows:

- Economic public enterprises,
- Commercial companies,
- Farmers,
- Self-employed professionals,
- Economic enterprises belonging to foundations and associations, and
- Artisans and tradespeople.

Merchants are divided into two groups regarding ledger-keeping as "first-class merchants and second-class merchants" (TPL, art. 176):

- First-class merchants are obliged to keep ledgers based on the balance sheet method.
- Second-class merchants are obliged to keep ledgers based on the operating account method.

Legal entities subject to corporate tax, organizations working for public benefit, commercial companies, and enterprises exceeding a certain sales volume must keep a "journal, general ledger, and inventory ledger" based on the balance sheet method. Second-class merchants, by contrast, must keep only an operating account ledger; they record revenues on the right side and expenses on the left side of this ledger. In addition, enterprises must keep different ledgers depending on their activity type. For instance, industrial enterprises must keep manufacturing and finishing operations ledgers; self-employed professionals must keep self-employment earnings ledgers; and farmers must keep farmer operating ledgers (Gökçen & Özdemir, 2016, p. 142). The fundamental purpose of keeping ledgers is stated in Article 171 of the TPL as "to monitor and determine the tax-related wealth and capital status, activity results, and tax obligations of taxpayers".

The E-Ledger, developed for the purposes listed in Article 171 of the TPL, can be defined as a comprehensive set of digital ledgers that allows taxpayer real persons and public and private sector legal entities to carry out their tax and other transactions electronically. It yields the same legal consequences as ledgers kept on paper, and the fundamental objectives of the e-ledger application are listed below (Erdoğan, 2020, p. 28; Güldoğan & Usul, 2021, p. 22):

- To ensure that accounting transactions are conducted in an electronic environment,
- To provide speed and efficiency in business processes,
- To help reduce the workload of accounting professionals,
- To facilitate archiving and submission processes,
- To enable the creation of standard accounting data,
- To ensure the transfer of financial data to the digital environment,
- To allow for the enhancement of information security,
- To provide accounting professionals with the opportunity to perform transactions independent of time and location,
- To enable tax audits to be conducted digitally,
- To facilitate compliance with legislation.

In Türkiye, Article 64 of the Turkish Commercial Code (TCC) No. 6102 is the primary legal regulation that provides the legal framework for the transition to the e-ledger application. This

article makes it legally possible to keep commercial ledgers electronically. Furthermore, for e-ledgers to gain legal validity, they must be kept in accordance with standards set by the Revenue Administration (TRA), along with opening and closing approvals. In this context, the formatting of e-ledgers and the principles and procedures to be followed were regulated through the Electronic Ledger General Communiqués Serial No. 1 and 2, the TPL General Communiqué Serial No. 421, and the TPL Circular No. 67. Based on these communiqués and Circular No. 67, e-ledgers must be prepared in the XBRL-GL (eXtensible Business Reporting Language – Global Ledger) format, signed with an e-signature (for real persons) or financial seal (for legal entities), and submitted to the TRA along with a certificate (berat) file. E-ledgers become downloadable after the TRA approves them with a financial seal; ledgers without a certificate are invalid. The TRA also approves the opening and closing of ledgers electronically. The e-ledger file and certificates must be stored electronically for 10 years (TCC No. 6102, art. 85). This obligation simultaneously prohibits taxpayers who issue e-ledgers from keeping ledgers on paper.

Taxpayers subject to the simple taxation method, self-employed professionals, and taxpayers who keep ledgers based on an operating account method execute their accounting records electronically via the "Ledger Declaration System". Through this system, income, expense, personnel, inventory, and fixed asset transactions are digitally recorded, and tax declarations can be prepared electronically (Tektüfekçi, 2019, p. 47).

Table 1
Thresholds for E-Ledger Use in Enterprises and Enterprises Obliged to Use e-Ledger

Category	Description
Enterprises Obliged to Use E-Ledger	Taxpayers obliged to use e-invoice must use the e-ledger application. Some of these enterprises are: • Healthcare providers that have signed contracts with the Social Security Institution. • Taxpayers who have obtained a license from the Energy Market Regulatory Authority. • Taxpayers engaged in the trade of vegetables and fruits as brokers or merchants. • Taxpayers manufacturing sugar as defined in the Sugar Law No. 4634. • Taxpayers engaged in the manufacturing, importing, or exporting of iron and steel (HS Code 72) and articles of iron or steel (HS Code 73). • Taxpayers registered in the Fertilizer Tracking System created by the Ministry of Agriculture and Forestry. • Taxpayers exceeding the revenue limit within the scope of TPL General Communiqué No. 535 (e.g., Gross sales revenue of 3 million TL and above; Intermediary service providers, internet advertisers, and real estate/motor vehicle traders with gross sales revenue of 500 thousand TL and above). • Enterprises subject to independent audit according to TCC No. 6102. • Taxpayers deemed risky by the TRA. • Companies keeping ledgers on a balance sheet basis within the scope of TPL and TCC.
Enterprises Optionally Using E-Ledger	• Public institutions and organizations subject to Law No. 5018.

Category	Description
Enterprises Not Obliged to Use E-Ledger, but Obliged to Keep Records via the Ledger Declaration System	• Taxpayers subject to the simple taxation method. • Self-employed professionals. • Those who keep ledgers according to the operating account method.

Resource: Adapted from GİB, 2025; TÜRMOB, 2023; TPL General Communiqué Serial No. 535; Public Financial Management and Control Law No. 5018, Add. Art. 4; TCC No. 6102, Art. 397.

The e-Ledger application provides numerous benefits to enterprises and accounting professionals. Some of these advantages include (Erdoğan, 2020, pp. 28-33; Gökçen & Özdemir, 2016, p. 150):

- Reducing archiving and stationery costs,
- Providing environmental benefits by decreasing paper usage,
- Eliminating the obligation for notary certification,
- Accelerating business and operational processes,
- Creating remote access convenience,
- Providing the opportunity for instant and continuous auditing,
- Increasing effectiveness in combating tax evasion,
- Enabling the creation of clear, comparable, and standardized financial reports through the XBRL infrastructure.

However, the application also presents certain disadvantages. Software and technical hardware costs can be high, especially for small enterprises. Additionally, training and technical support are critical to using the system accurately.

2.2. Theory of Planned Behavior and Its Theoretical Background

2.2.1. Theory of Reasoned Action

The Theory of Reasoned Action is a socio-psychological approach developed by Fishbein and Ajzen to explain individuals' decisions regarding a specific behavior through the relationships among attitude, subjective norm, and behavioral intention. The theory assumes that individuals make behavioral decisions by evaluating available information in a rational and systematic manner (Sezgin et al., 2019, p. 310). In the TRA, behavioral intention is the most immediate antecedent of behavior, and it is primarily shaped by attitude toward the behavior and subjective norm (Ajzen, 1991, pp. 181–182; Yılmaz, 2006, p. 19).

Behavioral intention can be described as a motivational construct that reflects the extent to which an individual is willing to perform a specific behavior and how much effort they plan to exert to perform that behavior. In general, the stronger the intention, the more likely the behavior is to be performed. However, whether behavioral intention is translated into actual behavior depends on the extent to which the behavior is under the individual's volitional control (Ajzen, 1991, pp. 181–182).

One of the TRAis principal limitations is its assumption that behavior is under the individual's volitional control. In practice, however, non-motivational factors such as time, money, skills,

opportunities, and cooperation from others may influence behavior. Such factors may constrain the degree of actual control an individual possesses over performing the behavior (Ajzen, 1991, pp. 181–182). For this reason, the Theory of Planned Behavior (TPB) was developed by incorporating perceived behavioral control into the model to address the TRA's limitation in explaining behaviors not fully under volitional control (Ajzen, 1991, pp. 181–183). This theoretical distinction is particularly important in the context of the e-Ledger examined in this study. In the present research, intention to use is not treated as an unrestricted decision to adopt or reject the e-Ledger application; rather, it is conceptualized as accounting professionals' willingness and psychological acceptance to use the e-Ledger in performing their professional activities. This approach aligns with the TPB, which proposes that perceived behavioral control helps explain intention and behavior in situations where behavior is not entirely under volitional control (Ajzen, 1991, pp. 181–186).

2.2.2. Theory of Planned Behavior

The Theory of Planned Behavior (TPB) extends the Theory of Reasoned Action. The key difference between the two theories is that the TPB includes perceived behavioral control. This extension was introduced to account for situations in which individuals lack complete volitional control over their behavior (Ajzen, 1991, pp. 181–183). Perceived behavioral control refers to an individual's perception of how easy or difficult it is to perform a particular behavior. This perception encompasses not only past experiences but also an assessment of the resources, opportunities, barriers, and constraints that may facilitate or impede behavior (Ajzen, 1991, pp. 183–185).

Within the TPB, intention represents the motivational readiness to perform a behavior. Three conceptually distinct determinants explain the formation of intention: attitude toward the behavior, subjective norm, and perceived behavioral control. A more favorable attitude and subjective norm, together with greater perceived behavioral control, are expected to strengthen the intention to perform the behavior. However, the relative importance of these three variables in explaining intention may vary by behavior and context (Ajzen, 1991, pp. 188–189; Özer & Yılmaz, 2010, p. 38).

Within the theory's belief-based structure, attitude toward the behavior is associated with behavioral beliefs, subjective norm with normative beliefs, and perceived behavioral control with control beliefs. Behavioral beliefs reflect evaluations of the likely consequences of performing the behavior; normative beliefs reflect expectations regarding whether significant referent individuals or groups approve or disapprove of the behavior; and control beliefs reflect perceptions of the resources and barriers that may facilitate or impede its performance (Ajzen, 1991, pp. 189–197). Accordingly, the TPB considers not only favorable or unfavorable evaluations of a behavior but also social pressure and individuals' perceived control over the behavior.

Attitude toward the behavior refers to the degree to which an individual evaluates a particular behavior favorably or unfavorably (Ajzen, 1991, pp. 188–189; Kayhan & Çakmak, 2020, p. 767). Subjective norm reflects the perceived social pressure exerted by individuals or groups who are important to the individual regarding whether the behavior should or should not be performed (Ajzen, 1991, pp. 188–189). Perceived behavioral control, in turn, refers to the perceived ease or difficulty of performing the behavior and is influenced by the individual's past experiences,

available resources and opportunities, and anticipated barriers (Ajzen, 1991, pp. 183–185). Therefore, perceived behavioral control should not be reduced solely to an individual's self-efficacy; rather, it should be conceptualized as a broader construct encompassing the control conditions that facilitate or constrain behavior performance (Ajzen, 1991, pp. 183–185).

This characteristic of the TPB is theoretically important in technology-use contexts in which adoption decisions are not entirely voluntary or are constrained by external conditions. According to Ajzen (1991, pp. 185–186), when a behavior is under an individual's complete volitional control, intention may be largely sufficient to explain the behavior; however, as volitional control decreases, perceived behavioral control becomes increasingly important. In the present study, intention to use the e-Ledger is conceptualized not as an unrestricted voluntary choice to adopt or reject the application, but as accounting professionals' willingness and level of acceptance of its use in their professional activities. Thus, even when regulatory conditions restrict the scope of voluntary choice, the TPB provides an appropriate theoretical framework for examining the extent to which attitude, subjective norm, and perceived behavioral control explain intention to use the e-Ledger (Ajzen, 1991, pp. 181–189).

In line with this theoretical framework, Table 2 presents studies in accounting and finance that used the TPB, along with the key relationships tested.

Table 2
National and International Studies on the Theory of Planned Behavior

Year	Author	Research Topic	Hypothesis and Relationship	Support
2010	Özer & Yılmaz	An Application of Accountants Information Technology Usage with the Theory of Planned Behavior	ATU→ I SN → I PBC → I I → AU PBC → AU	Supported Supported Supported Supported Not Supported
2011	Özer & Yilmaz	Comparison of the Theory of Reasoned Action and the Theory of Planned Behavior: An Application on Accountants' Information Technology Usage	ATU → I SN → I PBC → I	Supported Supported Supported
2016	Thorhauge et al.	Accounting for the Theory of Planned Behavior in Departure Time Choice	PBC → I ATU → I SN → I PBC → SN ATU → SN ATU → PBC	Supported Supported Supported Supported Supported Not Supported
2018	Santos & Almeida	To Pursue a Career in Accounting or Not: A Study Based on the Theory of Planned Behavior	ATU → I SN → I PBC → I	Supported Supported Supported
2018	Santos et al.	Students' Intention to Pursue a Career in Accounting from the Perspective of the Theory of Planned Behavior	ATU → I SN → I PBC → I	Supported Supported Supported

Year	Author	Research Topic	Hypothesis and Relationship	Support
2019	Tashakor et al.	Environmental Management Accounting Practices in Australian Cotton Farming: The Use of the Theory of Planned Behaviour	ATU → I SN → I PBC → I SN → ATU SN → PBC	Supported Not Supported Supported Supported Supported
2020	Owusu et al.	Whistleblowing Intentions of Accounting Students: An Application of the Theory of Planned Behaviour	ATU → IWI ATU → EWI SN → IWI SN → EWI PBC → IWI PBC → EWI	Supported Not Supported Supported Not Supported Not Supported Supported
2020	Kayhan & Çakmak	Analyzing the Effects of Whistleblowing Intentions on Revealing Fraud in Financial Reporting: A Theory of Planned Behavior Perspective	ATU → IWI ATU → EWI SN → IWI SN → EWI PBC → IWI PBC → EWI	Supported Not Supported Not Supported Not Supported Supported Supported
2020	Yücenurşen	An Investigation of Students' Careers in the Accounting Profession in the Planned Behavior Theory Perspective: An Ampiric Study	ATU → I PBC → I SN → I	Supported Not Supported Supported
2022	Toraman	User Acceptance of Digital Turkish Lira (DTL): Investigation in the Framework of Technology Acceptance Model (TAM) and Planned Behaviour Theory (PBT))	ATU → I SN → I PBC → I PBC → ATU SN → ATU	Supported Supported Supported Supported Supported
2022	Duman & Yücenurşen	Financial Decision-Making Processes of Family Companies: A Research Within the Framework of the Theory of Planned Behavior	ATU → I SN → I PBC → I	Supported Supported Not Supported
2020	Söylemez & Taşkın	Determinants of Customer' Intention to Use M-Banking Apps: A Cross-Nation Study	ATU → I SN → I PBC → I	Supported Supported Supported
2025	Özer et al.	Examining the Factors Affecting the Intention to Become an Accounting Professional within the Framework of the Theory of Planned Behavior	ATAP → IBAP SN → IBAP PBC → IBAP	Supported Supported Supported

Resources: Translated abbreviations adapted from original source: PBC: Perceived Behavioral Control; IWI: Internal Whistleblowing Intention; ATU: Attitude Toward Use; EWI: External Whistleblowing Intention; I: Intention; IBAP: Intention to Become an Accounting Professional; ATAP: Attitude Toward the Accounting Profession; AU: Actual Use; SN: Subjective Norm. Adapted from Duman & Yücenurşen, 2022; Kayhan & Çakmak, 2020; Owusu et al., 2020; Özer & Yilmaz, 2011; Özer & Yilmaz, 2010; Özer et al., 2025; Santos & Almeida, 2018; Santos et al., 2018; Söylemez & Taşkın, 2020; Tashakor et al., 2019; Thorhauge et al., 2016; Toraman, 2022; Yücenurşen, 2020.

2.2.3. Hypothesis Development

According to the TPB, an individual's intention to perform a particular behavior is explained by attitude toward the behavior, subjective norm, and perceived behavioral control. Attitude toward the behavior refers to the individual's positive or negative evaluation of the behavior; subjective norm refers to perceived expectations and social pressures in the social environment regarding performing the behavior; and perceived behavioral control refers to the extent to which performing the behavior is perceived as easy or difficult. Within the framework of the theory, strengthening these three variables in a positive direction is expected to contribute to a stronger behavioral intention. However, the relative influence of these variables on intention may vary depending on the behavior under investigation and the research context (Ajzen, 1991, pp. 188–189).

These fundamental TPB relationships have also been empirically examined in relation to the use of information technologies in the accounting profession. Studies conducted by both Toraman (2022, pp. 365–371) and Özer and Yılmaz (2010, pp. 40–49) among accounting and finance professionals found that attitude, subjective norm, and perceived behavioral control exert significant effects on intention to use (Özer & Yılmaz, 2010, pp. 40–42, 47–49). Based on these theoretical and empirical foundations, it was appropriate to investigate the direct relationships among the core TPB variables in explaining intention to use the e-Ledger application. Accordingly, the research hypotheses developed on this basis are presented below:

H2: Accounting professionals perceived behavioral control toward the TRA E-Ledger application has a direct effect on their intention to use the application.

H3: Accounting professionals' attitude toward use of the TRA e-Ledger application has a positive effect on their intention to use the application.

H5: Accounting professionals' subjective norms toward the TRA e-Ledger application affect their intention to use the application.

The research model was not limited to the fundamental direct relationships with intention proposed by the TPB; it also incorporated the role of perceived behavioral control in forming attitude toward the behavior. This relationship is not one of the core paths specified in the original TPB model. Nevertheless, extended applications of the TPB in the context of technology acceptance have examined the effect of perceived behavioral control on attitude toward the behavior. Toraman (2022, pp. 366, 371) incorporated the effect of perceived behavioral control on attitude toward the behavior into the research model and found this relationship to be positive and statistically significant.

Given the integrated nature of the e-Ledger application with technical and professional processes, accounting professionals' perceived control over their ability to use the system can be considered not only in terms of their intention to use it, but also in terms of how they evaluate the application. In other words, perceiving oneself as competent and in control in using the application may shape one's evaluation of the application. In this study, this relationship is not treated as a modification of the core TPB model, but rather as an extended path intended to

provide a more detailed examination of the relationships among the theory's variables in the context of the e-Ledger. Accordingly, the following hypothesis was developed:

H1: Accounting professionals perceived behavioral control toward the TRA E-Ledger application affects their attitude toward using the application.

The second relationship extended in the research model concerns the association between subjective norm and attitude toward the behavior. In the TPB, subjective norm is treated as an independent antecedent of behavioral intention. It reflects the extent to which an individual considers the expectations of people or groups important to them regarding the behavior (Ajzen, 1991, pp. 188–189). However, because professional activities occur within a social and institutional environment, colleagues' and other important reference groups' views may influence not only intention but also individuals' evaluations of the application. Özer and Yılmaz (2010, pp. 40–41), in their study of accountants' use of information technologies, also noted that reference groups such as colleagues, managers, and professional organizations may influence accounting professionals' subjective norms regarding technology use.

Empirical studies conducted in the context of technology acceptance further demonstrate that this relationship can be tested directly. In Toraman's (2022, pp. 366–371) study, the effect of subjective norm on attitude toward the behavior was incorporated into the research model, and the relationship was positive and significant. Accordingly, the following hypothesis was developed:

H4: Accounting professionals' subjective norms toward the TRA e-Ledger application have a positive effect on their attitude toward use of the application.

Another important aspect in which the research model differs from the standard TPB structure is the examination of the mediating role of attitude toward the behavior. Within the TPB, attitude toward the behavior is regarded as one of the principal determinants of behavioral intention (Ajzen, 1991, pp. 188–189). Research on the use of information technologies in the accounting profession also indicates that a positive attitude strengthens intention to use (Özer & Yılmaz, 2010, pp. 40–49). At the same time, empirical findings in the technology acceptance literature suggest that perceived behavioral control and subjective norm may also influence attitude toward the behavior (Toraman, 2022, pp. 366- 371).

Considering these relationships together makes it possible to examine attitude toward the behavior not only as an independent antecedent of intention to use, but also as a mechanism through which perceived behavioral control and subjective norm are transmitted to intention to use. This approach enables the identification of indirect effects that may arise through attitude toward the behavior, in addition to the direct effects of perceived behavioral control and subjective norm on intention. Thus, rather than treating the three core determinants of intention in the TPB merely as parallel independent variables, the research model also evaluates the indirect relationships that may arise among these variables. Within this framework, the following mediation hypotheses were developed:

H6: Accounting professionals' attitude toward use of the TRA e-Ledger application mediates the relationship between perceived behavioral control and intention to use the application.

H7: Accounting professionals' attitude toward use of the TRA e-Ledger application mediates the relationship between subjective norm and intention to use the application.

3. Methodology

3.1. Research Sample, Scope, Limitations, and Data Collection

The study aimed to identify the factors influencing accounting professionals' intention to use the e-Ledger application, introduced by the Revenue Administration (GİB) as one of the digital accounting applications in Türkiye. Within this scope, participants' intention to use the e-Ledger application was evaluated in accordance with the variables addressed in the TPB framework and the measurement criteria related to these variables.

The study's target population consisted of Certified Public Accountants (CPAs), Public Accountants (PAs), CPA trainees, accounting specialists, and assistant specialists working in enterprise accounting departments, as well as office staff employed in CPA offices or in enterprise accounting departments throughout Türkiye. However, the lack of a common, up-to-date population list covering all these groups made it difficult to conduct the study at the national level. In addition, given the geographical size of the target population and the study's time and cost constraints, the accessible population was limited to professionals engaged in accounting-related activities in Istanbul.

To assess the numerical adequacy of the sample size reached in the study, the researchers used sample size criteria developed for large populations. According to the sample size table developed by Krejcie and Morgan (1970, pp. 608–610), the required sample size increases gradually as the population size increases, and for very large populations, it stabilizes slightly above 380. In the relevant table, the required sample size for a population of 1,000,000 is reported as 384. The 646 valid questionnaire responses obtained in the present study indicate that the sample size was numerically adequate in this respect. Nevertheless, a large sample size alone does not demonstrate that the sample is representative of the target population or that the research findings can be generalized to all accounting professionals in Türkiye.

The study used the survey method as its data collection technique. The researchers administered the questionnaires to participants engaged in accounting-related professional activities in Istanbul through both online and face-to-face methods. Participants were selected using convenience sampling, a non-probability sampling method. Convenience sampling is a non-probability sampling method in which practical criteria such as accessibility, geographical proximity, availability during the research period, and willingness to participate are considered when selecting individuals from the target population. Because individuals in the target population do not have an equal probability of being selected under this method, the sample's representativeness may be limited, and caution is required when generalizing the findings to a broader population (Etikan et al., 2016, pp. 2–4). Accordingly, evaluate the findings in the context of data from 646 accounting professionals in Istanbul reached through convenience sampling. The fact that the study was conducted only in Istanbul and that participants were not selected through a probability sampling method constitutes one of the principal limitations of the study in terms of external validity and the generalizability of the findings to accounting professionals throughout Türkiye. Nevertheless, the sample size obtained allows the relationships among the

variables specified in the research model to be empirically evaluated within the current sample. Ethics approval for the study was obtained from the İstanbul Nişantaşı University Social and Human Sciences Ethics Committee (meeting date: 6 November 2025; decision no. 2025-12), and informed consent was obtained from the participants.

3.2. Measurement Instrument and Scale Adaptation

The measurement instrument used in this study was adapted from the scale used by Toraman (2022, pp. 70–71) to examine user acceptance of Metaverse technology within the Technology Acceptance Model and the TPB. In the source study, measurement items related to attitude toward the behavior, subjective norm, perceived behavioral control, and intention to use were included within the TPB framework, and participants' evaluations were obtained using a five-point Likert scale. In the present study, the TPB items originally presented in English were transferred into a Turkish application form and adapted to the context of e-Ledger use while preserving their core conceptual meanings. Participants evaluated the statements in the measurement instrument on a five-point Likert scale ranging from 1 = Strongly Disagree to 5 = Strongly Agree.

In measurement instruments developed within the TPB framework, items should be formulated in a manner conceptually consistent with the behavior under investigation. Ajzen (2006, pp. 2–3) states that direct measurement items should align with the behavioral criterion being examined and be formulated to reflect the individual's own evaluation. Ajzen (2006, pp. 3–5) also notes that data obtained from pilot testing may be used to evaluate the reliability and validity of items in newly developed measurement instruments. In the present study, however, the measurement instrument was not developed from scratch; instead, it was adapted from scale items previously used in an empirical study. Therefore, we did not conduct a separate pilot study or seek expert opinion during the adaptation process. We evaluated the psychometric adequacy of the measurement instrument in the e-Ledger context using reliability, convergent validity, and discriminant validity analyses based on data from the main research sample.

3.3. Research Model and Variables

This research examines the factors affecting adoption and usage acceptance of the E-Ledger application implemented by TRA, and the research model is structured as illustrated in Figure 1. Although the literature uses various models to determine intention, this study measures intention based on the TPB (Ajzen, 1991, pp. 1-5; Schierz et al., 2010, pp. 210-213).

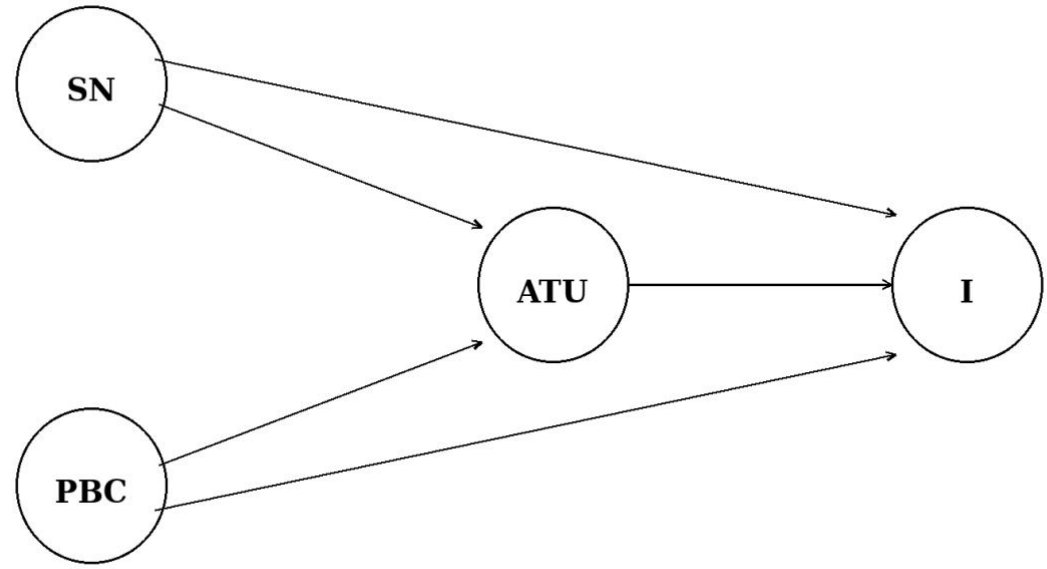


Figure 1. Research Model Framework

Resources: Adapted from the conceptual framework of the TPB variables: Perceived Behavioral Control (PBC), Attitude Toward Use (ATU), Subjective Norm (SN), and Intention (I).

3.4. Data Analysis Method and Rationale for the Use of PLS-SEM

Partial Least Squares Structural Equation Modeling (PLS-SEM) was employed to analyze the relationships among the constructs included in the research model. PLS-SEM is a variance-based structural equation modeling approach that enables theoretical models to be evaluated from a predictive perspective, examines the explained variance in endogenous constructs, and tests extended relationships derived from established theories across different research contexts (Hair et al., 2019, pp. 3–4). This study primarily identifies the relationships that explain accounting professionals' intention to use the e-Ledger application within the TPB framework and evaluates the direct and indirect effects specified in the research model simultaneously. Accordingly, the PLS-SEM approach was considered appropriate for both the structure of the research model and the study's explanatory focus.

In addition to the fundamental TPB relationships among attitude toward the behavior, subjective norm, perceived behavioral control, and intention to use, the research model also includes the effects of perceived behavioral control and subjective norm on attitude toward the behavior. Furthermore, the research model tests the mediating role of attitude toward the behavior in the relationships between perceived behavioral control and intention to use, as well as between subjective norm and intention to use. PLS-SEM enables the simultaneous evaluation of direct and indirect structural relationships within a model and the examination of mediation effects within the structural model (Hair et al., 2019, p. 13). Therefore, the choice of method was based not merely on the features of the software employed, but on its compatibility with the theoretical model and the research objective.

A small sample size was not a determining rationale for using PLS-SEM in this study. Although PLS-SEM can be applied to small samples, it has no restriction on use with large samples. Nevertheless, an adequate sample size alone should not justify selecting PLS-SEM (Hair et al., 2019, pp. 4–5). Given that the present study includes 646 valid questionnaire responses, the methodological choice was based primarily on the study's explanatory objective, the simultaneous evaluation of structural relationships, and the examination of the direct and indirect effects specified in the extended TPB model, rather than sample size.

The research data were analyzed using SmartPLS 4 software. In the PLS-SEM analysis, the reliability and validity of the measurement model were evaluated first, followed by an examination of the path relationships among the constructs in the structural model. When evaluating the structural model, consider multicollinearity among the predictor constructs, the explained variance of the endogenous constructs, and the statistical significance of the structural path coefficients jointly (Hair et al., 2019, pp. 10–13).

The nonparametric bootstrapping procedure was used to determine the statistical significance of the path coefficients and indirect effects in the structural model, and the analyses used 5,000 bootstrap subsamples. Within the PLS-SEM framework, bootstrapping enables evaluation of the statistical significance of path coefficients and the indirect effects in mediation models (Hair et al., 2019, p. 13).

4. Findings

4.1. Demographic Data of the Study

When the demographic characteristics of the survey participants are examined, 74.15% of participants are aged 30 or above, and 78.17% have at least five years of professional experience. This distribution indicates that a substantial proportion of the research data was obtained from participants with considerable professional experience. In terms of educational attainment, 86.38% of the participants hold a bachelor's, master's, or doctoral degree, while 52.63% hold the title of Certified Public Accountant (SMMM). Taken together, these findings suggest that the sample includes participants with sufficient educational and professional experience to evaluate the research subject. However, a final assessment of the dataset's reliability and validity should be made in conjunction with the results of the reliability and validity analyses conducted for the measurement model.

Table 3
Demographic Data of the Research

Demographic Data		Frequency	Percentage (%)
Respondent's Age	20 Years and Under	19	2,94
	21 – 29 Years	148	22,91
	30 – 39 Years	197	30,5
	40 – 49 Years	163	25,23
	50 – 59 Years	86	13,31

Demographic Data		Frequency	Percentage (%)
	60 Years and Over	33	5,11
	Total	646	100
Respondent's Gender	Male	429	66,41
	Female	217	33,59
	Total	646	100
Respondent's Educational Attainment	Primary School	0	0
	Middle School	0	0
	High School	37	5,73
	Associate Degree	51	7,89
	Bachelor's Degree	449	69,5
	Master's Degree	104	16,1
	Doctorate	5	0,78
	Total	646	100
Respondent's Professional Experience	Less Than 2 Years	50	7,74
	2 Years – Less Than 5 Years	91	14,09
	5 Years – Less Than 10 Years	96	14,86
	10 Years – Less Than 15 Years	106	16,41
	15 Years – Less Than 20 Years	113	17,49
	20 Years and Over	190	29,41
	Total	646	100
Respondent's Position within the Company / Institution	Budget and Reporting Specialist	1	0,15
	CEO (General Manager)	5	0,77
	CFO (Finance Manager)	6	0,93
	Financial Planning and Analysis Specialist	1	0,15
	Financial Affairs Manager	2	0,31
	Accounting Department Manager	55	8,51
	Accounting Supervisor	5	0,77
	Assistant Accounting Specialist	1	0,15
	Accounting Specialist	16	2,48
	Certified Public Accountant	340	52,64

Demographic Data		Frequency	Percentage (%)
	CPA Trainee	69	10,69
	Accounting Office Staff	137	21,21
	Tax and Reporting Specialist	8	1,24
	Total	646	100
Professional Titles Held by the Respondent	Certified Public Accountant	340	52,63
	CPA Trainee	187	28,95
	Auditor	31	4,8
	Those Without Any Professional Title	88	13,62
	Total	646	100

4.2. Reliability and Validity Analyses of the Study

In the first stage of the PLS-SEM analysis process, the measurement model of the study was evaluated. Within this scope, the reliability and validity of the research constructs were examined based on indicator loadings, internal consistency reliability, convergent validity, and discriminant validity criteria. After establishing the adequacy of the measurement model, the evaluation of the structural model was undertaken.

Table 4
Reliability and Validity Analyses of the Research

Measurement Criteria / Items	VIF Values	Factor Loadings	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)	Mean	Standard Deviation
I1: I consider using the TRA E-Ledger application among digital accounting applications.	5.255	0.942	0.963	0.966	0.901	3.964	1.128
I2: I will probably use the TRA E-Ledger application among digital accounting applications soon.	5.359	0.938				3.989	1.099

Measurement Criteria / Items	VIF Values	Factor Loadings	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)	Mean	Standard Deviation
I3: I would like to use the TRA E-Ledger application among digital accounting applications.	7.343	0.955				3.952	1.100
I4: I plan to use the TRA E-Ledger application among digital accounting applications.	8.251	0.961				3.927	1.114
ATU1: Using the TRA E-Ledger application in my future transactions is valuable to me.	3.178	0.921	0.941	0.941	0.894	3.972	1.083
ATU2: Conducting accounting processes by using the TRA E-Ledger application in the future is important.	6.277	0.959				3.995	1.148
ATU3: The idea of conducting accounting processes by using the TRA E-Ledger application in the future interests me.	6.049	0.956				3.937	1.161
PBC1: The TRA E-Ledger application is easy to use.	2.238	0.915	0.828	0.892	0.741	3.822	1.189

Measurement Criteria / Items	VIF Values	Factor Loadings	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)	Mean	Standard Deviation
PBC2: Whether I use the TRA E-Ledger application for my work and transactions is entirely my choice.	1.583	0.755				3.491	1.385
PBC3: If I am sure about using the TRA E-Ledger application, I can use it.	2.303	0.902				3.930	1.109
SN1: It is important to me that professional colleagues think I should use the TRA E-Ledger application.	3.011	0.916	0.922	0.923	0.865	3.899	1.099
SN2: Most professional colleagues whose opinions I value would approve of my using the TRA E-Ledger application.	4.026	0.943				3.943	1.102
SN3: My professional colleagues and acquaintances use the TRA E-Ledger application.	3.585	0.930				3.994	1.067

When evaluating research reliability, the internal consistency and homogeneity were verified by examining the "Cronbach's Alpha coefficient and Composite Reliability value" of the research variables. To establish internal consistency, the Composite Reliability calculated based on the outer loadings of the variables must be greater than 0.70 and the Cronbach's Alpha coefficient must be greater than 0.70. When the values in Table 4 are examined, the Cronbach's Alpha values

are 0.82 and above, and the Composite Reliability values are 0.89 and above, demonstrating that research reliability and internal consistency are satisfied at a very high level.

In quantitative research, validity values must also be thoroughly considered to ensure the findings are generalizable to the target population. To ensure validity of the results, both convergent and discriminant validity values must be examined. Convergent validity is defined as the degree to which a measurement correlates positively with alternative measurements of the same construct. The research examines convergent validity through the factor loadings of the measurement criteria for each variable and the Average Variance Extracted (AVE) values. For research variables to satisfy convergent validity, the factor loading (an item's ability to explain the variable) must be 0.60 or above, and the AVE must be 0.50 or above. When examining the factor loadings in Table 4, all items have factor loadings of 0.75 or higher; moreover, the outer loadings of most measurement criteria are 0.90 or higher, which significantly strengthens explanatory power. AVE values of 0.74 and above also support strong convergent validity.

Before analyzing discriminant validity, evaluate the outer model variance inflation factor (VIF) values and the p-values of outer model factor weights to support structural robustness. To ensure the structural validity of the model used within the scope of the research, VIF values for each measurement criterion should be below 10, and the p-values for outer model factor weights should be less than 0.05. As can be seen from the VIF values in Table 4, there is no multicollinearity problem regarding the measurement criteria included in the model. In addition, the p-values for the outer model factor weights are less than 0.05, confirming structural validity.

Discriminant validity analysis must be used to distinguish a variable from other variables. Three main indicators guide discriminant validity assessment: the Cross Loadings Table, the Fornell-Larcker Criterion Table, and the Heterotrait-Monotrait Ratio (HTMT) Coefficients Table. Data regarding discriminant validity are presented in the following tables.

Table 5
Cross Loadings Table

Measurement Criteria	PBC	ATU	I	SN
PBC1	***0.915***	0.757	0.710	0.704
PBC2	***0.755***	0.412	0.377	0.388
PBC3	***0.902***	0.669	0.602	0.664
ATU1	0.690	***0.921***	0.746	0.710
ATU2	0.692	***0.959***	0.787	0.715
ATU3	0.719	***0.956***	0.789	0.712
I1	0.656	0.779	***0.942***	0.692
I2	0.584	0.704	***0.938***	0.667
I3	0.674	0.820	***0.955***	0.729
I4	0.668	0.798	***0.961***	0.711
SN1	0.662	0.693	0.664	***0.916***

Measurement Criteria	PBC	ATU	I	SN
SN2	0.677	0.723	0.710	***0.943***
SN3	0.634	0.687	0.684	***0.930***

A cross loading occurs when a measurement criterion used within the scope of the research has a higher explanatory power for an alternative variable rather than the variable to which it is theoretically assigned. Therefore, when evaluating whether the measurement criteria in the study exhibit cross-loading cross-contamination, the factor loading for the measurement criterion's own variable is expected to be at least 0.1 points higher than the factor loading for any other variable. As can be seen from the analysis results in Table 5, each measurement item possesses an explanatory power (factor loading) that is at least 0.1 points higher in its own designated variable compared to other variables, indicating satisfactory item-level discriminant validity.

Table 6
Fornell-Larcker Criterion Table and Correlation Analysis Results Between Variables

Variables	PBC	ATU	I	SN
PBC (Perceived Behavioral Control)	**0.861**			
ATU (Attitude Towards Use)	0.741	**0.946**		
I (Intention)	0.682	0.819	**0.949**	
SN (Subjective Norm)	0.707	0.754	0.738	**0.930**

The Fornell-LarThe table presents the relationship between the average variance extracted (AVE) of each variable and its correlations with other constructs. This table also incorporates the direct correlations between variables. Based on the table, if the square root of a variable's AVE (shown on the diagonal) is greater than its correlations with all other variables, this indicates that discriminant validity is established at the construct level. Based on the analysis results in Table 6, all diagonal values for the variables are the highest in their respective columns and rows. Therefore, in terms of the values in the Fornell-Larcker Criterion table, it can be stated that construct-level discriminant validity is successfully achieved in the research.

Table 7
HTMT Coefficients Table

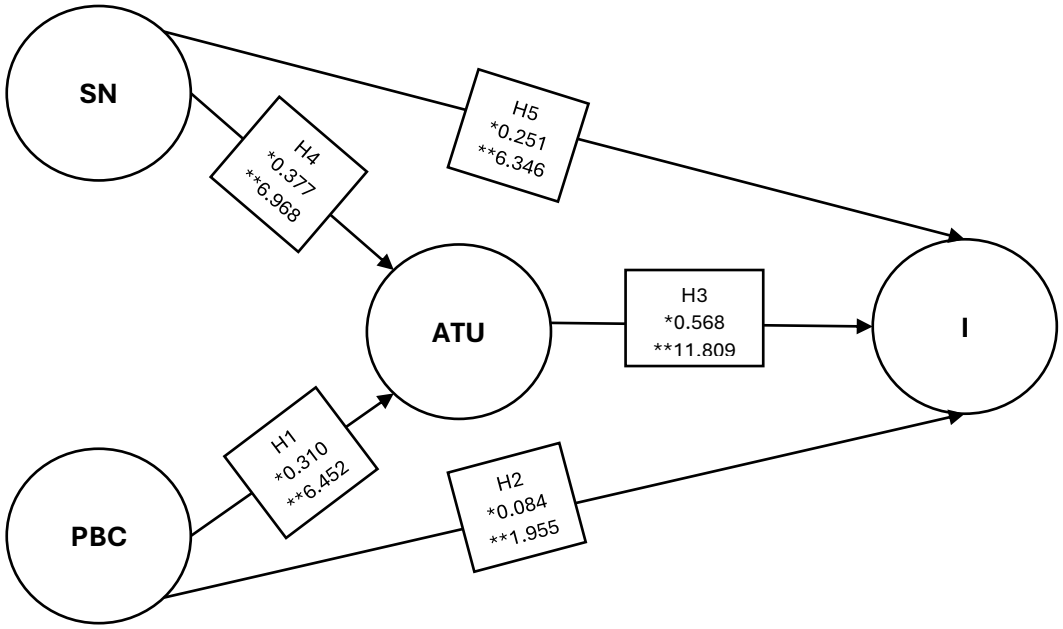
Variables	PBC	ATU	I	SN
PBC				
ATU	0.804			
I	0.729	0.848		
SN	0.776	0.709	0.782	

While determining the HTMT coefficient: the average of the correlation values for the measurement criteria belonging to all variables in the model is calculated, and this average is ratioed to the geometric mean of the correlations calculated for the measurement criteria of the same variable. These coefficients are used to evaluate the accuracy of the Fornell-Larcker Criterion and to measure similarities between variables. Theoretically, the HTMT coefficient

should be below 0.90 for closely related variables and below 0.85 for distinctly related variables. When examining the HTMT coefficients in Table 7, all coefficients are 0.85 or below. From this point of view, considering the cumulative analysis results in Table 5, Table 6, and Table 7, it can be stated with confidence that discriminant validity is fully established in the research.

4.3. Structural Model

The dependent and independent variables included in the research model are schematized to test the proposed path relationships. The dependent variable is intention, while the independent variables are the foundational variables derived from the TPB. These core independent constructs comprise "subjective norm, attitude toward use, and perceived behavioral control".



Note: *Indicates the path coefficients of the hypotheses. **Indicates the t-values of the hypotheses.

Figure 2. T-Statistic Values and Path Coefficients

The H1–H7 hypotheses, developed in accordance with the theoretical framework and relevant literature, were tested within the study's structural model using the PLS-SEM method. Figure 2 presents the path coefficients, t-values, and significance levels for the hypothesis tests.

Table 8
Model Fit Values

Fit Indices	Model Fit Values
SRMR	0.043
Chi-square	2,285.732
NFI	0.904

Before moving to the structural path results, we must evaluate whether the overall model fit is achieved for the research data. In this regard, Table 8 presents the model fit values obtained via SmartPLS 4. The SRMR (Standardized Root Mean Square Residual) and NFI (Normed Fit Index)

values indicate the suitability of the structural model for the data. An NFI above 0.90 and an SRMR below 0.08 indicate good model-data fit. Considering the values in Table 8, it can be stated that model fit is successfully achieved in this research.

Table 9
Hypothesis Tests for the Structural Model

Hypothesis	Path Relationship	Path Coefficient	t-Value	p-Value	Hypothesis Supported (p < 0.05)
H1	PBC → ATU	0.310	6.452	0.000	Yes
H2	PBC → I	0.084	1.955	0.051	No
H3	ATU → I	0.568	11.809	0.000	Yes
H4	SN → ATU	0.377	6.968	0.000	Yes
H5	SN → I	0.251	6.346	0.000	Yes

Table 9 shows the results of the 5 direct hypothesis tests formulated to measure the interaction of research variables within the structural model. Three important indicators are taken into consiDerivation when deciding on the acceptance or rejection of hypotheses: the p-value, the t-value, and the path coefficient. To accept a hypothesis, $p < 0.05$ must be met at a 0.95 confidence level. The t-value indicates statistical significance, showing the extent to which latent variables explain observed criteria. Critical t-values must be above ±1.96 for $p < 0.05$ (Turğay, 2022). Statistically insignificant paths are excluded or interpreted carefully, whereas the path coefficient determines the strength and direction of the explanation. Across these values, 4 out of 5 direct research hypotheses were accepted, while 1 was rejected.

The results show that perceived behavioral control (PBC) does not directly affect intention (I). However, the major advantage of Structural Equation Modeling (SEM) is that it also evaluates indirect effects through mediating constructs. When considering the indirect relationships (Hypothesis H6), we found that perceived behavioral control affects intention indirectly through attitude toward use, showing that attitude toward use strongly mediates this path ($t = 5.439$, $p = 0.000$).

In addition, Table 9 shows that attitude toward use ($t = 11.809$; path coefficient = 0.568) has strong direct explanatory power for intention. This result proves that attitude toward use is the most important and robust antecedent of intention, as frequently emphasized in the academic literature. Furthermore, t-values and path coefficients for hypotheses H1, H4, and H5 show that the independent variables explain the dependent variable to a significant extent and confirm strong, positive, and statistically significant relationships.

Table 10
Indirect Effects

Hypothesis	Path Relationship	Path Coefficient	t-Values	p-Values	Hypothesis Supported (p < 0.05)
H6	PBC → ATU → I	0.176	5.439	0.000	Yes
H7	SN → ATU → I	0.214	6.104	0.000	Yes

The results in Table 10 show that the attitude toward us variable has a strong, significant mediating effect in the relationship between perceived behavioral control, subjective norm, and intention, thereby enhancing the total effects of these independent variables on the dependent construct, intention.

Table 11
R^2 Values of the Variables

Variables	R^2	Adjusted R^2
ATU (Attitude Toward Use)	0.678	0.677
I (Intention)	0.707	0.706

The R^2 value indicates how well the independent variables explain the dependent variable, expressed as a percentage. If the R^2 value is below 0.25, the explanation rate is considered weak; if it is between 0.50 and 0.75, it is considered moderate; and if it is 0.75 and above, it indicates a strong explanation rate. In this research, the R^2 (0.707) and Adjusted R^2 (0.706) values obtained for intention indicate a moderate-to-high level of explanation; however, an R^2 value of even 0.10 can be considered sufficient in micro-scale empirical studies (Yıldız, 2021). Therefore, the R^2 values are fully acceptable considering the existing literature. The critical target variable for this research model remains intention.

5. Discussion

The empirical findings obtained from the structural equation modeling analysis provide significant insights into the technology acceptance dynamics of accounting professionals during the digital transformation process. By evaluating the TRA E-Ledger application through the lens of the TPB, this study elucidates how individual attitudes, environmental influences, and control beliefs interact to shape professional intentions.

The most striking result of the structural path analysis is that attitude toward use (ATU) is the primary and strongest determinant of intention (I), with a path coefficient of 0.568 and a t-value of 11.809. This outcome shows that an accounting professional's deliberate evaluation of the E-Ledger application's value, importance, and utility is the primary driver of their intention to adopt the system. When professionals view the digital application as an asset that improves operational efficiency, reduces manual workload, and automates tracking processes, their intent to use it increases substantially. This strong impact of attitude supports the core assertions of the TPB. It aligns with prior empirical accounting literature, such as findings by Özer and Yılmaz (2010), Santos and Almeida (2018), and Toraman (2022), which consistently position attitude toward use as the most critical antecedent of technological intention.

In contrast to the strong direct effect of attitude, the direct path from perceived behavioral control (PBC) to intention (I) was statistically unsupported (H2 rejected: path coefficient = 0.084, t = 1.955, p = 0.051). This indicates that a professional's self-efficacy, or internal belief in the ease of use and individual choice, does not automatically translate into direct behavioral intention in this setting. A key explanation for this phenomenon lies in the E-Ledger system's regulatory nature. Because the application carries mandatory usage thresholds enforced by the Revenue Administration (TRA) for a substantial portion of businesses, absolute voluntary choice is constrained. Consequently, simply possessing the technical capability or resources to operate

the application is insufficient to form an autonomous intention. This result aligns with similar findings in the TPB literature, where the direct path of PBC was found to be insignificant, notably in studies by Thorhauge et al. (2016), Yücenurşen (2020), and Duman and Yücenurşen (2022).

However, the structural modeling approach successfully reveals a deeper indirect mechanism through mediation analysis (H6 accepted: path coefficient = 0.176, t = 5.439). Although perceived behavioral control does not directly affect intention to use, it exerts a significant and positive indirect effect by shaping attitude toward use. This finding indicates that when an accounting professional believes that the e-Ledger application is easy to use and that they possess the necessary skills to manage it, they are more likely to develop a positive attitude toward the system. This more favorable attitude, in turn, substantially strengthens their intention to use the application. This full mediation effect shows that technical competence and system user-friendliness matter not only as mechanical determinants, but also as factors that shape users' psychological acceptance and cognitive evaluation of the system.

Furthermore, subjective norms (SN) exerted both a direct and indirect positive influence on intention. The direct path (SN → I) yielded a path coefficient of 0.251 (t = 6.346), while the indirect path via attitude toward use (SN → ATU → I) produced a path coefficient of 0.214 (t = 6.104). These results indicate that the professional social network, including colleagues, peer networks, and respected institutional opinions, plays a dual role in the digital transformation process. Social pressure and professional consensus not only directly persuade practitioners to intend to use the e-ledger system, but they also indirectly reshape individual mindsets, helping practitioners cultivate a more favorable inner attitude toward digital accounting technologies. The dual significance of subjective norms aligns with the findings of Özer and Yılmaz (2011) and Söylemez and Taşkın (2020), supporting the view that accounting environments are collaborative, institutionalized ecosystems in which peer behavior and regulatory approvals strongly guide technological adoption.

Ultimately, the structural model has strong explanatory power, with the independent variables explaining 70.7% of the variance in intention (R^2 = 0.707) and 67.8% of the variance in attitude toward use (R^2 = 0.678). These high R^2 values confirm that adapting the TPB specifically to the operational realities of the E-Ledger application yields a highly effective and theoretically sound model for understanding digital transition patterns within the professional accounting framework.

6. Conclusion

The global technological transformation process has gained momentum more rapidly, significantly influenced by the pandemic. Along with necessary lockdowns, both individuals and enterprises have digitized their operations, accelerating a digital transformation process already underway. The shift of many business and operational processes to the electronic environment has increased the use of electronic applications integrated into business processes and laid the groundwork for individuals to intend to use them.

The e-ledger application is one such electronic application. In Turkey, the e-ledger application was first introduced in 2011, with its legal framework established by the Tax Procedure Law (TPL) General Communiqué (Serial No. 1). However, use became mandatory for certain taxpayer

groups as of January 1, 2014. Nevertheless, alongside intensive digital transformation, many companies have started using the application voluntarily to speed up transactions and reduce workloads, rather than out of sheer obligation. Although the Revenue Administration (TRA) initially developed the application, numerous institutions and organizations have since developed e-ledger software solutions, made them available for use, and integrated them into the TRA's system through integrator companies.

Within the scope of the research, the factors affecting accounting professionals' intention to use the e-ledger application developed by the TRA were examined and evaluated through the variables of the TPB. The measurement criteria were adapted to the e-ledger application, and researchers collected data through a questionnaire administered to accounting professionals. The research results were analyzed based on 646 complete questionnaire responses. The analyses showed that the results are both reliable and valid. The study tested 7 research hypotheses and accepted 6.

The results showed that "attitude toward use and subjective norm" directly and strongly affect intention. Furthermore, it showed that this strong effect is also due to the interrelationship of these variables with intention. From this perspective, accounting professionals' positive attitude toward the TRA e-ledger application, along with their social environment's positive approach to it, positively affects their intention to use it.

Another significant finding is the absence of a direct effect between perceived behavioral control and intention. However, an effect can sometimes be indirect rather than direct. Hypothesis tests of indirect relationships indicate that perceived behavioral control affects intention through attitude toward use. Accounting professionals' belief in their ability to use the application leads them to develop a positive attitude toward it. This, combined with other positive factors constituting the attitude, further strengthens attitude toward use and ultimately directs the professional toward intention.

Declarations

Ethics Approval	**Ethics approval for this study was obtained from the İstanbul Nişantaşı University Social and Human Sciences Ethics Committee (meeting date: 6 November 2025; decision no. 2025-12). Written or informed consent was obtained from all participants.**
Conflict of Interest	The author declares no conflict of interest.
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Author Contributions	İlyas Turğay: Conceptualization, Methodology, Data Collection, Formal Analysis, Writing – Original Draft, Writing – Review & Editing. The author has read and approved the final version of the manuscript.
Data Availability Statement	The data supporting the findings of this study are available from the corresponding author upon reasonable request. The data are not publicly available due to privacy and confidentiality considerations related to the participants.
Use of AI and AI-Assisted Technologies	The author declares that no artificial intelligence (AI) or AI-assisted technologies were used to prepare this manuscript. The author is solely responsible for all ideas, analyses, interpretations, and conclusions presented in this manuscript.

References

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179–211.

Ajzen, I. (2006). *Constructing a theory of planned behavior questionnaire: Conceptual and methodological considerations*. University of Massachusetts Amherst.

Akın Turğay, A. (2024). *Muhasebe mesleğinde yeni bir teknoloji olarak e-defter uygulamasının kullanımı: Muhasebe meslek mensupları üzerine bir alan araştırması* (Yayın No. 903179) [Yüksek lisans tezi, İstanbul Nişantaşı Üniversitesi]. Yükseköğretim Kurulu Ulusal Tez Merkezi.

Duman, H., & Yücenurşen, M. (2022). Aile şirketlerinin finansal karar verme süreçleri: Planlı davranış teorisi çerçevesinde bir araştırma. *Muhasebe ve Vergi Uygulamaları Dergisi, 15*(2), 483–508. https://doi.org/10.29067/muvu.1059180

Elektronik Defter Genel Tebliği (Sıra No. 1). (2011, 13 Aralık). *Resmî Gazete* (Sayı: 28141).

Erdoğan, E. (2020). *Dijital muhasebe uygulamaları kullanımının teknoloji kabul modeli ile incelenmesi: Muhasebe meslek mensupları üzerine bir araştırma* (Yayın No. 636830) [Yüksek lisans tezi, İnönü Üniversitesi]. Yükseköğretim Kurulu Ulusal Tez Merkezi.

Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics*, *5*(1), 1–4. https://doi.org/10.11648/j.ajtas.20160501.11

Gelir İdaresi Başkanlığı. (2025). *Yardım*. https://defterbeyan.gov.tr/tr/yardim/basit-usul

Gökçen, G., & Özdemir, M. (2016). Türkiye'de muhasebe uygulamalarından e-defter ve e-fatura uygulaması. *Öneri Dergisi, 12*(46), 137–154. https://doi.org/10.14783/od.v12i46.1000010008

Güldoğan, Ö., & Usul, H. (2021). Dijital dönüşüm sürecinde e-defter uygulamalarına getirilen [Bildiri metni]. Ö. Tekşen, A. Apalı ve N. Gülcan (Ed.), *XXXIX. Türkiye Muhasebe Eğitimi Sempozyumu Bildiriler Kitabı* içinde (ss. 15–31). Detay Yayıncılık.

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*, *31*(1), 2–24. https://doi.org/10.1108/EBR-11-2018-0203

Kamu Malî Yönetimi ve Kontrol Kanunu (Kanun No. 5018). (2003, 24 Aralık). *Resmî Gazete* (Sayı: 25326).

Kayhan, M. G., & Çakmak, A. F. (2020). Hileli finansal raporlama faaliyetinin ortaya çıkarılmasında ihbar niyetinin planlanmış davranış teorisi ile irdelenmesi. *Ordu Üniversitesi Sosyal Bilimler Enstitüsü Sosyal Bilimler Araştırmaları Dergisi, 10*(3), 762–775. https://doi.org/10.48146/odusobiad.759637

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, *30*(3), 607–610. https://doi.org/10.1177/001316447003000308

Owusu, G. M. Y., Bekoe, R. A., Anokye, F. K., & Okoe, F. O. (2020). Whistleblowing intentions of accounting students: An application of the theory of planned behaviour. *Journal of Financial Crime, 27*(2), 477–492. https://doi.org/10.1108/JFC-01-2019-0007

Özer, G., & Yilmaz, E. (2010). Planlı davranış teorisi (PDT) ile muhasebecilerin bilgi teknolojisi kullanımına yönelik bir uygulama. *World of Accounting Science, 12*(2), 33–54.

Özer, G., & Yilmaz, E. (2011). Comparison of the theory of reasoned action and the theory of planned behavior: An application on accountants' information technology usage. *African Journal of Business Management, 5*(1), 50–58. https://doi.org/10.5897/AJBM10.389

Özer, G., Özcan, M., & Günlük, M. (2025). Muhasebe meslek mensubu olma niyetini etkileyen faktörlerin planlı davranış teorisi çerçevesinde incelenmesi. *Muhasebe ve Denetime Bakış*, (74), 101–122. https://doi.org/10.55322/mdbakis.1485454

Santos, E. A. D., & Almeida, L. B. D. (2018). To pursue a career in accounting or not: A study based on the theory of planned behavior. *Revista Contabilidade & Finanças, 29*, 114–128. https://doi.org/10.1590/1808-057x201804890

Santos, E. A. D., Moura, I. V., & de Almeida, L. B. (2018). Students' intention to pursue a career in accounting from the perspective of the theory of planned behavior. *Revista de Educação e Pesquisa em Contabilidade, 12*(1), 63–78. https://doi.org/10.17524/repec.v12i1.1635

Schierz, P. G., Schilke, O., & Wirtz, B. W. (2010). Understanding consumer acceptance of mobile payment services: An empirical analysis. *Electronic Commerce Research and Applications, 9*(3), 209–216. https://doi.org/10.1016/j.elerap.2009.07.005

Sezgin, S., Tosun, P., & Börekçi, E. (2019). Finansal hizmetlerde kurumsal marka imajı ve marka güveninin bankacılık hizmeti alma eğilimine etkisi. *Pazarlama ve Pazarlama Araştırmaları Dergisi, 12*(24), 303–330.

Söylemez, C., & Taşkın, E. (2020). Tüketicilerin mobil bankacılık uygulamalarını kullanma niyetini etkileyen faktörler: Uluslararası bir karşılaştırma. *Eskişehir Osmangazi Üniversitesi İİBF Dergisi, 15*(2), 411–436. https://doi.org/10.17153/oguiibf.549422

Tashakor, S., Appuhami, R., & Munir, R. (2019). Environmental management accounting practices in Australian cotton farming: The use of the theory of planned behaviour. *Accounting, Auditing & Accountability Journal, 32*(4), 1175–1202. https://doi.org/10.1108/AAAJ-04-2018-3465

Tektüfekçi, F. (2019). Endüstri 4.0 kapsamında dijital dönüşümün güncel elektronik muhasebe uygulamalarına yansıması ve pragmatik yaklaşım olarak mali mühendislik. *Bilgi Ekonomisi ve Yönetimi Dergisi, 14*(1), 43–56.

Thorhauge, M., Haustein, S., & Cherchi, E. (2016). Accounting for the theory of planned behaviour in departure time choice. *Transportation Research Part F: Traffic Psychology and Behaviour, 38*, 94–105. https://doi.org/10.1016/j.trf.2016.01.009

Toraman, Y. (2022). User acceptance of metaverse: Insights from Technology Acceptance Model (TAM) and Planned Behavior Theory (PBT). *EMAJ: Emerging Markets Journal*, *12*(1), 67–75. https://doi.org/10.5195/emaj.2022.258

Toraman, Y. (2022). Dijital Türk Lirasının (DTL) kullanım kabulü: Teknoloji kabul modeli (TKM) ve planlı davranış teorisi (PDT) çerçevesinde incelenmesi. *Sosyoekonomi, 30*(54), 357–376. https://doi.org/10.17233/sosyoekonomi.2022.04.19

Turğay, İ. (2022). *İç denetim kalitesi ve risk yönetim sistemi etkinliğinin şirket performansına etkisi* (Yayın No. 772570) [Doktora tezi, Marmara Üniversitesi]. Yükseköğretim Kurulu Ulusal Tez Merkezi.

Türk Ticaret Kanunu (Kanun No. 6102). (2011, 14 Şubat). *Resmî Gazete* (Sayı: 27846).

Türkiye Serbest Muhasebeci Mali Müşavirler ve Yeminli Mali Müşavirler Odaları Birliği. (2023). *Kimler e-defter kullanmak zorundadır?* https://www.turmob.org.tr/e-donusum/edefter/kimler-kullanmak-zorunda

Vergi Usul Kanunu (Kanun No. 213). (1961, 10 Ocak). *Resmî Gazete* (Sayı: 10703).

Vergi Usul Kanunu Genel Tebliği (Sıra No. 421). (2012, 14 Aralık). *Resmî Gazete* (Sayı: 28497).

Vergi Usul Kanunu Genel Tebliği (Sıra No. 509)'nde Değişiklik Yapılmasına Dair Tebliğ (Sıra No. 535). (2022, 22 Ocak). *Resmî Gazete* (Sayı: 31727).

Vergi Usul Kanunu Sirküleri (Sıra No. 67). (2013, 26 Kasım). *Resmî Gazete* (Sayı: 28861).

Yıldız, E. (2021). *SmartPLS ile yapısal eşitlik modellemesi: Reflektif ve formatif yapılar*. Seçkin Yayıncılık.

Yilmaz, E. (2006). *Mantıklı eylem teorisi ile muhasebecilerin bilgi teknolojisi kullanımı üzerine bir uygulama* (Yayın No. 241610) [Yüksek lisans tezi, Gebze Yüksek Teknoloji Enstitüsü]. Yükseköğretim Kurulu Ulusal Tez Merkezi.

Yücenurşen, M. (2020). Öğrencilerin muhasebe mesleğinde kariyer yapma niyetlerinin planlı davranış teorisi perspektifinde incelenmesi: Ampirik bir çalışma. *Business & Management Studies: An International Journal, 8*(2), 1866–1891. https://doi.org/10.15295/bmij.v8i2.1476

1 Sıra Numaralı Elektronik Defter Genel Tebliği'nde Değişiklik Yapılmasına Dair Genel Tebliğ (Sıra No. 2). (2013, 24 Aralık). *Resmî Gazete*.

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Comparative Financial Performance of Participation Banks in Türkiye and Islamic Banks in GCC Countries: Evidence from the MULTIMOORA Method[1]

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Abstract

Purpose: *This study compares the financial performance of participation banks in Türkiye and Islamic banks operating in the Gulf Cooperation Council (GCC) countries during the COVID-19 period.*

Methodology: *Financial performance is evaluated using nine financial ratios representing capital adequacy, leverage, asset quality, liquidity, and profitability. The MULTIMOORA method, including the Ratio System, Reference Point Approach, Full Multiplicative Form, and Dominance Theory, is employed to obtain comprehensive performance rankings.*

Findings: *The findings indicate that the different components of the MULTIMOORA method produce varying rankings, highlighting the multidimensional nature of financial performance evaluation. The results show that several GCC Islamic banks outperform their Turkish counterparts in overall financial performance, although Turkish participation banks perform competitively under specific evaluation approaches.*

Scope and Limitations: *The sample and scope of the study are limited to six participation banks in Türkiye and seventeen full-fledged Islamic banks in GCC countries specifically during the COVID-19 period.*

Originality / Value: *The study contributes to the Islamic banking literature by comparing participation banks in Türkiye with GCC Islamic banks. It also demonstrates the usefulness of the MULTIMOORA method for evaluating multidimensional financial performance.*

Keywords: Islamic and Participation Banks, Financial Performance, MULTIMOORA

JEL Codes: C44, G21, M41

[1] This article is based on the master's thesis entitled "Financial Performance Evaluation of Islamic Banks with the MULTIMOORA Method: An Analytical Study of Islamic Banks in Turkey and the Gulf Cooperation Council Countries," completed in 2022 by Sherwan Younis OTHMAN under the supervision of Prof. Dr. Mihriban COŞKUN ARSLAN.

1. Introduction

Islamic finance has become one of the fastest-growing components of the global financial system over the last two decades. According to the Islamic Financial Services Industry Stability Report 2025, published by the Islamic Financial Services Board (IFSB), total assets in the global Islamic financial services industry reached USD 3.88 trillion by the end of 2024, representing an annual growth rate of 14.9% (IFSB, 2025). This remarkable expansion has not only increased the industry's economic size but also strengthened its strategic role in the global financial system. Today, Islamic banking accounts for the largest share of global Islamic financial assets. With its interest-free financing principles, risk-sharing approach, and close connection to real economic activities, Islamic banking has expanded steadily in both Muslim-majority countries and countries with different legal and economic systems. Since its institutional development accelerated during the 1970s, the industry has evolved beyond banking to include sukuk markets, takaful, Islamic investment funds, and various other Shariah-compliant financial products, becoming an important component of the global financial system (Hassan & Lewis, 2007; Wilson, 2009).

The Gulf Cooperation Council (GCC) countries have historically played a leading role in developing the Islamic finance industry. Modern Islamic banking in the region gained momentum in the 1970s, as oil revenues accumulated and demand for interest-free financial institutions grew. The establishment of Dubai Islamic Bank in the United Arab Emirates and the Islamic Development Bank in Jeddah in 1975 marked important milestones in the institutionalization of modern Islamic banking. This development continued with the establishment of Kuwait Finance House in 1977 and the rapid expansion of Islamic financial institutions in Bahrain after 1978. As a result, the GCC countries have become a global center for Islamic banking, sukuk markets, and takaful services (Wilson, 2009; Akkaş, 2017).

In Türkiye, the institutional development of interest-free banking began with the legal regulations introduced in 1983 that allowed the establishment of Special Finance Houses. The sector became operational in 1985 with the establishment of Albaraka Türk and Faisal Finans. A significant stage of institutional development came in 1999, when Special Finance Houses were brought under the Banking Law, followed by the enactment of Banking Law No. 5411 in 2005, which officially replaced the term Special Finance House with Participation Bank. The establishment of Türkiye Finans Participation Bank and the subsequent entry of state-owned participation banks further strengthened participation banking's position within the Turkish financial system. After more than four decades of development, participation banks have strengthened their institutional capacity and gradually increased their share of the financial sector, becoming important actors.

Although the GCC countries and Türkiye operate under the same principles of Islamic banking, their financial systems have evolved under different historical, regulatory, market, and macroeconomic conditions. These differences make it important to evaluate Islamic banks' financial performance not only within individual countries but also across financial systems. Financial performance is a key indicator of how effectively banks use their resources, including capital adequacy, financial structure, asset quality, liquidity, and profitability. Evaluating these indicators together provides a more comprehensive understanding of banks' financial resilience and operational efficiency.

Against this background, this study aims to evaluate and compare the financial performance of participation banks operating in Türkiye and Islamic banks operating in the GCC countries using the MULTIMOORA method for 2020, when the effects of the COVID-19 pandemic were felt most strongly across the global financial system. Financial performance is measured using nine financial ratios representing five key dimensions: capital adequacy, financial leverage, asset quality, liquidity, and profitability. The year 2020 was selected because the COVID-19 pandemic created a common environment of economic uncertainty for all banks, allowing evaluation of the financial resilience of banks operating under different institutional settings under comparable macroeconomic conditions. In addition, since multi-criteria decision-making methods focus on the relative performance of alternatives within a specific period, using a single accounting year reduces the influence of intertemporal economic fluctuations and enables a more reliable comparison of banks' financial performance. In this respect, the study contributes to the literature by providing a common analytical framework for evaluating the financial performance of Islamic banks operating under different institutional structures. To achieve this objective, the study first reviews the literature on Islamic banks' financial performance to identify key findings, commonly used methods, and existing knowledge. The study then highlights the research gap this analysis addresses.

2. Literature Review

The financial performance of Islamic banks has long been a major topic in banking and finance research. A considerable body of research has evaluated the financial performance of Islamic banks operating under interest-free banking principles compared with conventional banks. Al-Fadhli (1998) examined Islamic banks in Kuwait using financial ratios, customer satisfaction, and managerial evaluations, and concluded that these banks achieved financial performance comparable to conventional banks. Similarly, Samad and Hassan (2004) and Safiullah (2010) reported that Islamic banks exhibit a competitive financial structure, particularly in terms of profitability and financial stability.

The global financial crisis of 2008 shifted scholarly attention toward the performance of Islamic banks during periods of financial distress. Hasan and Dridi (2010) compared Islamic and conventional banks across eight countries. They found that Islamic banks were less affected by the crisis because of their asset-backed business model and risk-sharing financing structure. Their findings indicate that Islamic banks maintained stronger credit growth and asset expansion during the crisis, although weaknesses in risk management negatively affected some institutions' profitability in 2009.

Subsequent studies of crisis periods have reassessed these findings using different performance indicators and shown that Islamic banks' financial performance should be evaluated multidimensionally. In this context, Beck et al. (2013) emphasized the importance of considering asset quality, capital structure, and risk management together when evaluating Islamic banks' performance. Likewise, Hazzi and Al Kilani (2013) reported significant differences between Islamic and conventional banks in profitability, liquidity, and capital adequacy. Ibrahim (2015) found that Islamic banks in the United Arab Emirates outperformed one another across different financial indicators. In contrast, Daoud and Kammoun (2017) showed that Al Baraka Bank achieved superior results, particularly in profitability and risk management, among banks operating in Tunisia. Chokri and Anis (2018) further argued that bank performance is influenced not only by financial indicators but also by capital structure, asset utilization, and

macroeconomic conditions. Studies investigating the effects of Islamic banking practices on financial performance have reached similar conclusions. Odongo and Muchelule (2019) reported that interest-free banking practices positively influence commercial banks' financial performance.

Collectively, these studies suggest that financial performance is a multidimensional concept that extends beyond profitability and should be evaluated by considering liquidity, capital adequacy, asset quality, and risk management simultaneously. Moreover, global financial crises and periods of economic uncertainty have highlighted financial resilience as an essential dimension of bank performance. Nevertheless, most previous studies have examined these indicators separately, while relatively few have employed comprehensive approaches that evaluate multiple criteria simultaneously to rank banks. This limitation has increased the importance of multi-criteria decision-making (MCDM) methods in banking research.

Recent studies have also shown that liquidity risk, capital adequacy, and profitability are key determinants of financial resilience. Ben Jedidia (2020) identified liquidity risk as a primary driver of financial performance, while Bilgin et al. (2021) emphasized the critical role of liquidity indicators during periods of economic uncertainty. Similarly, Moustapha and Benziane (2022), El-Chaarani (2023), and Ghenimi et al. (2024) concluded that evaluating capital adequacy, capital structure, and profitability together provides a more comprehensive assessment of bank performance.

The COVID-19 pandemic has also generated new evidence regarding the financial performance of Islamic banks during periods of crisis. Butt and Chamberlain (2025) compared Islamic and conventional banks and concluded that Islamic banks showed greater resilience in asset quality, capital adequacy, and risk management. The authors attributed this resilience to the risk-sharing financing model and the asset-backed nature of Islamic banking transactions. These findings further indicate that focusing on a single financial indicator is insufficient for evaluating bank performance and that multiple performance dimensions should be considered simultaneously.

This growing need has encouraged the widespread application of multi-criteria decision-making (MCDM) methods in banking research. MCDM techniques enable researchers to evaluate different performance dimensions—including profitability, liquidity, capital adequacy, asset quality, risk management, and operational efficiency—within a unified analytical framework, thereby providing a more comprehensive assessment of banks' relative performance. Among the most widely used MCDM techniques are the Analytic Hierarchy Process (AHP), TOPSIS, VIKOR, COPRAS, MOORA, and MULTIMOORA. Özçalıcı et al. (2022) compared the performance of deposit banks using different MCDM methods. They found that although the methods produced similar rankings, combining multiple approaches improved decision-making reliability.

Brauers and Zavadskas (2012) developed MULTIMOORA (Multi-Objective Optimization by Ratio Analysis plus the Full Multiplicative Form). The method combines the Ratio System, the Reference Point Approach, and the Full Multiplicative Form within a single framework, thereby enhancing the robustness of ranking results. In the international literature, MULTIMOORA has been widely applied in the performance evaluation and risk analysis of financial institutions (Baležentis et al., 2010; Gou et al., 2017). Unlike methods such as TOPSIS and VIKOR, which rely on a single evaluation mechanism, MULTIMOORA integrates the results of three independent ranking approaches to produce the final ranking, thereby reducing potential biases associated with any individual method (Brauers and Zavadskas, 2012).

Empirical applications in the banking sector have demonstrated that the MULTIMOORA method produces reliable results in financial performance evaluation. Şişman and Doğan (2016) and Altunöz (2017) employed the method together with fuzzy decision-making techniques and found that profitability, liquidity, and capital adequacy were the most influential performance criteria. Similarly, Ceyhan and Demirci (2017) evaluated the financial performance of financial leasing companies using different MULTIMOORA approaches and confirmed the method's applicability across different types of financial institutions.

However, studies focusing specifically on participation banks remain limited. Erdoğdu (2018) and Çilek and Karavardar (2020) applied the MULTIMOORA method to participation banks operating in Türkiye. Although these studies demonstrated the method's effectiveness in ranking banking performance, they were largely confined to single-country settings.

The growing use of multi-criteria decision-making (MCDM) methods has contributed to more comprehensive approaches to evaluating the financial performance of Islamic banks. Jamali, Faghih, Fathi, and Rostami (2023) evaluated Islamic banks operating in the MENA region using an integrated fuzzy multi-criteria decision-making framework and found that incorporating uncertainty into the evaluation process produces more reliable performance rankings. Their findings further demonstrate the suitability of MCDM methods for assessing the financial performance of Islamic banks.

Despite this growing body of literature, comparative studies examining participation banks in Türkiye and Islamic banks operating in the Gulf Cooperation Council (GCC) countries within a common evaluation framework remain scarce. Furthermore, limited attention has been given to comparing the financial resilience of Islamic banks under the common macroeconomic uncertainty created by the COVID-19 pandemic. To address this gap, the present study aims to contribute to the literature by comparatively evaluating the financial performance of participation banks in Türkiye and Islamic banks in the GCC countries using the MULTIMOORA method.

3. Methodology

3.1. Research Design

This study was designed as a quantitative study to comparatively evaluate the financial performance of participation banks operating in Türkiye and Islamic banks operating in the Gulf Cooperation Council (GCC) countries. The study adopted a cross-sectional comparative research design based on financial data from a single accounting period. Within this framework, the banks' financial performance was evaluated using the MULTIMOORA method, a Multi-Criteria Decision-Making (MCDM) technique. This method enables a comprehensive assessment of banks' relative financial performance by incorporating multiple financial performance indicators into a single evaluation framework.

The analysis focuses on the year 2020. This period was selected because the COVID-19 pandemic created significant uncertainty across the global financial system, providing a common macroeconomic environment for comparing the financial performance of Islamic banks operating in different countries. Using a single accounting period minimizes the influence of year-to-year changes in economic conditions and allows evaluation of banks' relative performance under comparable circumstances. Furthermore, because MCDM techniques assess the relative

performance of alternatives within a specific decision environment, single-period data are fully consistent with the MULTIMOORA methodological framework.

The analysis includes participating banks operating in Türkiye and Islamic banks operating in the GCC countries within a common evaluation framework. Although these banks operate under different regulatory and institutional environments, they all follow Islamic finance principles. Therefore, the study evaluated their financial performance using the same analytical approach, allowing consistent comparison and ranking of relative performance.

3.2. Sample and Data Set

The study established the sample through a multi-stage, systematic screening procedure. First, the study identified all interest-free financial institutions officially registered with the central banks and regulatory supervisory authorities of the six GCC member countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates). To ensure institutional comparability and financial statement consistency, we excluded conventional banks operating under the "Islamic window" model, as their financial data, risk exposures, and balance sheet items are not reported on a fully segregated and autonomous accounting basis. Consequently, the initial screening universe was limited to fully fledged, standalone Islamic commercial banks.

From an initial universe of 35 fully-fledged Islamic banks identified across the GCC region, the following exclusion criteria were applied:

1. Banks undergoing restructuring, merger/acquisition, or liquidation procedures during the fiscal year 2020 (3 banks),

2. Institutions whose audited annual reports and comprehensive financial statement footnotes for 2020 were publicly inaccessible or incomplete (4 banks),

3. Institutions reporting negative equity balances or extreme outlier values that distorted ratio denominators (5 banks),

4. Specialized institutions operating exclusively in wholesale, investment, or offshore banking whose asset and liability structures are not directly comparable to commercial retail participation banking (6 banks).

After these exclusions, the final sample included 17 fully fledged Islamic banks from the GCC with complete, audited, and continuous financial data. On the Turkish side, we included all six participation banks (both state-owned and privately held) operating in Türkiye during 2020. Thus, the study formed a balanced and comparable sample of 23 banks, representing the core of the participation and Islamic banking sectors in their respective jurisdictions. Table 3.1 presents the banks included in the analysis.

Table 1. Islamic Banks and Participation Banks Used in the Research

Gulf Arab Countries Cooperation Council (GCC)	Türkiye
A1 - Saudi Arabia /Bank Albilad	T1 - Albaraka Turk Participation Bank
A2 - Saudi Arabia /Al Rajhi Bank	T2 - Kuwait Turk Participation Bank
A3 - Saudi Arabia /Bank Al Jazira	T3 - Turkiye Emlak Participation Bank

Gulf Arab Countries Cooperation Council (GCC)	Türkiye
A4 - Saudi Arabia /Alinma Bank	T4 - Turkiye Fınans Participation Bank
A5 - Oman/ Nizwa Bank	T5 - Vakıf Participation Bank
A6 - UAE / Dubai Islamic Bank	T6 - Zıraat Participation Bank
A7 - UAE / Emirates Islamic Bank	
A8 - Kuwait / Ahli United Bank	
A9 - Kuwait / Kuwait International Bank	
A10 - Kuwait /Boubyan Bank	
A11 - Kuwait /Warba Bank	
A12 - Kuwait /Kuwait Finance House	
A13 - Qatar /Qatar International Islamic Bank	
A14 - Qatar /Masraf Al Rayan	
A15 - Qatar /Qatar Islamic Bank	
A16 - Bahrain /Khaleeji Commercial Bank	
A17 - Bahrain /Al Salam Bank	

The analysis is based on the audited annual financial statements of the sample banks for the year 2020. Financial data were obtained from the annual reports and financial statements published on the official websites of the respective banks. The financial ratios used in the analysis were calculated from these financial statements, and a common decision matrix was constructed for all banks. This approach ensured that the financial performance of the banks was evaluated within a comparable framework using the same set of performance indicators.

The year 2020 was selected as the analysis period because the COVID-19 pandemic created substantial uncertainty across the global financial system, providing a common macroeconomic environment for comparing the financial performance of Islamic banks operating in different countries. Using a single accounting period minimizes the potential influence of cross-period economic differences and allows assessment of the banks' relative performance under comparable conditions. Furthermore, because Multi-Criteria Decision-Making (MCDM) methods evaluate the relative performance of decision alternatives within a specific period, single-period data align with the analysis' methodological framework.

3.3. Financial Performance Indicators

Islamic banks' financial performance is multidimensional and cannot be adequately evaluated using a single financial indicator. Therefore, this study employs a set of financial ratios representing five key dimensions of financial performance: capital adequacy, financial leverage, asset quality, liquidity, and profitability. These performance dimensions collectively reflect banks' financial soundness, risk management capacity, efficiency in utilizing assets, ability to meet short-term obligations, and overall profitability. Consequently, the literature has widely used them to evaluate the financial performance of both conventional and Islamic banks (Samad & Hassan, 2004; Olson & Zoubi, 2008; Hasan & Dridi, 2010; Beck et al., 2013).

Table 3.2 presents the financial ratios used in this study and their calculation methods. All ratios were calculated using the same methodology for each bank and were incorporated into the MULTIMOORA analysis as the decision criteria.

Table 2. Financial Ratios Used in the Research

Financial Indicators	Code	Name of Ratio	Formulation of Ratio
Capital Adequacy	K1	Capital Adequacy	Equity/ (Credit+Market+Operational Risk Basel)
	K2	Equity To Assets	Total Equity/Total Assets
leverage ratio	K3	Debt-to-Equity Ratio	Total Liabilities/Total Equity
	K4	Debt-to-Assets	Total Liabilities/Total Assets
Assets Quality	K5	Financial Assets To Assets	Financial Assets/Total Assets
Liquidity	K6	Liquid Assets To Assets	Liquid Assets/Total Assets
	K7	Current Ratio	Current Assets/Current Liabilities
Profitability	K8	Return on Assets	Net Profit (Loss)/Total Assets
	K9	Return on Equity	Net Profit (Loss)/Total Equity

The financial performance indicators used in this study were selected because they provide a comprehensive assessment of banks' financial performance and are widely accepted in the Islamic banking literature. Accordingly, the selected ratios are among the most frequently used indicators for evaluating the financial performance of Islamic banks and enable a comprehensive assessment of capital adequacy, financial structure, asset quality, liquidity, and profitability (Akhtar et al., 2011; Mollah et al., 2017; Ghenimi et al., 2024). Moreover, using these ratios consistently across periods and countries improves comparability with previous studies and supports the reliability of the results. Therefore, this study's decision criteria were based on both the theoretical foundations of bank performance evaluation and evidence from recent empirical literature.

A critical methodological consideration in cross-country comparative banking research is the underlying financial reporting framework. Participating banks in Türkiye prepare their financial statements in full compliance with the Banking Regulation and Supervision Agency (BRSA/BDDK) regulations and Turkish Financial Reporting Standards (TFRS/TMS), which correspond directly to International Financial Reporting Standards (IFRS). In contrast, Islamic banks in the GCC region report either under IFRS or under the accounting and governance standards issued by the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI), depending on their respective national central bank mandates.

To mitigate potential classification discrepancies and ensure strict cross-country comparability across the decision matrix, the audited balance sheet items and disclosure notes were cross-examined and standardized as follows:

Capital Adequacy Ratio (Regulatory Capital to Risk-Weighted Assets – K1): Rather than relying on accounting equity, the K1 numerator represents regulatory total capital (Tier 1 plus Tier 2 capital) as defined by national supervisory authorities under the Basel framework. The denominator comprises total Risk-Weighted Assets (RWA), aggregating credit, market, and operational risk exposures. These figures were extracted directly from the mandatory, audited Basel capital adequacy disclosures in the banks' annual financial reports. Because the BRSA in Türkiye and national central banks across the GCC jurisdictions had enforced the Basel III capital standards as of 2020, regulatory capital comparability across the sample is robust.

Financial Assets (Asset Quality - K5): In the Turkish context (under TFRS 9), financial assets represent financial assets measured at fair value through profit or loss (FVTPL), fair value through other comprehensive income (FVOCI), and debt securities measured at amortized cost. For GCC banks, this category comprises investments in sukuk portfolios, Islamic mutual funds, and other Shariah-compliant negotiable market instruments, as reported under equivalent AAOIFI or IFRS classifications. This ratio deliberately excludes direct customer financing portfolios (such as Murabaha, Mudaraba, and Ijara receivables). It reflects the proportion of marketable financial instruments and securities within total assets and serves as an indicator of portfolio composition and market exposure.

Liquid Assets (Liquidity - K6): To prevent variations in national reporting terminology from skewing the results, a conservative and unified definition of liquid assets was adopted. Specifically, the numerator is restricted to:

- Cash in hand,
- Free (unrestricted) balances and demand deposits held with respective central banks,
- Unencumbered, short-term placements and balances with other financial institutions with original maturities of 90 days or less (cash and cash equivalents).
- Statutory mandatory reserve requirements with central banks that are legally restricted or blocked, as well as medium- to long-term placements, were excluded from liquid assets.

Debt and Leverage Ratios (K3 and K4): In Islamic financial reporting, funds mobilized under profit-sharing contracts (such as unrestricted investment accounts/participation accounts) represent partnership funds. However, because they are formally recognized as obligations toward depositors within total liabilities (or liabilities and equity of investment account holders) in standard accounting presentations, they were treated as part of total debt/liabilities to preserve structural consistency and leverage comparability across both banking systems.

Current Ratio (Bank Liquidity & Maturity Matching Approach – K7): Because commercial bank balance sheets do not present a standard working-capital structure based on conventional 'current' versus 'non-current' distinctions, the Current Ratio was constructed using the contractual liquidity risk and remaining maturity profiles disclosed in the audited financial statement footnotes:

- Current Assets: Defined as short-term assets maturing within one year, encompassing cash in hand, unrestricted central bank deposits, interbank placements maturing under 12 months, and short-term financing receivables/marketable securities due within one year.
- Current Liabilities: Defined as short-term obligations maturing within one year, including current/checking accounts, participation/investment deposit accounts with remaining maturities up to one year, and short-term money market borrowings. This standardized definition aligns with regulatory liquidity risk profiling and ensures consistent, cross-border comparability across both banking systems.

3.4. Method

Evaluating financial performance is a multi-criteria decision-making problem that requires considering numerous financial indicators with different characteristics. For this reason, Multi-Criteria Decision-Making (MCDM) methods have been widely applied in recent years to financial performance analysis in banking and finance. Among these methods, the MULTIMOORA approach has gained considerable attention because it does not require predetermined criterion weights, integrates three complementary evaluation techniques—the Ratio System, the Reference Point Approach, and the Full Multiplicative Form—and provides more robust ranking results (Brauers & Zavadskas, 2011; Brauers & Zavadskas, 2012).

The MULTIMOORA method begins by constructing a decision matrix of the alternatives and evaluation criteria. Because the criteria are measured in different units, the data are normalized to ensure comparability across criteria. After normalization, the first evaluation uses the Ratio System approach, in which the performance value of each alternative is calculated by considering both benefit and cost criteria simultaneously. Next, the Reference Point Approach determines each alternative's distance from the ideal solution. Finally, the Full Multiplicative Form evaluates the multiplicative relationship between the benefit and cost criteria. The three ranking results obtained from these approaches are then integrated using the Dominance Theory to produce the final performance ranking of the alternatives.

In the final synthesis stage of MULTIMOORA, Dominance Theory is deployed following Brauers and Zavadskas (2012). Under this framework, alternative A dominates alternative B if it achieves a superior ranking in at least two of the three sub-methods: the Ratio System, the Reference Point Approach, and the Full Multiplicative Form. To ensure a strictly deterministic and reproducible final ranking in cases of parity (i.e., non-dominance or circular pairwise dominance), we implemented an auxiliary tie-breaking rule in line with established MULTIMOORA conventions: we calculated the sum of ordinal ranks across the three sub-techniques for tied institutions. We assigned the bank with the lower aggregate rank sum the higher overall ranking.

4. Findings

This section evaluates the financial performance of participation banks operating in Türkiye and Islamic banks operating in the GCC countries using the MULTIMOORA method. The analysis begins by constructing the decision matrix, followed by data normalization and applying the Ratio System, the Reference Point Approach, and the Full Multiplicative Form. In the final stage, we integrate the results from these three approaches using Dominance Theory to determine the overall performance rankings. The findings of each stage of the analysis are presented below.

Step 1. Construction of the Decision Matrix

In the first stage of the MULTIMOORA analysis, we treated the banks in the sample as the decision alternatives. The selected financial performance indicators served as the evaluation criteria. Based on these alternatives and criteria, we constructed the decision matrix. Table 3.3 presents the resulting decision matrix.

Table 3. Decision Matrix Used in the MULTIMOORA Analysis

BANKS	K1	K2	K3	K4	K5	K6	K7	K8	K9
T1	0.1497	0.1537	6.5081	0.1632	0.9666	0.4799	0.6444	0.0037	0.0239
T2	0.2126	0.1081	9.2495	0.1075	0.9134	0.4000	0.4986	0.0092	0.0850

BANKS	K1	K2	K3	K4	K5	K6	K7	K8	K9
T3	0.2830	0.1717	5.8250	0.4038	0.9742	0.3117	0.5442	0.0040	0.0230
T4	0.1664	0.1526	6.5544	0.1868	0.9659	0.4867	0.6901	0.0083	0.0544
T5	0.1847	0.1820	5.4953	0.1337	0.9812	0.3779	0.5077	0.0125	0.0689
T6	0.1480	0.1319	7.5826	0.1613	0.9872	0.3414	0.4430	0.0106	0.0804
A1	0,1795	0,1121	7,9227	0,8879	0,9704	0,0828	0,0932	0,0141	0,1257
A2	0,1908	0,1240	7,0667	0,8760	0,9641	0,1621	0,1851	0,0226	0,1823
A3	0,2362	0,1234	7,1032	0,8766	0,9806	0,0616	0,0703	0,0004	0,0030
A4	0,1900	0,1554	5,4352	0,8446	0,9780	0,0807	0,0955	0,0125	0,0807
A5	0,1368	0,1324	4,2613	0,5641	0,9826	0,0671	0,1189	0,0092	0,0693
A6	0,1200	0,1490	5,7135	0,8510	0,9604	0,1231	0,1447	0,0095	0,0641
A7	0,1805	0,1212	7,2499	0,8788	0,9675	0,1946	0,2214	0,0077	0,0635
A8	0,1610	0,1257	6,9564	0,8743	0,9591	0,1900	0,2173	0,0121	0,0966
A9	0,2201	0,1258	6,9519	0,8742	0,9816	0,1897	0,2169	0,0000	0,0003
A10	0,1350	0,0974	9,2710	0,9026	0,9788	0,1249	0,1383	0,0052	0,0535
A11	0,1694	0,0806	11,4075	0,9194	0,9877	0,1349	0,1468	0,0016	0,0201
A12	0,1753	0,0977	9,2324	0,9023	0,9539	0,2723	0,3018	0,0086	0,0877
A13	0,1655	0,1358	2,9582	0,4016	0,9903	0,2167	0,5395	0,0153	0,1127
A14	0,2031	0,1205	3,1591	0,3806	0,9948	0,1105	0,2902	0,0180	0,1496
A15	0,1940	0,1331	2,1728	0,2892	0,9841	0,0876	0,3029	0,0173	0,1303
A16	0,2031	0,1497	2,8823	0,4315	0,9654	0,0992	0,2299	0,0078	0,0520
A17	0,2646	0,1243	2,6845	0,3338	0,9364	0,3181	0,9530	0,0040	0,0324

Step 2. Normalization of the Decision Matrix

To ensure comparability of the financial ratios measured in different units, the decision matrix was normalized. Table 3.4 presents the normalized decision matrix.

Table 4. Normalized Decision Matrix

BANKS	K1	K2	K3	K4	K5	K6	K7	K8	K9
T1	0.02241	0.02361	42.35514	0.02663	0.93436	0.23026	0.41530	0.00001	0.00057
T2	0.04520	0.01169	85.55367	0.01155	0.83434	0.15999	0.24859	0.00008	0.00723
T3	0.08009	0.02947	33.93114	0.16309	0.94907	0.09713	0.29614	0.00002	0.00053
T4	0.02769	0.02328	42.95961	0.03491	0.93301	0.23692	0.47628	0.00007	0.00296
T5	0.03411	0.03311	30.19816	0.01789	0.96268	0.14282	0.25779	0.00016	0.00475
T6	0.02190	0.01739	57.49636	0.02601	0.97450	0.11659	0.19628	0.00011	0.00647
A1	0,03222	0,01256	62,76862	0,78841	0,94174	0,00685	0,00869	0,00020	0,01579
A2	0,03640	0,01537	49,93827	0,76743	0,92957	0,02629	0,03426	0,00051	0,03324
A3	0,05579	0,01523	50,45553	0,76841	0,96163	0,00380	0,00494	0,00000	0,00001
A4	0,03610	0,02415	29,54086	0,71336	0,95655	0,00651	0,00912	0,00016	0,00651
A5	0,01871	0,01753	18,15876	0,31824	0,96554	0,00450	0,01415	0,00008	0,00480
A6	0,01440	0,02219	32,64426	0,72428	0,92234	0,01516	0,02093	0,00009	0,00410
A7	0,03257	0,01469	52,56047	0,77226	0,93605	0,03786	0,04903	0,00006	0,00403
A8	0,02592	0,01580	48,39119	0,76443	0,91982	0,03611	0,04723	0,00015	0,00933
A9	0,04844	0,01581	48,32850	0,76430	0,96358	0,03597	0,04707	0,00000	0,00000
A10	0,01823	0,00948	85,95159	0,81476	0,95796	0,01559	0,01913	0,00003	0,00287
A11	0,02870	0,00650	130,13005	0,84530	0,97556	0,01820	0,02154	0,00000	0,00040

BANKS	K1	K2	K3	K4	K5	K6	K7	K8	K9
A12	0,03073	0,00955	85,23694	0,81409	0,90995	0,07415	0,09109	0,00007	0,00769
A13	0,02739	0,01843	8,75090	0,16127	0,98072	0,04694	0,29108	0,00023	0,01269
A14	0,04125	0,01452	9,97970	0,14486	0,98957	0,01220	0,08423	0,00032	0,02238
A15	0,03764	0,01771	4,72098	0,08363	0,96849	0,00767	0,09172	0,00030	0,01698
A16	0,04125	0,02241	8,30764	0,18618	0,93208	0,00984	0,05285	0,00006	0,00270
A17	0,07001	0,01546	7,20679	0,11141	0,87689	0,10119	0,90823	0,00002	0,00105

Step 3. Application of the Ratio System Approach

Using the normalized decision matrix, the Ratio System performance value (y_i) for each bank was calculated by subtracting the sum of the cost criteria from the sum of the benefit criteria. Based on the calculated $y_i$values, the banks were ranked according to their performance. Table 3.5 presents the resulting performance values and ranking results.

Table 5. Performance Values and Ranking Results of the Ratio System Approach

	K1	K2	K3	K4	K5	K6	K7	K8	K9	yi	Türkiye Rank	GCC Rank	Rank
	max	max	min	max	min	max	max	max	max				
T1	0.311	0.413	0.381	0.308	0.409	0.484	0.469	0.173	0.159	1.528	6		9
T2	0.442	0.290	0.541	0.203	0.386	0.403	0.363	0.432	0.567	1.773	5		5
T3	0.588	0.461	0.341	0.763	0.412	0.314	0.396	0.186	0.153	2.109	2		2
T4	0.346	0.410	0.383	0.353	0.409	0.491	0.502	0.390	0.363	2.063	3		3
T5	0.384	0.489	0.321	0.253	0.415	0.381	0.369	0.590	0.459	2.189	1		1
T6	0.308	0.354	0.443	0.305	0.418	0.344	0.322	0.499	0.536	1.807	4		4
A1	0,2326	0,2167	0,2926	0,2874	0,2419	0,1222	0,0696	0,2945	0,3305	1,0189		10	16
A2	0,2472	0,2397	0,2610	0,2836	0,2404	0,2394	0,1381	0,4725	0,4795	1,5986		2	7
A3	0,3060	0,2387	0,2624	0,2838	0,2445	0,0910	0,0525	0,0077	0,0078	0,4805		16	22
A4	0,2462	0,3005	0,2007	0,2734	0,2438	0,1191	0,0713	0,2621	0,2122	1,0402		8	14
A5	0,1772	0,2560	0,1574	0,1826	0,2450	0,0991	0,0888	0,1918	0,1823	0,7754		13	19
A6	0,1555	0,2881	0,2110	0,2755	0,2394	0,1818	0,1080	0,1995	0,1685	0,9263		12	18
A7	0,2338	0,2344	0,2678	0,2845	0,2412	0,2873	0,1653	0,1610	0,1671	1,0243		9	15
A8	0,2086	0,2431	0,2569	0,2830	0,2391	0,2805	0,1622	0,2538	0,2540	1,1892		6	12
A9	0,2852	0,2432	0,2568	0,2830	0,2447	0,2800	0,1619	0,0009	0,0009	0,7536		14	20
A10	0,1749	0,1883	0,3424	0,2922	0,2440	0,1843	0,1032	0,1090	0,1408	0,6062		15	21
A11	0,2195	0,1559	0,4213	0,2976	0,2462	0,1992	0,1095	0,0339	0,0529	0,4009		17	23
A12	0,2271	0,1890	0,3410	0,2921	0,2378	0,4020	0,2253	0,1791	0,2306	1,1663		7	13
A13	0,2144	0,2625	0,1093	0,1300	0,2469	0,3199	0,4027	0,3197	0,2963	1,5893		3	8
A14	0,2631	0,2330	0,1167	0,1232	0,2480	0,1631	0,2166	0,3768	0,3934	1,4046		4	10
A15	0,2513	0,2574	0,0802	0,0936	0,2454	0,1293	0,2260	0,3626	0,3427	1,3374		5	11
A16	0,2631	0,2895	0,1065	0,1397	0,2407	0,1464	0,1716	0,1627	0,1367	0,9626		11	17
A17	0,3428	0,2405	0,0992	0,1081	0,2335	0,4696	0,7113	0,0843	0,0853	1,7092		1	6

The study presents not only the overall performance rankings of the banks but also their relative rankings within the Türkiye and GCC groups. While the overall ranking reflects the comparative performance of all banks included in the sample, the group-specific rankings reveal performance differences within each group. This approach allows evaluation of both the competitive positions of participation banks in Türkiye and the relative performance of Islamic banks operating in the GCC countries, while also examining both groups' positions in the overall ranking.

According to the Ratio System results, T5 achieved the highest performance among the participation banks in Türkiye, whereas A17 ranked first within the GCC group. However, A17 ranked sixth overall. This indicates that although A17 was the best-performing bank among the GCC institutions, several Turkish participation banks achieved higher Ratio System performance values. Similarly, although T1 ranked last within the Türkiye group, it ranked ninth overall, suggesting that the relative performance of Turkish participation banks within their own group differs from their position in the full sample.

Step 4. Reference Point Approach

Using the normalized decision matrix, we identified reference points for each evaluation criterion and calculated each bank's maximum deviation from the corresponding reference point. Based on these deviations, we ranked the banks by financial performance. Table 3.6 presents the resulting financial performance values and ranking results.

Table 6. Financial Performance Values and Ranking Results Based on the Reference Point Approach

	K1	K2	K3	K4	K5	K6	K7	K8	K9	yi	Türkiye Rank	GCC Rank	Rank
	max	max	min	max	min	max	max	max	max				
	0.5883	0.4889	0.3213	0.7631	0.3864	0.4908	0.5019	0.5897	0.5667				
T1	0.2771	0.0761	0.0592	0.4548	0.0225	0.0070	0.0332	0.4169	0.4073	1.5907	6		17
T2	0.1463	0.1984	0.2195	0.5600	0.0000	0.0875	0.1393	0.1575	0.0000	1.0696	3		6
T3	0.0000	0.0277	0.0193	0.0000	0.0257	0.1765	0.1061	0.4039	0.4133	1.0826	4		7
T4	0.2424	0.0790	0.0619	0.4100	0.0222	0.0000	0.0000	0.1994	0.2040	1.0507	2		4
T5	0.2043	0.0000	0.0000	0.5104	0.0287	0.1097	0.1327	0.0000	0.1073	1.0358	1		3
T6	0.2806	0.1346	0.1220	0.4584	0.0312	0.1465	0.1797	0.0910	0.0306	1.1682	5		9
A1	0,1103	0,0838	0,2124	0,0102	0,0085	0,3474	0,6417	0,1780	0,1489	1,2995		7	12
A2	0,0956	0,0608	0,1808	0,0140	0,0069	0,2302	0,5731	0,0000	0,0000	0,7861		1	1
A3	0,0368	0,0619	0,1821	0,0139	0,0110	0,3786	0,6588	0,4648	0,4716	1,8933		17	23
A4	0,0967	0,0000	0,1205	0,0242	0,0104	0,3505	0,6400	0,2104	0,2673	1,4582		10	15
A5	0,1656	0,0445	0,0771	0,1150	0,0115	0,3705	0,6225	0,2807	0,2972	1,8073		16	22
A6	0,1873	0,0125	0,1308	0,0221	0,0060	0,2878	0,6033	0,2730	0,3110	1,5603		11	16
A7	0,1090	0,0661	0,1875	0,0131	0,0077	0,1823	0,5460	0,3115	0,3124	1,3453		8	13
A8	0,1342	0,0575	0,1767	0,0146	0,0056	0,1891	0,5491	0,2187	0,2254	1,2062		5	10
A9	0,0577	0,0573	0,1765	0,0146	0,0113	0,1896	0,5493	0,4716	0,4785	1,6309		13	19
A10	0,1679	0,1122	0,2622	0,0054	0,0106	0,2853	0,6080	0,3635	0,3387	1,6084		12	18
A11	0,1233	0,1447	0,3411	0,0000	0,0128	0,2704	0,6017	0,4386	0,4266	1,6514		14	20
A12	0,1157	0,1115	0,2607	0,0055	0,0044	0,0676	0,4860	0,2934	0,2489	1,0635		3	5
A13	0,1284	0,0380	0,0290	0,1676	0,0134	0,1497	0,3086	0,1528	0,1832	1,0858		4	8
A14	0,0797	0,0675	0,0364	0,1744	0,0145	0,3065	0,4947	0,0957	0,0860	1,2536		6	11
A15	0,0915	0,0431	0,0000	0,2040	0,0119	0,3403	0,4852	0,1099	0,1367	1,3988		9	14
A16	0,0797	0,0110	0,0262	0,1579	0,0072	0,3232	0,5397	0,3098	0,3427	1,7305		15	21
A17	0,0000	0,0601	0,0189	0,1896	0,0000	0,0000	0,0000	0,3882	0,3942	1,0131		2	2

According to the Reference Point Approach results, A2, operating in the GCC countries, achieved the highest financial performance in the overall sample, with a value of 0.7861. A17, also from the GCC group, followed A2 with a value of 1.0131, while T5 from Türkiye ranked third with 1.0358. These results indicate that the two best-performing banks according to the Reference Point Approach belong to the GCC group.

Among the participating banks in Türkiye, T5 ranks first, followed by T4, T2, T3, T6, and T1. In contrast, among the GCC banks, A2, A17, and A12 occupy the top three positions.

In the overall ranking, the top ten positions include five Turkish participation banks (T5, T4, T2, T3, and T6) and five GCC banks (A2, A17, A12, A13, and A8). This finding indicates that, under the Reference Point Approach, the two groups show relatively similar levels of financial performance. In contrast, the Ratio System approach shows a more pronounced advantage for Turkish participation banks, while GCC banks occupy the top two positions under the Reference Point Approach. This difference arises from the different evaluation logic underlying the two methods.

The table also presents important findings on competition within each group. In the Türkiye group, the difference between the highest- and lowest-performing banks spans 3rd to 17th place in the overall ranking, whereas in the GCC group it spans 1st to 23rd place. This finding indicates that GCC banks have a more heterogeneous performance structure within their group, whereas Turkish participation banks are relatively more homogeneous in performance.

When examining the lowest-performing banks, A3, A5, and A16 occupy the last three positions in the overall ranking. In the Türkiye group, T1 performed the worst and ranked 17th overall.

Step 5. Full Multiplicative Form Approach

In the matrix, the Full Multiplicative Form performance value for each bank was calculated by considering the product of the benefit criteria and the product of the cost criteria. Based on these performance values, the banks were ranked by financial performance. Table 3.7 presents the resulting performance values and rankings.

According to the Full Multiplicative Form results, A13 ranks first among both GCC banks and the overall sample. A13 is followed by A2, A14, A15, and A17, respectively. Thus, the top five positions in the overall ranking are occupied entirely by Islamic banks operating in the GCC countries. T5, the best-performing bank in Türkiye, ranks sixth overall.

Within the Türkiye group, the ranking is T5, T4, T6, T3, T2, and T1. The fact that T5, the best-performing bank in the Türkiye group, ranks sixth overall, while T4, which ranks second within the group, occupies the eighth position in the overall ranking, indicates that although Turkish participating banks are positioned in the upper part of the overall ranking, they remain behind the best-performing banks in the GCC group. T1, which ranks last within the Türkiye group, ranks 18th overall.

Notably, A13, A2, A14, A15, and A17, which occupy the top five positions among GCC banks, also rank in the top five overall. However, not all GCC banks exhibit high financial performance. A9, A3, and A11 occupy the last three positions in the overall ranking. Therefore, the concentration of GCC banks at both the upper and lower ends of the ranking indicates that financial performance differences within this group are quite pronounced.

Table 7. Financial Performance Values and Rankings Based on the Full Multiplicative Form Approach

	max	max		min		max		min		max		max		max		max		Türkiye Rank	GCC Rank	Rank
	K1	K2	K1xK2	K3	2'/K3	K4	3'/K4	K5	4'xK5	K6	5'xK6	K7	6'xK7	K8	7'xK8	K9	8'xK9			
	1	2	2'	3	3'	4	4'	5	5'	6	6'	7	7'	8	8'	9	9'			
T1	0,150	0,154	0,023	6,508	0,004	0,967	0,004	0,163	0,0005	0,480	0,000286	0,64443	0,000185	0,00368	6,8E-07	0,02392	1,62E-08	6		18
T2	0,213	0,108	0,023	9,250	0,002	0,913	0,003	0,107	0,0002	0,400	0,000117	0,49859	5,83E-05	0,00919	5,4E-07	0,08505	4,56E-08	5		13
T3	0,283	0,172	0,049	5,825	0,008	0,974	0,009	0,404	0,0034	0,312	0,001078	0,54418	0,000586	0,00395	2,3E-06	0,02302	5,34E-08	4		12
T4	0,166	0,153	0,025	6,554	0,004	0,966	0,004	0,187	0,0007	0,487	0,000365	0,69013	0,000252	0,00830	2,1E-06	0,05443	1,14E-07	2		8
T5	0,185	0,182	0,034	5,495	0,006	0,981	0,006	0,134	0,0008	0,378	0,000315	0,50773	0,00016	0,01255	2E-06	0,06894	1,38E-07	1		6
T6	0,148	0,132	0,020	7,583	0,003	0,987	0,003	0,161	0,0004	0,341	0,000144	0,44304	6,36E-05	0,01061	6,7E-07	0,08045	5,43E-08	3		11
A1	0,1795	0,1121	0,0201	7,9227	0,0025	0,8879	0,0023	0,9704	0,0023	0,0828	0,0002	0,0932	1,793E-05	0,0141	2,525E-07	0,1257	3,173E-08		11	16
A2	0,1908	0,1240	0,0237	7,0667	0,0033	0,8760	0,0029	0,9641	0,0030	0,1621	0,0005	0,1851	9,127E-05	0,0226	2,063E-06	0,1823	3,761E-07		2	2
A3	0,2362	0,1234	0,0291	7,1032	0,0041	0,8766	0,0036	0,9806	0,0037	0,0616	0,0002	0,0703	1,589E-05	0,0004	5,824E-09	0,0030	1,73E-11		16	22
A4	0,1900	0,1554	0,0295	5,4352	0,0054	0,8446	0,0046	0,9780	0,0047	0,0807	0,0004	0,0955	3,615E-05	0,0125	4,532E-07	0,0807	3,656E-08		10	15
A5	0,1368	0,1324	0,0181	4,2613	0,0042	0,5641	0,0024	0,9826	0,0024	0,0671	0,0002	0,1189	1,947E-05	0,0092	1,787E-07	0,0693	1,238E-08		13	19
A6	0,1200	0,1490	0,0179	5,7135	0,0031	0,8510	0,0027	0,9604	0,0028	0,1231	0,0003	0,1447	4,939E-05	0,0095	4,713E-07	0,0641	3,019E-08		12	17
A7	0,1805	0,1212	0,0219	7,2499	0,0030	0,8788	0,0027	0,9675	0,0027	0,1946	0,0005	0,2214	0,0001181	0,0077	9,092E-07	0,0635	5,775E-08		8	10
A8	0,1610	0,1257	0,0202	6,9564	0,0029	0,8743	0,0025	0,9591	0,0027	0,1900	0,0005	0,2173	0,0001095	0,0121	1,329E-06	0,0966	1,284E-07		6	7
A9	0,2201	0,1258	0,0277	6,9519	0,0040	0,8742	0,0035	0,9816	0,0035	0,1897	0,0007	0,2169	0,0001459	0,0000	6,406E-09	0,0003	2,236E-12		17	23
A10	0,1350	0,0974	0,0131	9,2710	0,0014	0,9026	0,0013	0,9788	0,0013	0,1249	0,0002	0,1383	2,258E-05	0,0052	1,177E-07	0,0535	6,299E-09		14	20
A11	0,1694	0,0806	0,0137	11,4075	0,0012	0,9194	0,0011	0,9877	0,0011	0,1349	0,0002	0,1468	2,206E-05	0,0016	3,576E-08	0,0201	7,193E-10		15	21
A12	0,1753	0,0977	0,0171	9,2324	0,0019	0,9023	0,0017	0,9539	0,0018	0,2723	0,0005	0,3018	0,0001443	0,0086	1,236E-06	0,0877	1,083E-07		7	9
A13	0,1655	0,1358	0,0225	2,9582	0,0076	0,4016	0,0031	0,9903	0,0031	0,2167	0,0007	0,5395	0,00036	0,0153	5,506E-06	0,1127	6,203E-07		1	1
A14	0,2031	0,1205	0,0245	3,1591	0,0077	0,3806	0,0029	0,9948	0,0030	0,1105	0,0003	0,2902	9,5E-05	0,0180	1,712E-06	0,1496	2,562E-07		3	3
A15	0,1940	0,1331	0,0258	2,1728	0,0119	0,2892	0,0034	0,9841	0,0035	0,0876	0,0003	0,3029	9,263E-05	0,0173	1,607E-06	0,1303	2,094E-07		4	4

	max	max		min		max		min		max		max		max		max				
	K1	K2	K1xK2	K3	2'/K3	K4	3'/K4	K5	4'xK5	K6	5'xK6	K7	6'xK7	K8	7'xK8	K9	8'xK9	Türkiye Rank	GCC Rank	Rank
	1	2	2'	3	3'	4	4'	5	5'	6	6'	7	7'	8	8'	9	9'			
A16	0,2031	0,1497	0,0304	2,8823	0,0105	0,4315	0,0046	0,9654	0,0047	0,0992	0,0005	0,2299	0,0001075	0,0078	8,367E-07	0,0520	4,351E-08		9	14
A17	0,2646	0,1243	0,0329	2,6845	0,0123	0,3338	0,0041	0,9364	0,0044	0,3181	0,0014	0,9530	0,0013243	0,0040	5,34E-06	0,0324	1,732E-07		5	5

The overall ranking shows that the top ten positions include three Turkish participating banks and seven GCC banks. Among the top ten, T5, T4, and T6 represent Türkiye, while A13, A2, A14, A15, A17, A8, and A12 represent the GCC group. This finding indicates that the Full Multiplicative Form approach ranks GCC banks particularly highly.

These findings are more meaningful when considered alongside the results of the previous approaches. While the Ratio System approach shows Turkish participating banks performing better overall, the Full Multiplicative Form approach reveals a clear advantage for GCC banks. This difference arises because the Full Multiplicative Form approach evaluates the criteria multiplicatively rather than additively. As a result, a very low value for any single criterion can substantially reduce the overall performance score. Consequently, banks with balanced, consistently strong criterion values gain an advantage under this approach. In contrast, banks with very low values in one or more indicators tend to fall more quickly in the ranking.

Step 6. Determination of the Final Ranking Using Dominance Theory

To determine the final MULTIMOORA ranking, we integrated the rankings from the Ratio System, Reference Point, and Full Multiplicative Form approaches using Dominance Theory.

Dominance Theory is a decision rule applied in the final stage of the MULTIMOORA method. Within this framework, we compared each bank pairwise with every other bank in the sample. In the pairwise comparisons, we considered a bank dominant if it outperformed the other bank in at least two of the three approaches: Ratio System, Reference Point, and Full Multiplicative Form. We then counted how many alternatives each bank dominated and established the final performance ranking based on dominance. When banks had the same level of dominance, we used the sum of their rankings from the three sub-methods as a tie-breaking criterion. Tables 3.8, 3.9, and 3.10 present the final MULTIMOORA rankings for the Türkiye group, the GCC group, and the overall sample, respectively.

Table 8. Final Financial Performance Ranking Obtained Using Dominance Theory

	Ratio Method	Reference Point Approach	FMF	MULTI - MOORA
T1 - Albaraka Turk Participation Bank	6	6	6	6
T2 - Kuveyt Turk Participation Bank	5	3	5	5
T3 - Turkıye Emlak Participation Bank	2	4	4	3
T4 - Türkiye Finans Participation Bank	3	2	2	2
T5 - Vakıf Participation Bank	1	1	1	1
T6 - Ziraat Participation Bank	4	5	3	4

Final ranking: T5 > T4 > T3 > T6 > T2 > T1

Since T5 ranks first in all three approaches, it is clearly the best-performing bank. T4 outperforms T3 in the Reference Point and Full Multiplicative Form (FMF) approaches, whereas T3 performs better only in the Ratio System approach. Therefore, under the majority rule, T4 ranks second and T3 third. Similarly, T6 outperforms T2 in the Ratio System and FMF results and therefore ranks fourth, while T2 ranks fifth. Since T1 ranks last in all three approaches, it ranks sixth in the final ranking.

Table 9. Final Financial Performance Ranking for the GCC Group Obtained Using Dominance Theory

	Ratio Method	Reference Point Approach	FMF	MULTI - MOORA
A1 - Saudi Arabia /Bank Albılad	10	7	11	10
A2 - Saudi Arabia /Al Rajhı Bank	2	1	2	1
A3 - Saudi Arabia /Bank Al Jazira	16	17	16	17
A4 - Saudi Arabia /Alınma Bank	8	10	10	9
A5 - Oman/ Nizwa Bank	13	16	13	13
A6 - UAE / Dubai Islamic Bank	12	11	12	12
A7 - UAE / Emirates Islamic Bank	9	8	8	8
A8 - Kuwait / Ahli United Bank	6	5	6	6
A9 - Kuwait / Kuwait International Bank	14	13	17	15
A10 - Kuwait /Boubyan Bank	15	12	14	14
A11 - Kuwait /Warba Bank	17	14	15	16
A12 - Kuwait /Kuwait Finance House	7	3	7	7
A13 - Qatar /Qatar International Islamic Bank	3	4	1	3
A14 - Qatar /Masraf Al Rayan	4	6	3	4
A15 - Qatar /Qatar Islamic Bank	5	9	4	5
A16 - Bahrain /Khaleeji Commercial Bank	11	15	9	11
A17 - Bahrain /Al Salam Bank	1	2	5	2

Final ranking: A2 > A17 > A13 > A14 > A15 > A8 > A12 > A7 > A4 > A1 > A16 > A6 > A5 > A10 > A9 > A11 > A3

In the final MULTIMOORA ranking, Al Rajhi Bank (A2) ranks first because it outperforms all other banks in at least two of the three approaches in the pairwise comparisons. Al Salam Bank (A17) ranks second because it performs strongly in the Ratio System and Reference Point approaches. Qatar International Islamic Bank (A13) ranks third, mainly because it ranked first in the Full Multiplicative Form (FMF) approach.

Table 10. Final Financial Performance Ranking for the Overall Sample Obtained Using Dominance Theory

	Ratio Method	Reference Point Approach	FMF	MULTI - MOORA
T1 - Albaraka Turk Participation Bank	9	17	18	16
T2 - Kuveyt Turk Participation Bank	5	6	13	7
T3 - Turkıye Emlak Participation Bank	2	7	12	5
T4 - Türkiye Finans Participation Bank	3	4	8	4
T5 - Vakıf Participation Bank	1	3	6	3
T6 - Ziraat Participation Bank	4	9	11	8
A1 - Saudi Arabia /Bank Albılad	16	12	16	15
A2 - Saudi Arabia /Al Rajhı Bank	7	1	2	1
A3 - Saudi Arabia /Bank Al Jazira	22	23	22	23
A4 - Saudi Arabia /Alınma Bank	14	15	15	14

	Ratio Method	Reference Point Approach	FMF	MULTI - MOORA
A5 - Oman/ Nizwa Bank	19	22	19	19
A6 - UAE / Dubai Islamic Bank	18	16	17	17
A7 - UAE / Emirates Islamic Bank	15	13	10	13
A8 - Kuwait / Ahli United Bank	12	10	7	12
A9 - Kuwait / Kuwait International Bank	20	19	23	21
A10 - Kuwait /Boubyan Bank	21	18	20	20
A11 - Kuwait /Warba Bank	23	20	21	22
A12 - Kuwait /Kuwait Finance House	13	5	9	10
A13 - Qatar /Qatar International Islamic Bank	8	8	1	6
A14 - Qatar /Masraf Al Rayan	10	11	3	9
A15 - Qatar /Qatar Islamic Bank	11	14	4	11
A16 - Bahrain /Khaleeji Commercial Bank	17	21	14	18
A17 - Bahrain /Al Salam Bank	6	2	5	2

Table 3.10 shows that, according to the final MULTIMOORA ranking obtained using Dominance Theory, Al Rajhi Bank (A2) ranks first, followed by Al Salam Bank (A17) in second place and Vakıf Participation Bank (T5) in third place. Türkiye Finans Participation Bank (T4) and Türkiye Emlak Participation Bank (T3) also rank among the top five, while Bank Al Jazira (A3) ranks last. These results indicate that the final financial performance rankings of the participation banks in Türkiye and the Islamic banks operating in the GCC countries were determined by integrating the rankings obtained from the three MULTIMOORA approaches using Dominance Theory.

5. Discussion

This study comparatively evaluated the financial performance of banks operating in Türkiye and Islamic banks operating in the Gulf Cooperation Council (GCC) countries using the MULTIMOORA method. The findings indicate that the three component approaches employed in the analysis (Ratio System, Reference Point, and Full Multiplicative Form) provide different perspectives on bank performance. However, the final ranking obtained by integrating these approaches through Dominance Theory offers a more balanced and comprehensive evaluation. This finding supports the rationale of the MULTIMOORA method developed by Brauers and Zavadskas (2010), which seeks to reduce the potential biases associated with relying on a single decision-making approach by combining different evaluation logics.

One notable finding is that although participating banks operating in Türkiye achieved relatively strong results under some component approaches, large-scale Islamic banks in the GCC countries generally ranked higher in the final MULTIMOORA ranking. In particular, Al Rajhi Bank and Al Salam Bank ranked first and second, respectively, suggesting these banks have a more balanced financial structure across dimensions of financial performance. At the same time, the high rankings of Vakıf Participation Bank, Türkiye Finans Participation Bank, and Türkiye Emlak Participation Bank demonstrate that Turkish participation banks also display competitive financial performance. Nevertheless, the presence of only one Turkish participation bank among the top five institutions in the overall ranking suggests the relative strength of GCC banks, particularly in capital structure, profitability, and financial resilience.

These findings generally align with previous studies reporting that Islamic banks' financial performance differs across countries. Hasan and Dridi (2010), Beck et al. (2013), and Mollah et al. (2017) emphasize that large-scale Islamic banks in the Gulf region show greater financial resilience due to strong capital structures, high liquidity levels, and risk-sharing business models. The findings of the present study support these conclusions. In particular, the high rankings of banks headquartered in Qatar and Saudi Arabia indicate that the Islamic banking systems in these countries possess a relatively strong financial structure.

However, the results should not be interpreted as implying that all GCC banks perform at similarly high levels. The relatively low rankings of Bank Al Jazira, Kuwait International Bank, and Warba Bank show that substantial performance differences exist even among Islamic banks operating in the same region. Therefore, a bank's country of operation cannot explain financial performance on its own. Institutional factors, including bank size, capital structure, asset quality, managerial efficiency, and strategic decisions, also play an important role in determining financial performance.

Another noteworthy finding is that the different MULTIMOORA components may evaluate the same banks differently. For example, some banks ranked highly under the Ratio System approach but received lower rankings under the Reference Point or Full Multiplicative Form approaches. This finding suggests that financial performance is a multidimensional concept and that different decision-making approaches vary in their sensitivity to financial indicators. Accordingly, performance evaluations based on a single multi-criteria decision-making method may not fully reflect banks' actual financial performance.

From this perspective, the study's principal methodological contribution is the use of Dominance Theory. By integrating three evaluation approaches, the study considered each approach's relative strengths, resulting in a more comprehensive final performance ranking. Consequently, the ranking differences that may arise from relying on any single component approach were reduced, thereby enhancing the reliability of the decision-making process. This finding demonstrates that the integrated structure of the MULTIMOORA method provides an important advantage, particularly in multi-criteria performance evaluation studies.

6. Conclusion

This study comparatively evaluated the financial performance of participation banks operating in Türkiye and Islamic banks operating in the Gulf Cooperation Council (GCC) countries for the year 2020 using the MULTIMOORA method. The analysis considered nine financial ratios representing capital adequacy, financial leverage, asset quality, liquidity, and profitability. The results obtained from the Ratio System, Reference Point, and Full Multiplicative Form approaches were integrated using Dominance Theory to establish the final performance rankings.

The findings show that the three component approaches assess bank performance from different perspectives. At the same time, the final ranking from Dominance Theory provides a more comprehensive and balanced evaluation of financial performance. According to the results, several large-scale Islamic banks operating in the GCC countries ranked among the top-performing institutions in the final ranking. At the same time, participation banks in Türkiye—particularly Vakıf Participation Bank, Türkiye Finans Participation Bank, and Türkiye Emlak Participation Bank—also demonstrated competitive financial performance. Nevertheless, considerable performance differences even among banks within the same country group suggest

that financial performance cannot be explained solely by the country or market in which a bank operates. Rather, bank-specific factors such as capital structure, asset quality, liquidity management, and profitability also play a decisive role.

One of the main contributions of this study to the literature is that it not only compares Islamic banks operating in Türkiye and the GCC countries within a common analytical framework but also evaluates financial performance from a multidimensional perspective by integrating the three components of the MULTIMOORA method through Dominance Theory. In this respect, the study provides a more comprehensive and reliable assessment than analyses based on a single multi-criteria decision-making approach. Moreover, the findings offer a useful decision-support tool for managers, investors, and regulatory authorities in assessing the relative financial performance of Islamic banks.

From a practical perspective, the findings suggest that participating banks in Türkiye could strengthen their international competitiveness by developing strategies to improve capital adequacy, asset quality, liquidity management, and profitability, while considering the financial strengths demonstrated by leading GCC banks. Furthermore, the results may help regulatory authorities formulate policies to enhance the financial resilience of the Islamic banking sector.

This study has several limitations. First, the analysis is based solely on financial data for the year 2020. Consequently, the findings reflect the economic conditions during the period when the effects of the COVID-19 pandemic were most pronounced. Second, the analysis is limited to nine financial ratios and does not incorporate corporate governance practices, digital transformation, sustainability performance, ESG indicators, or macroeconomic variables. In addition, the study includes only full-fledged Islamic banks and excludes conventional banks that offer Islamic windows.

The empirical findings show that the sub-techniques of the MULTIMOORA method (Ratio System, Reference Point Approach, and Full Multiplicative Form) capture distinct facets of financial performance, which Dominance Theory synthesizes into a coherent final ranking. The strong showing of large-scale GCC institutions, such as Al Rajhi Bank and Al Salam Bank, reflects a balanced performance across capital adequacy, profitability, and leverage indicators within the nine-criteria matrix. Concurrently, the competitive positions of Turkish institutions—notably Vakıf Katılım, Türkiye Finans, and Türkiye Emlak Katılım—show their relative strengths, particularly in liquidity ratios and capital adequacy indicators under standardized evaluation.

However, because Multi-Criteria Decision-Making (MCDM) methods evaluate relative, normalized positions across specified criteria rather than test causal econometric relationships, caution is warranted when drawing deterministic or causal conclusions. The observed variations between Turkish participation banks and GCC Islamic banks cannot be attributed definitively to single factors such as operational governance or managerial quality. Instead, these comparative rankings reflect the mathematical aggregation of the nine performance indicators, which are inevitably shaped by institutional asset size, prevailing macroeconomic contexts (such as local inflation and monetary policy divergence in 2020), and specific balance sheet structures. Consequently, these rankings reflect relative multidimensional standings rather than absolute superiority.

Future research may use panel datasets spanning multiple years to examine changes in financial performance over time, compare MULTIMOORA results with those from other multi-criteria decision-making methods, and incorporate sustainability, corporate governance, and digital banking indicators alongside traditional financial measures. Furthermore, extending the analysis to Islamic banks operating in different geographical regions would contribute to a more comprehensive understanding of how structural differences across countries influence financial performance.

Declarations

Ethics Approval	**This study is based exclusively on publicly available annual reports and audited financial statements of banks. Since the research did not involve human participants, animals, personal data, or experimental procedures, ethical approval was not required.**
Conflict of Interest	The authors declare no conflict of interest regarding this study.
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Author Contributions	Mihriban Coşkun Arslan, Sherwan Younis Othman; Methodology: Mihriban Coşkun Arslan, Sherwan Younis Othman; Data Collection: Sherwan Younis Othman; Formal Analysis: Sherwan Younis Othman; Writing – Original Draft: Sherwan Younis Othman; Writing – Review & Editing: Mihriban Coşkun Arslan. All authors have read and approved the final version of the manuscript.
Data Availability Statement	The data used in this study were obtained from the publicly available annual reports and audited financial statements of the banks included in the analysis. These data are available on the respective banks' official websites.
Use of AI and AI-Assisted Technologies	AI-assisted tools were used solely to improve language quality, readability, and academic writing during manuscript preparation. The author(s) carried out the study design, literature review, data collection, analysis, interpretation of the findings, and all scientific conclusions, and took full responsibility for the manuscript's content.

References

Akhtar, M., Ali, K., & Sadaqat, S. (2011). Liquidity risk Management: A comparative study between Conventional and Islamic Banks of Pakistan. Interdisciplinary Journal of Research in Business, 1(1), 35-44

Akkaş, E. (2017). An Overview of Islamic Economics and Finance in the GCC Countries. IKAM: Research Center for Islamic Economics, July.

Al-Fadhli, M. (1998). Financial performance of Islamic banking in Kuwait (Doctoral dissertation, Loughborough University). Loughborough University.

Altunöz, U. (2017). Bankaların finansal performanslarının bulanık MOORA ve bulanık AHP yöntemleri ile analizi: Türk bankaları deneyimi. Route Educational and Social Science Journal, 4(4), 116–132.

Baležentis, A., Baležentis, T., & Valkauskas, R. (2010). Evaluating the situation of Lithuania in the European Union: Structural indicators and the MULTIMOORA method. Technological and Economic Development of Economy, 16(4), 578–602.

Beck, T., Demirgüç-Kunt, A., & Merrouche, O. (2013). Islamic vs. conventional banking: Business model, efficiency and stability. Journal of Banking & Finance, 37(2), 433–447.

Ben Jedidia, K. (2020). Profit- and loss-sharing impact on Islamic bank liquidity in GCC countries. Journal of Islamic Accounting and Business Research, 11(10), 1791–1806.

Bilgin, M. H., Danisman, G. O., Demir, E., & Tarazi, A. (2021). Economic uncertainty and bank stability: Conventional vs. Islamic banking—Journal of Financial Stability, 56, Article 100911.

Brauers, W. K. M., & Zavadskas, E. K. (2011). MULTIMOORA optimization used to decide on a bank loan to buy property. Technological and Economic Development of Economy, 17(1), 174–188.

Brauers, W. K. M., & Zavadskas, E. K. (2012). Robustness of MULTIMOORA: A method for multi-objective optimization. Informatica, 23(1), 1–25.

Butt, U., & Chamberlain, T. (2025). Performance of Islamic banks during the COVID-19 pandemic: An empirical analysis and comparison with conventional banking. Journal of Risk and Financial Management, 18(6), 308

Ceyhan, İ., & Demirci, F. (2017). Multi-MOORA yöntemi ile finansal performans ölçümü: Leasing şirketlerinde bir uygulama. Bartın Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 8(15), 277–296.

Chokri, T., & Anis, E. A. (2018). Measuring the financial performance of Islamic banks in selected countries. Journal of Business & Financial Affairs, 7(1).

Çilek, A., & Karavardar, A. (2020). Analysis of the financial performance of participation banks in Turkey. Journal of Finance Letters (Maliye ve Finans Yazıları), 113, 99–118

Daoud, Y., & Kammoun, A. (2017). Financial performance analysis of Islamic banks in Tunisia. Asian Economic and Financial Review, 7(8), 780–789.

El-Chaarani, H. (2023). The impact of COVID-19 on the performance of Islamic banks in the MENA region. ISRA International Journal of Islamic Finance, 15(1), 109–129.

Erdoğdu, A. (2018). Katılım bankalarının performans analizlerine Multi-MOORA yöntemiyle bir bakış. İstanbul Arel Üniversitesi İktisadi ve İdari Bilimler Fakültesi Ekonomi, Yönetim ve Sosyal Araştırmalar Dergisi, 99–111.

Ghenimi, A., Chaibi, H. and Omri, M.A. (2024), "Risk and performance of Islamic and conventional banks under COVID-19 pandemic: evidence from MENA region", Arab Gulf Journal of Scientific Research, Vol. 42 No. 4, pp. 1788-1804,

Gou, X., Liao, H., Xu, Z., & Herrera, F. (2017). Double hierarchy hesitant fuzzy linguistic term set and MULTIMOORA method: A case study to evaluate the implementation status of haze controlling measures. Information Fusion, 38, 22–34.

Hasan, M., & Dridi, J. (2010). The effects of the global crisis on Islamic and conventional banks: A comparative study (IMF Working Paper No. WP/10/201). International Monetary Fund.

Hassan, M. K., & Lewis, M. K. (Eds.). (2007). Handbook of Islamic Banking. Edward Elgar.

Hazzi, O. A., & Al Kilani, M. I. (2013). The financial performance analysis of Islamic and traditional banks: Evidence from Malaysia. European Journal of Economics, Finance and Administrative Sciences, 57, 133–144.

Ibrahim, M. (2015). Measuring the financial performance of Islamic banks. Journal of Applied Finance & Banking, 5(3), 93–104.

Islamic Financial Services Board. (2025). *Islamic financial services industry stability report 2025*. https://www.ifsb.org/publication-document/islamic-financial-services-industry-stability-report-2025/

Jamali, A., Faghih, A., Fathi, M. R., & Rostami, F. (2023). A combined fuzzy multi-criteria decision-making framework for evaluation of Islamic banks: A case of the MENA region. Fuzzy Optimization and Modeling Journal, 4(2), 62–80.

Mollah, S., Hassan, M. K., Al Farooque, O., & Mobarek, A. (2017). The governance, risk-taking, and performance of Islamic banks. Journal of Financial Services Research, 51(2), 195–219

Moustapha, L., & Benziane, R. (2022). The impact of capital structure on Islamic banks' profitability: Evidence from GCC countries. Indian Journal of Finance and Banking, 9(1), 203–212.

Odongo, A. E., & Muchelule, Y. (2019). Effect of Islamic banking on financial performance of commercial banks in Nairobi City County.

Olson, D., & Zoubi, T. A. (2008). Using accounting ratios to distinguish between Islamic and conventional banks in the GCC region. The International Journal of Accounting, 43(1), 45–65

Özçalıcı, M., Kaya, A., & Gürler, H. E. (2022). Long-term performance evaluation of deposit banks with multi-criteria decision-making tools: The case of Turkey. Pamukkale University Journal of Social Sciences Institute, (50), 87–114.

Safiullah, M. (2010). Superiority of conventional banks & Islamic banks of Bangladesh: A comparative study. International Journal of Economics and Finance, 2(3), 199–207.

Samad, A., & Hassan, M. K. (2004). The performance of Malaysian Islamic Bank during 1984–1997: An exploratory study. International Islamic University Malaysia.

Şişman, B., & Doğan, M. (2016). Türk bankalarının finansal performanslarının bulanık AHP ve bulanık MOORA yöntemleri ile değerlendirilmesi. Yönetim ve Ekonomi, 23(2), 353–371.

Wilson, R. (2009). The development of Islamic finance in the GCC (Kuwait Program on Development, Governance and Globalization in the Gulf States, Working Paper No. 7). London School of Economics and Political Science.

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Integration of Data Analytics and Information Technologies in Graduate Accounting Education: A Curriculum Review in Türkiye

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Abstract

Purpose: *This study aims to evaluate the extent to which graduate accounting and auditing programs in Türkiye integrate data analytics and information technology competencies into their curricula in accordance with AACSB Standard A7.*

Methodology: *The study employs a document analysis approach. A total of 146 graduate programs offered by 78 Turkish universities with "accounting" and/or "auditing" in their program titles were examined. Curriculum data were collected from publicly available university websites and analyzed according to the data analytics and information technology competencies specified in AACSB Standard A7.*

Findings: *Only 21 graduate programs include courses related to data analytics and information technology competencies, while seven could not be evaluated due to inaccessible curriculum information. Overall, the integration of digital competencies into graduate accounting and auditing education in Türkiye remains limited, although some programs show a gradual transition toward digitally oriented curricula.*

Scope and Limitations: *The study is limited to graduate accounting and auditing programs in Türkiye. The analysis relies on publicly available curriculum information from university websites and evaluates course offerings rather than teaching practices or learning outcomes.*

Originality / Value: *This study provides a current national assessment of data analytics and information technology integration in graduate accounting and auditing curricula in Türkiye based on an AACSB-informed framework. It offers insights for universities and policymakers to better align accounting education with evolving professional and accreditation requirements.*

Keywords: *Accounting education, Data analytics, Information technology, Master's programs, AACSB A7*

JEL Codes: *M41; M42; M48*

1. Introduction

The accounting and auditing profession is fundamentally a data-driven discipline, relying on the collection, verification, analysis, and interpretation of financial and non-financial data to provide critical inputs for strategic decision-making. However, the global expansion of internet infrastructure and the evolution of enterprise information systems have substantially increased the volume, velocity, variety, and complexity of corporate data, commonly conceptualized as "Big Data" (Aslan & Özerhan, 2017, p. 865; Demir et al., 2022, p. 189). This shift has challenged traditional sampling-based auditing approaches because of their limited assurance capacity. It has also encouraged a transition toward continuous auditing models powered by Big Data Analytics (BDA), which enable full-population testing in real time (Yadav, 2020, p. 1).

While the integration of BDA into auditing frameworks offers important opportunities for risk assessment, fraud detection, anomaly identification, and inventory automation, it simultaneously requires a broader set of competencies for professionals (Cunningham & Stein, 2018; Öztürk, 2021, p. 34). Rather than requiring advanced programming proficiency, the contemporary market demands auditors who possess data literacy. This includes the ability to understand data structures, evaluate data security, optimize processes, and use data visualization techniques to communicate complex analytical insights to financial stakeholders (Earley, 2015, p. 499; Losi et al., 2022, p. 2). Consequently, equipping a "digitally competent" workforce capable of bridging technological analytical capacity with professional judgment has emerged as an important responsibility for higher education institutions (Atayah & Alshater, 2021, p. 121).

Despite this clear imperative, global accounting education literature indicates that university curricula lag behind this technological development, leaving graduates underprepared for current professional demands (Dewu & Barghathi, 2019, p. 436). Empirical evidence from emerging markets reveals that digital accounting and data analytics instruction remains heavily confined to undergraduate levels. Such instruction is often provided through unstructured elective courses or introductory computer literacy courses, including spreadsheet applications and standard bookkeeping software (e.g., Bağdat, 2022; Mert, 2023; Erbuğa & Karakelleoğlu, 2024). For instance, while accounting programs in developed nations, particularly the United States, offer broader integration of big data management and IT governance, curricula in emerging countries like Türkiye remain deficient in scope and depth, exhibiting significant gaps in process management and data protection frameworks (Eskin & Sarısoy, 2023; Kandemir & Kardeş, 2023).

This bottleneck in the accounting education literature is even more pronounced at the postgraduate level. The vast majority of existing studies focus almost exclusively on undergraduate education, leaving a distinct empirical gap regarding how master's programs, which are designed to train advanced auditors and strategic financial managers, are adapting to this digital shift. This gap is particularly relevant because global accreditation frameworks, including those of the AACSB (Association to Advance Collegiate Schools of Business), emphasize the integration of information technology, data-related capabilities, and analytical competencies into accounting education.

To address this research gap, this study examines the following primary research question: "To what extent do graduate accounting and auditing programs in Türkiye align with the information technology competencies emphasized by the AACSB regarding big data and analytics

education?" To achieve this objective, curriculum mapping and content analysis were conducted across all active Master of Science (M.Sc.) and Master of Arts (M.A.) programs, including both thesis and non-thesis tracks, in accounting and/or auditing in Türkiye. To provide deeper empirical resolution, the study investigates the following sub-questions:

(Q1) What is the prevalence of courses embedding big data, data analytics, data mining, data management, and artificial intelligence within Turkish graduate accounting and auditing programs?

(Q2) What is the distribution of digital analytics and information technology courses across thesis-track and non-thesis-track graduate programs?

(Q3) What is the distribution of digital analytics and information technology competencies across state and foundation universities?

By systematically benchmarking postgraduate curricula against an AACSB-informed technology and data analytics framework, this study provides a current descriptive assessment of graduate accounting and auditing education in Türkiye. Its contribution lies primarily in the national scope of the curriculum mapping, covering 146 graduate programs across 78 universities and distinguishing between thesis and non-thesis programs and state and foundation universities.

2. Literature Review

This section systematically categorizes and evaluates the existing literature on Big Data Analytics (BDA) in accounting education, presenting a comparative analysis divided into international and national dimensions to highlight prevailing trends and current empirical boundaries.

2.1. International Literature

In investigating the operational dynamics of contemporary practice, Booker et al. (2023) demonstrated that early-career auditors predominantly rely on traditional data analysis software (e.g., Microsoft Excel) in BDA applications, whereas their utilization of advanced, specialized analytics tools (e.g., Power BI, Alteryx) remains significantly constrained. Furthermore, the authors noted that corporate training programs successfully address the technical functionalities of these advanced tools but often neglect the cognitive skills needed to interpret BDA outputs. Regardless of the software employed, the most frequent task executed by auditors involves identifying anomalies within BDA outputs and evaluating their downstream implications for substantive audit testing. Consequently, Booker et al. (2023) argued that auditing courses should directly integrate these critical analytical skills rather than reducing core auditing content to make room for separate BDA modules. This approach shifts the educational focus from what is taught toward how analytical competencies are developed.

Recognizing that textbooks remain the primary instructional anchor in higher education, Blix et al. (2021) conducted a content analysis of seven prominent auditing textbooks to assess their coverage of BDA. Their findings emphasized that contemporary textbooks should incorporate BDA as standalone chapters, provide real-world case studies, and offer practical, hands-on exercises to systematically foster students' analytical proficiency. Addressing curricular restructuring, Guo (2023) explored what content should be integrated into or removed from traditional auditing syllabi to embed data analytics more effectively. Guo (2023) suggested that accounting faculties should cultivate intra-departmental collaboration and shift overlapping, foundational IT concepts

to "Accounting Information Systems" courses. This would allow auditing curricula to focus more directly on the analytical dimensions of business processes. Crucially, the study concluded that learning outcomes improve when institutions avoid excessive emphasis on specific software packages and instead train students to reframe overarching auditing dilemmas as data analytics problems.

Overall, the international literature highlights three related themes. First, data analytics is increasingly regarded as a core competency rather than an optional technical skill in accounting and auditing education. Second, effective integration requires more than introducing specific software tools. Students must also learn to interpret analytical outputs and connect them with accounting and auditing judgments. Third, institutions face curricular constraints when introducing new technologies. These constraints have encouraged integrative and hybrid approaches alongside standalone courses. Together, these findings provide an important conceptual basis for examining whether such competencies are structurally visible in graduate curricula in Türkiye.

From a software-specific perspective, Islam et al. (2023) observed that higher education actively utilizes tools such as Power BI, Tableau, Excel, and Alteryx to train the next generation of accountants. However, advanced programming languages heavily favored by data scientists, namely R and Python, receive negligible attention in accounting programs. To bridge this deficit, they demonstrated the computational utility of the R programming language for financial workflows. Their survey findings further indicated that proficiency in advanced programming languages such as R can contribute to analytical precision and long-term professional development in modern auditing.

A broader consensus in the literature supports curriculum modernization to accommodate these digital demands. Richardson and Shan (2019) reported that an overwhelming majority (90.7%) of accounting department chairs surveyed acknowledged the necessity of integrating data analytics into their programs. Most respondents projected implementation within a three-to-five-year window through either standalone courses or integrated modules. Similarly, McConville (2023) affirmed that BDA has evolved into an indispensable component of accounting education. The study also noted growing curricular support for robotic process automation (RPA), artificial intelligence (AI), and blockchain technologies.

When evaluating specific implementation strategies, Dzuranin et al. (2018) identified three primary pedagogical modalities for integrating new technologies into undergraduate frameworks:

1. The Standalone Approach: Introducing distinct, dedicated data analytics courses.
2. The Integrative Approach: Embedding data analysis goals directly into existing core accounting courses.
3. The Hybrid Approach: Combining a foundational standalone course with pervasive integration across existing modules.

Their findings indicated that educators predominantly favor integrative and hybrid methods, primarily because these approaches do not require additional credit hours. This preference reflects a broader curricular constraint: undergraduate accounting curricula are already highly saturated, and limited credit hours can restrict the introduction of additional technological content.

Despite the emergence of sophisticated technologies, empirical evidence underscores the persistent use of foundational tools alongside advanced software. Felski (2023) demonstrated that Microsoft Excel remains universally utilized on a daily basis (100%) by auditing professionals. However, contemporary market expectations require graduates to look beyond basic spreadsheet proficiency and demonstrate competence in advanced data analytics environments, such as Alteryx, Power BI, Tableau, and IDEA/ACL. Practitioners identify data preparation, exploratory data analysis, output comprehension, and workflow efficiency as core baseline competencies for entry-level associates. In tandem with these expectations, Weirich et al. (2018) presented an active-learning case study utilizing Tableau visualization software within auditing classes. Through this framework, students learned to construct interactive dashboards and integrate data visualization into the initial audit-planning phase. The case illustrates how applied engagement with analytical software can support the development of students' analytical skills.

Ultimately, bridging the gap between educational outputs and professional reality remains an ongoing challenge. Abdelwahed et al. (2023, p. 75) emphasized that further empirical research is needed to determine how to effectively embed BDA within both academic accounting curricula and global professional certification frameworks (e.g., CPA, CIA, CMA, CFA). The authors cautioned that institutional barriers to expanding university syllabi frequently cause accounting education to lag behind rapid innovations in corporate practice. Echoing this concern, Barr-Pulliam et al. (2022, p. 14) offered diverse structural recommendations for curriculum adaptation. They noted that many recent graduates and current students completed their education under technologically restrictive frameworks that gave limited attention to big data. Crucially, McBride and Philippou (2022, p. 88) argued that while skill deficits persist in foundational undergraduate degrees, these competencies can be strategically remediated through specialized graduate (Master's level) programs.

2.2. National Literature (Studies in Türkiye)

In the context of the Turkish higher education landscape, Ciğer et al. (2018) argued that undergraduate accounting curricula face significant modernization challenges due to a deficit of specialized faculty and a lack of localized pedagogical resources. To address this constraint, the authors proposed establishing strategic partnerships with enterprise accounting software developers to integrate contemporary tools into course content. They further recommended guiding students toward data analytics minors or interdisciplinary courses. They also emphasized the need to upskill existing faculty through intensive seminars, certification programs, summer schools, and workshops. The overriding objective, they clarified, is not to train core computer scientists but to cultivate robust data competencies within business and accounting cohorts. Ciğer et al. (2018) further argued that, beyond generic data analytics degrees, the establishment of domain-specific graduate programs, specifically titled "Accounting and Data Analytics," could contribute to developing specialized human capital for the domestic market.

Focusing on structural implementation, Öztürk (2021) evaluated the strategic integration of data analytics into accounting syllabi. The study examined the division of instructional responsibilities and appropriate pedagogical methods. By benchmarking data analytics courses within undergraduate and graduate accounting programs in the United States against the current state of Turkish higher education, Öztürk identified opportunities for curricular reform in Türkiye. The findings indicated that systematically embedding data analytics into Turkish accounting curricula, together with institutional support for faculty development, is important for developing

specialists capable of adapting to the digital transformation of the accounting profession in Türkiye.

Taken together, the Turkish literature indicates that digital transformation has been recognized as an important issue in accounting education. However, existing studies have primarily focused on undergraduate curricula, selected institutions, or curriculum development recommendations rather than providing a national mapping of graduate accounting and auditing programs. For example, Ciğer et al. (2018) emphasized the need for digital competencies and specialized educational initiatives, while Öztürk (2021) examined curriculum integration and instructional responsibilities by drawing comparisons between Turkish and U.S. accounting education. More recent Turkish studies have also examined digital competencies and technology-oriented courses in accounting education. Nevertheless, these studies do not provide a national census of graduate accounting and auditing programs across Türkiye. The present study therefore extends this literature by examining 146 graduate programs across 78 universities. It also distinguishes between thesis and non-thesis tracks and between state and foundation institutions. The contribution is consequently primarily empirical and descriptive rather than theoretical or methodological.

3. Methodology

3.1. Research Design

This study employs a descriptive quantitative content analysis design based on documentary data. The analysis examines the structural integration of data analytics and information technology courses within graduate accounting and auditing programs in Türkiye. The primary objective is to systematically map the observable presence of technology-related curricular content and compare its distribution across program tracks and institutional typologies using frequencies and percentages. The analysis benchmarks the identified curricular themes against an AACSB-informed technology and data analytics framework.

Because the study examines the identifiable population of graduate accounting and auditing programs rather than a sample drawn from a larger population, the comparisons are presented descriptively rather than as inferential tests of population differences. Accordingly, frequencies and percentages are used to describe the distribution of technology-related curricular themes across thesis and non-thesis programs and across state and foundation institutions. These comparisons are intended to characterize the observed curricular landscape rather than to establish statistically significant differences between institutional groups.

3.2. Research Population and Unit of Analysis

The research population encompasses all active Master of Science (M.Sc.) and Master of Arts (M.A.) programs—including both thesis and non-thesis tracks—offered by higher education institutions in Türkiye that explicitly contain the terms "accounting" (muhasebe), "auditing" (denetim), or a combination of both in their official program titles. Rather than relying on a sampling method, this study adopts a full census approach (total population sampling). Consequently, every identifiable program meeting the inclusion criteria was included in the analysis. This approach reduces the risk of sampling bias and provides broad coverage of the national landscape.

3.3. Data Collection Process and Analytical Framework

The data collection was systematically conducted by screening the official course catalogs, institutional websites, and graduate school databases of all active universities in Türkiye. A total of 146 graduate programs across 78 universities were identified and included in the analytical matrix. Course syllabi, structural curricula, and institutional graduation requirements were downloaded and archived as the primary textual data. The curriculum data were collected between January and May 2026, covering the Spring semester of the 2025–2026 academic year. The analysis was based on the curricula and course information publicly available on official institutional websites and graduate school databases during this data-collection period. Accordingly, the findings represent the curricular structure of accounting and auditing graduate programs as publicly available between January and May 2026 and should be interpreted within this specific temporal context.

To operationalize the variables, a predefined title-based coding protocol was used. Courses were extracted and evaluated based on explicit digital keywords and clearly identifiable technology-oriented terminology in their titles. The analytical framework was informed by the AACSB's technology and data analytics competencies in accounting education. The core analytical keywords established for manifest content analysis included:

- Data Analytics (Veri Analitiği)
- Big Data (Büyük Veri)
- Data Mining (Veri Madenciliği)
- Business Analytics / Business Intelligence (İş Analitiği / İş Zekası)
- Artificial Intelligence (Yapay Zekâ)
- Information Systems / Information Technology Governance (Bilgi Sistemleri / BT Yönetişimi)

In addition to these core keywords, the coding protocol included course titles containing clear references to technology applications, programming, software or application development, enterprise technologies, financial technologies, or information technology applications relevant to accounting, auditing, finance, or business processes. Thus, the classification was based on a predefined set of digital and technology-oriented criteria rather than exclusively on exact keyword matching.

While detailed course descriptions and weekly schedules were accessible for a subset of the population, missing data across certain institutional databases prevented a uniform analysis of all course-level content. To ensure methodological consistency and cross-institutional comparability, manifest content analysis of course titles was adopted as the primary analytical framework. Courses were classified as digitally integrated when their titles explicitly contained one or more of the predetermined digital keywords or clearly indicated a relevant technology-oriented competency based on the coding protocol. This approach captures the manifest curricular presence of digital or technological content rather than the depth or quality of its instructional coverage.

For thematic classification, courses were assigned to the technological theme that best corresponded to the competency explicitly indicated by their titles. The Enterprise Systems / Fintech (ERP / Fintech) category included courses referring to enterprise technologies, financial technologies, information technology applications, programming, software or application

development, and technology applications relevant to accounting, auditing, finance, or business processes. Accordingly, “Finance and Computer Programming” was classified under Enterprise Systems / Fintech because its title explicitly indicates a programming competency within a finance-related context.

Ambiguous course titles were assessed according to the predefined coding criteria rather than on the basis of assumptions about their underlying course content. The inclusion and exclusion rules used for the thematic classification are summarized in Appendix 1 to provide transparency and facilitate replication of the coding process.

The data were cross-tabulated for thesis vs. non-thesis and state vs. foundation universities, and the resulting distributions were summarized using frequencies and percentages for descriptive comparison. Each digitally integrated program could be assigned to more than one technological theme when its curriculum included courses corresponding to multiple analytical or technological domains. Accordingly, the thematic frequencies are not mutually exclusive and may collectively exceed the number of digitally integrated programs.

4. Findings and Results

The structural curriculum mapping executed across 146 graduate programs across 78 universities in Türkiye provides empirical resolution regarding the integration level of digital competencies mandated by AACSB Standard A7. Of the evaluated higher education institutions, 60 operate as state universities, while 18 are categorized as foundation universities (see Figure 1).

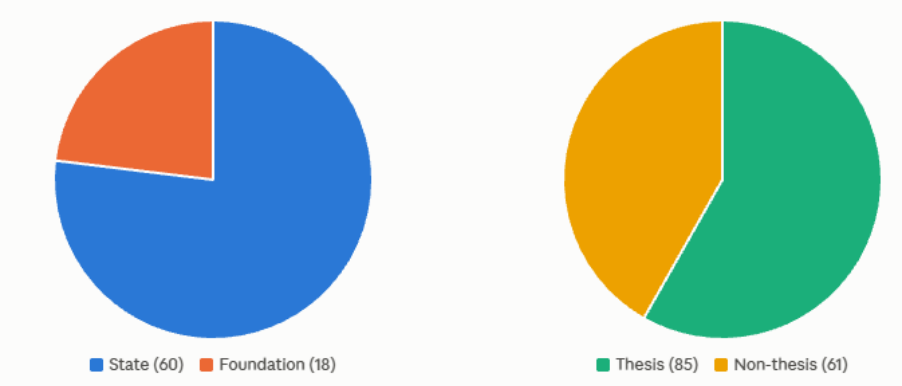


Figure 1.
Distribution of sampled universities by institutional type (state vs. foundation) and programs by degree track (thesis vs. non-thesis)

The macro-level analysis identified 19 distinct nomenclatures for graduate programs containing the keywords "accounting" (muhasebe) and/or "auditing" (denetim) in their official titles. These variations are cataloged as follows:

- Banking and Accounting (Bankacılık ve Muhasebe)
- Auditing, Accounting, and Finance (Denetim, Muhasebe ve Finans)
- Auditing and Risk Management (Denetim ve Risk Yönetimi)
- Financial Reporting and Auditing (Finansal Raporlama ve Denetim)
- Internal Auditing and Independent Auditing (İç Denetim ve Bağımsız Denetim)
- Internal Auditing and Internal Control (İç Denetim ve İç Kontrol)

- Internal Auditing and Risk Management (İç Denetim ve Risk Yönetimi)
- Accounting (Muhasebe)
- Accounting Auditing (Muhasebe Denetimi)
- Accounting Finance (Muhasebe Finans)
- Accounting, Finance, and Banking (Muhasebe, Finans ve Bankacılık)
- Accounting - Finance (Muhasebe - Finansman)
- Accounting and Auditing (Muhasebe ve Denetim)
- Accounting and Finance (Muhasebe ve Finans)
- Accounting and Financial Management (Muhasebe ve Finans Yönetimi)
- Accounting and Financial Management (Muhasebe ve Finansal Yönetim)
- Accounting and Finance (Muhasebe ve Finansman)
- International Financial Reporting and Auditing (Uluslararası Finansal Raporlama ve Denetim)
- International Financial Reporting and Financial Analysis (Uluslararası Finansal Raporlama ve Finansal Analiz)

When analyzing the structural distribution of these program nomenclatures, the top five most prevalent program types are presented in Table 1.

Table 1
Distribution and Frequencies of the Most Prevalent Graduate Accounting and Auditing Program Nomenclatures

Rank	Program Nomenclature	Frequency (n)
1	Accounting and Auditing (Muhasebe ve Denetim)	43
2	Accounting and Finance (Muhasebe ve Finansman)	41
3	Accounting Finance (Muhasebe Finansman)	10
4	Accounting (Muhasebe)	9
5	International Financial Reporting and Auditing (Uluslararası Finansal Raporlama ve Denetim)	6

Regarding institutional tracks, 85 of the examined programs operate as thesis-track Master of Science/Arts (M.Sc./M.A.) degrees, while 61 are structured as non-thesis professional tracks. The manifest content analysis of the curricula revealed a critical structural deficit: a total of 118 graduate programs completely lack any course content related to data analytics or information technologies (see Figure 1). This empirical baseline indicates that approximately 80.8% of the graduate accounting and auditing programs in Türkiye do not satisfy the technological and analytical competencies explicitly mandated by AACSB Standard A7 at the instructional level.

Conversely, granular curriculum data for 7 programs could not be retrieved through the universities' official online portals or graduate school information registries. These undocumented curricula are concentrated within Aksaray University, Istanbul Arel University, and Near East University, and were consequently excluded from the analytical baseline mapping.

4.1. Availability of Data Analytics and Information Technology Courses

All 146 graduate program records within the comprehensive census were rigorously evaluated to determine the structural integration of data analytics and information technology courses. The descriptive findings regarding these digital curricula are presented in Table 2.

Table 2
Status of Data Analytics and Information Technology Integration in Graduate Accounting and Auditing Programs

Integration Status of Data Analytics and IT Themes	Program Frequency (n)	Percentage (%)
Programs incorporating data analytics and IT-related courses	21	14.4
Programs lacking data analytics and IT-related courses	118	80.8
Programs with inaccessible curriculum details	7	4.8
TOTAL	146	100.0

The findings presented in Table 2 provide a descriptive overview of the extent to which technology-related courses are visible in graduate accounting and auditing curricula in Türkiye. The vast majority of the investigated curricula (n = 118) did not show any identifiable academic course focused on data analytics or information systems infrastructure under the coding criteria used in this study. This finding suggests that technology-related competencies are not yet widely represented as distinct course components within the examined curricula.

Conversely, a small segment consisting of 21 programs (14.4%) included identifiable courses related to data analytics and information technologies under the coding criteria used in this study. These programs, together with their identified technological course themes, are presented in Table 3. Overall, these findings indicate that courses reflecting the data generation, data analytics, and technology-related competencies outlined in AACSB Standard A7 are present in a relatively limited proportion of the examined graduate programs in Türkiye. Finally, 7 programs (4.8%) had inaccessible curriculum information and were therefore excluded from the program-level analysis.

Table 3
Comprehensive Mapping of Graduate Accounting and Auditing Programs Incorporating Data Analytics and IT Courses

University	Institution Type	Program Type	Track	Course Name(s)
Marmara University	State	Accounting Auditing	Thesis	ERP Auditing (ERP Denetimi)
Marmara University	State	Accounting Finance (English)	Thesis	Artificial Intelligence and Fintech in Financial Markets
Istanbul University	State	Accounting and Auditing (English)	Non-Thesis	Statistical Analysis For Decision Making; Business Analysis
Istanbul Bilgi University	Foundation	Accounting and Auditing	Non-Thesis	Big Data Management (Büyük Veri Yönetimi); Business Analytics and Research Methods (İş Analitiği ve Araştırma Yöntemleri); Low-Code Application Development (Az Kodlu Uygulama Geliştirme)
Aksaray University	State	Accounting - Finance	Thesis	Advanced Business Analytics (İleri İş Analitiği)

University	Institution Type	Program Type	Track	Course Name(s)
Bartın University	State	Accounting - Finance	Thesis	Finance and Computer Programming (Finans ve Bilgisayar Programlama)
Bilecik Şeyh Edebali University	State	Accounting and Auditing	Thesis	Technology Applications in Accounting and Auditing (Muhasebe ve Denetimde Teknoloji Uygulamaları)
Bilecik Şeyh Edebali University	State	Accounting and Auditing	Non-Thesis	Technology Applications in Accounting and Auditing (Muhasebe ve Denetimde Teknoloji Uygulamaları)
Burdur Mehmet Akif Ersoy University	State	Accounting and Finance	Thesis	IT-Supported Internal Auditing (Bilişim Destekli İç Denetim)
Necmettin Erbakan University	State	Accounting and Finance	Thesis	Data Analytics (Veri Analitiği)
Uşak University	State	Accounting and Finance	Thesis	Data Analysis (Veri Analizi); Data Analysis in Accounting Applications (Muhasebe Uygulamalarında Veri Analizi)
Başkent University	Foundation	Accounting Finance	Thesis	Machine Learning and Artificial Intelligence Applications for Social Sciences (Sosyal Bilimler İçin Makine Öğrenmesi ve Yapay Zekâ Uygulamaları); Data Mining in Social Sciences with IBM SPSS Modeler Application (Sosyal Bilimlerde Veri Madenciliği- IBM SPSS Modeler Uygulamasıyla)
Başkent University	Foundation	Accounting Finance	Non-Thesis	Machine Learning and Artificial Intelligence Applications for Social Sciences (Sosyal Bilimler İçin Makine Öğrenmesi ve Yapay Zekâ Uygulamaları); Data Mining in Social Sciences with IBM SPSS Modeler Application (Sosyal Bilimlerde Veri Madenciliği- IBM SPSS Modeler Uygulamasıyla)
Başkent University	Foundation	International Financial Reporting and Auditing	Non-Thesis	Machine Learning and Artificial Intelligence Applications for Social Sciences (Sosyal Bilimler İçin Makine Öğrenmesi ve Yapay Zekâ Uygulamaları); Data Mining in Social Sciences with IBM SPSS Modeler Application (Sosyal Bilimlerde Veri Madenciliği- IBM SPSS Modeler Uygulamasıyla)

University	Institution Type	Program Type	Track	Course Name(s)
Başkent University	Foundation	International Financial Reporting and Auditing	Thesis	Machine Learning and Artificial Intelligence Applications for Social Sciences (Sosyal Bilimler İçin Makine Öğrenmesi ve Yapay Zekâ Uygulamaları); Data Mining in Social Sciences with IBM SPSS Modeler Application (Sosyal Bilimlerde Veri Madenciliği- IBM SPSS Modeler Uygulamasıyla)
Istanbul Nişantaşı University	Foundation	Accounting and Auditing	Non-Thesis	Data Mining I (Veri Madenciliği I); Artificial Intelligence and Its Application Fields in Academia (Yapay Zekâ ve Akademide Uygulama Alanları)
Istanbul Nişantaşı University	Foundation	International Financial Reporting and Auditing	Non-Thesis	Business Intelligence (İş Zekâsı)
Istanbul Nişantaşı University	Foundation	Accounting and Auditing (Distance Education)	Non-Thesis	Data Mining I (Veri Madenciliği I)
Social Sciences University of Ankara	State	Auditing and Risk Management	Thesis	Introduction to Machine Learning (Makine Öğrenmesine Giriş); Multivariate Statistical Data Analysis (Çok Değişkenli İstatistiksel Veri Analizi)
Gaziantep University	State	Accounting and Finance	Thesis	Data Analysis and Reporting (Veri Analizi ve Raporlama)
Gaziantep University	State	Accounting and Finance	Non-Thesis	Statistical Data Analysis (İstatistiki Veri Analizi); Data Analysis and Reporting (Veri Analizi ve Raporlama)

Out of the 146 graduate accounting and auditing programs evaluated across Türkiye, only 21 incorporate advanced technological paradigms—such as data analytics, artificial intelligence, and machine learning—into their formal curricula. These 21 integrated programs are distributed across 13 unique higher education institutions, comprising 10 state universities and 3 foundation universities. This finding demonstrates that the macro-level rate of technological integration across the general population of relevant graduate programs in the Turkish higher education system remains remains limited. Specifically, the technological penetration rate across the entire data universe was calculated at 14.4%. This finding indicates that the majority of programs (85.6%) did not show identifiable technology-related courses under the coding criteria used in this study. This pattern points to a potential gap in the representation of technology-related competencies relevant to the ongoing digital transformation within the corporate ecosystem. Notably, the courses Statistical Analysis for Decision Making and Business Analysis are compulsory courses within the Accounting and Auditing (English) graduate program at Istanbul University, whereas all other courses listed in Table 3 are elective courses. In terms of workload, all technology-related courses identified across the 21 integrated programs carry a uniform course credit of 3 credits. However, their corresponding European Credit Transfer and Accumulation System (ECTS) values vary across programs, reflecting differences in the credit structures adopted by individual universities.

Conversely, the 21 programs that included identifiable technology-related courses represent a relatively more technology-oriented segment of the examined curricula. A thematic content analysis of these curricula reveals distinct technological dimensions, which are synthesized in Table 4.

Table 4
Thematic Distribution of Technological Competencies within Digitally Integrated Graduate Programs by Institutional Typology

Institutional Typology	Artificial Intelligence / Machine Learning	Data Analysis / Data Science	Enterprise Systems / Fintech (ERP / Fintech)
State programs (n = 13 of 21)	15.4 %	53.8 %	46.2 %
Foundation programs (n = 8 of 21)	62.5 %	75.0 %	25.0 %

Note: Percentages are calculated within each institutional typology (state: n = 13; foundation: n = 8). Because programs may be coded under more than one technological theme, percentages across thematic categories are not expected to sum to 100%.

When the 21 digitally integrated programs are examined by institutional typology, foundation programs show a higher prevalence of data analysis/data science and artificial intelligence/machine learning themes, whereas state programs show a relatively greater concentration of enterprise systems and fintech-related themes (Table 5).

Table 5
Frequency and Distribution of Technological Themes by Institutional Typology

Technological Theme	State Programs (n = 13)	Foundation Programs (n = 8)	Total Programs (n = 21)
Data Analysis / Data Science	7 (53.8%)	7 (87.5%)	14 (66.7%)
Enterprise Systems / Fintech (ERP / Fintech)	6 (46.2%)	1 (12.5%)	7 (33.3%)
Artificial Intelligence / Machine Learning	2 (15.4%)	4 (50.0%)	6 (28.6%)

Note: Frequencies represent the number of programs coded under each technological theme. Percentages in the State and Foundation columns are calculated within the respective institutional typology, whereas total percentages are calculated based on all 21 digitally integrated programs. Because a program may be coded under more than one technological theme, the thematic categories are not mutually exclusive; therefore, the percentages across themes do not necessarily sum to 100%.

When comparing the structural configurations of these programs along institutional tracks (thesis vs. non-thesis), distinct divergences emerge regarding the weight, depth, and operational focus of the digital coursework. Thesis-track programs predominantly embed advanced technical and theoretical dimensions—such as advanced data analysis, machine learning algorithms, ERP auditing architectures, and IT-supported internal auditing frameworks. This concentration aligns with the foundational objective of thesis tracks, which seeks to foster academic research capabilities and analytical depth. Conversely, non-thesis professional tracks prioritize applied, market-oriented modules including introductory business analytics, business intelligence (BI) systems, applied data mining, and basic statistical data processing. This dichotomy strongly suggests that non-thesis curricula are strategically calibrated to deliver immediate operational competencies tailored for practical professional execution (see Table 3).

4.2. Alignment Analysis with AACSB Accreditation Standards

The curriculum mapping executed across the total data universe of 146 graduate accounting and auditing programs in Türkiye reveals that only 21 programs directly incorporate courses embedded with big data analytics, data mining, business intelligence, artificial intelligence, machine learning, or technology-driven auditing themes. This integration rate accounts for approximately 14.4% of the total population, indicating a remarkably constrained level of alignment with the information technology and data-related competencies examined in this study through the AACSB technology-oriented framework historically identified as Standard A7.[1] The empirical findings demonstrate that a subset of state universities has initiated technological integration by introducing specific modules such as "Data Analysis," "Data Analytics," "ERP Auditing," "IT-Supported Internal Auditing," and "Technology Applications in Accounting and Auditing." However, the volume, rigor, and granular scope of these courses exhibit significant cross-institutional variance. For instance, while established state institutions—such as Marmara University, Istanbul University, and Gaziantep University—have embedded statistical analysis for decision support or introductory data analysis into their graduate tracks, the depth to which these quantitative contents are synthesized with applied accounting and auditing workflows varies substantially. Conversely, an examination of foundation universities reveals that institutions such as Başkent University, Istanbul Bilgi University, and Istanbul Nişantaşı University offer structurally superior and more comprehensive curricula encompassing advanced analytical domains like Machine Learning, Applied Artificial Intelligence, Data Mining, Business Intelligence, and Big Data Management. A significant portion of these courses are explicitly practice-oriented, utilizing industry-standard analytical software platforms like IBM SPSS Modeler within their pedagogical frameworks. This applied infrastructure represents a closer and more robust alignment with the technology-related competencies emphasized in the analytical framework adopted in this study. Given that only 21 out of 146 graduate accounting and auditing curricula across Türkiye exhibit advanced technological coursework, these findings evaluate institutional alignment with AACSB accreditation standards from a critical academic perspective:

a) *Curricular Relevance and Technology-Oriented Competencies (Standard A7):* Within the analytical framework adopted in this study, Standard A7 provides the principal reference point for examining the extent to which accounting education incorporates information technology and technology-related competencies into graduate curricula. Accordingly, the presence or absence of courses addressing data analytics, information systems, artificial intelligence, machine learning, and technology-supported auditing is interpreted as an indicator of the extent to which these competencies are reflected in the curricula. The finding that a large proportion of the examined programs (80.8%) did not include identifiable coursework in data analytics, information systems, or artificial intelligence under the coding criteria used in this study suggests that these areas are not yet widely represented in Turkish graduate accounting education. The concentration of technological integration within a mere 21 programs suggests that technology-oriented

[1] Note: Standard A7 is used in this study as the historical analytical framework on which the research design and curriculum coding scheme were developed. The study was conceptually developed using the AACSB A7 framework prior to subsequent revisions of the AACSB accreditation framework. The curriculum data were collected between January and May 2026. The February 2025 AACSB Accounting Standards subsequently included curriculum-related expectations under Standard A4; however, this study retains the earlier A7-based framework as its analytical benchmark for consistency with the original research design. Accordingly, references to Standard A7 in this study denote the analytical framework adopted for the study rather than a claim concerning the current numbering of AACSB Accounting Standards.

curricular competencies have not yet been systematically embedded across graduate accounting and auditing education in Türkiye. Rather than indicating a complete absence of technological content, these findings point to a relatively limited and uneven representation of technology-oriented courses across the examined curricula. This pattern may indicate room for further development in the representation of technology-related competencies emphasized within the AACSB framework.

b) *Data Analytics and Information Technology Competencies (Standard A7):* The technology-oriented competency perspective underlying Standard A7 is particularly relevant to the empirical distribution of data analytics and information technology courses identified in this study. Among the 21 programs that included identifiable technology-related courses, the most prevalent curricular theme was foundational Data Analysis/Data Science, identified in 13 programs. While this confirms an initial structural effort to incorporate technology and analytical competencies into graduate accounting education, the integration of advanced analytical layers such as Artificial Intelligence and Machine Learning remains relatively restricted, appearing in 7 programs. The findings therefore indicate that, among the limited number of programs incorporating technology-oriented content, curricular integration remains concentrated primarily on foundational analytical capabilities, while more advanced technologies such as AI and ML are less frequently represented. This empirical distribution strongly suggests that analytic integration in the domestic market is currently bottlenecked at introductory levels.

c) *Institutional Divergence in Innovative Trajectories*: AACSB continuously evaluates business schools based on their strategic commitment to agile governance and continuous innovation. Although this study does not directly evaluate institutional accreditation status or compliance, the structural variances observed across institutions provide useful evidence for assessing the extent to which technology-oriented curricular competencies are reflected in different institutional contexts. foundation universities demonstrate a higher observed level of integration of advanced analytical technologies within the digitally integrated programs examined. The descriptive findings indicate a higher observed penetration rate of Artificial Intelligence/Machine Learning competencies among foundation universities (62.5%) than among state universities (15.4%). This observed difference describes the distribution of AI/ML-related competencies within the digitally integrated programs examined and should not be interpreted as evidence of a statistically significant difference between institutional types.

5. Discussion

The findings indicate that the integration of data analytics and emerging technologies into graduate accounting and auditing education in Türkiye remains limited. Only 21 of the 146 programs examined (14.4%) included relevant courses, while 118 programs (80.8%) contained no such courses. This contrasts with international literature, which increasingly recognizes data analytics and technological competencies as essential to accounting education (Andiola et al., 2020). It is also consistent with Ciğer et al. (2018), who emphasized the need to strengthen data competencies and develop specialized educational initiatives in Turkish accounting education. The findings therefore suggest that the digital transformation emphasized in the literature has not yet been widely reflected in Turkish graduate curricula.

The findings further show that technology-related courses are concentrated in a limited number of programs and are often offered as individual courses. This contrasts with the integrative and

hybrid approaches recommended in the literature (Dzuranin et al., 2018; Kennedy & Stratopoulos, 2025). Öztürk (2021) similarly emphasized the need for systematic integration of data analytics into Turkish accounting curricula. Thus, the challenge appears to extend beyond introducing technology-oriented courses to embedding technological and analytical competencies throughout accounting education.

A further concern is the limited presence of advanced technologies. Data analysis/data science was the most prevalent theme, whereas artificial intelligence and machine learning appeared less frequently. This suggests that Turkish graduate accounting education currently emphasizes foundational analytical capabilities more than advanced technologies. Consistent with Ballantine et al. (2024), these findings indicate that accounting education needs to respond more systematically to rapid technological developments. Overall, the results support a curriculum strategy that combines technical skills, analytical thinking, and accounting-specific professional judgment.

6. Conclusion

The empirical evidence compiled in this national census provides an overview of the extent to which master's programs in accounting and auditing in the Turkish higher education system include technology-related competencies in their formal curricula. Only 21 master's programs showed evidence of identifiable technology-related courses under the coding criteria used in this study. Among these 21 programs, data analysis was the most commonly observed technology-related theme. Foundation universities showed a higher observed prevalence of some technology-related themes, particularly artificial intelligence. This pattern points to a potential gap between current curricular offerings and the growing relevance of technology-related competencies in accounting, suggesting that further curricular development may be warranted in response to the evolving needs of the corporate sector.

The curricular baseline mapping indicates that technology-related courses are not yet widely represented across the examined graduate accounting and auditing programs in Türkiye. For institutions pursuing or maintaining AACSB accreditation, these findings may provide a useful reference point for considering how information systems and data analytics competencies are represented within their curricula. Rather than implying a uniform pattern across institutions, the findings suggest variation in the extent to which technology-related courses are represented across graduate programs.

Furthermore, this study contributes to the literature by providing an up-to-date overview of graduate accounting and auditing education in Türkiye as of 2025–2026. By examining 146 active graduate programs across 78 universities, including 85 thesis-based and 61 non-thesis programs offered by 60 state and 18 foundation universities, the study provides a descriptive overview of the current structure of graduate accounting and auditing education in Türkiye.

6.1. Methodological Delimitations and Future Research Directions

The primary delimitation of this research rests on its operational reliance on a manifest content analysis of formal course titles. Because nominal course designations may not always capture the full granular scope or pedagogical nuances of internal weekly syllabi, certain dimensions of data analytics or implicit information technology modules may be underrepresented. Additionally, non-standardized institutional databases and restricted public access to granular

learning outcomes across a minor subset of universities limited the possibility of more detailed curriculum-level analysis. Consequently, interpretation of these findings should be balanced against these methodological parameters.

To expand upon these findings, future researchers could conduct latent content analyses that scrutinize complete institutional syllabi, weekly reading materials, and specific course learning outcomes. Securing direct, primary-source data access from university administrations could further enhance the level of curricular analysis. Furthermore, integrating mixed-methods frameworks that capture qualitative survey and interview data from corporate accounting practitioners, graduate students, and academic faculty would provide a broader understanding of how technology-related competencies are addressed and experienced within accounting education. Finally, future curriculum development efforts may consider AACSB criteria alongside emerging competency needs in areas such as big data, artificial intelligence, and predictive data analytics.

Declarations

Ethics Approval	**This study is based exclusively on publicly available institutional curriculum information and did not involve human participants, animals, or identifiable personal data. Therefore, ethical approval was not required.**
Conflict of Interest	The author declares that there is no conflict of interest.
Funding	This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.
Author Contributions	The author solely conceived and designed the study, collected and analyzed the data, interpreted the findings, and wrote, reviewed, and approved the final version of the manuscript.
Data Availability Statement	The data supporting the findings of this study were collected from publicly available curriculum information on the official websites of Turkish universities. All data used in the analysis are publicly accessible through these institutional websites. The compiled dataset is available from the corresponding author upon reasonable request.
Use of AI and AI-Assisted Technologies	The author used generative artificial intelligence (AI) as a language-support tool to improve the clarity, grammar, and readability of the manuscript. The author reviewed and edited the AI-generated output as necessary and takes full responsibility for the content of the published work.

References

AACSB. (2018). 2018 Accounting Standards (July 1, 2024 Update). https://www.aacsb.edu/educators/accreditation/accounting-accreditation/aacsb-accounting-accreditation-standards

AACSB. (2025). AACSB-accredited institutions. Retrieved from https://www.aacsb.edu/accredited

Abdelwahed, A. S., Abu-Musa, A. A., Moubarak, H., & Badawy, H. A. (2023). The adoption of big data analytics in the external auditing: Bibliometric and content analyses. *International Journal of Auditing and Accounting Studies*, 5(1), 49–85. https://doi.org/10.47509/IJAAS.2023.v05i01.03

Andiola, L. M., Masters, E., & Norman, C. (2020). Integrating technology and data analytic skills into the accounting curriculum: Accounting department leaders' experiences and insights. *Journal of Accounting Education*, 50, 100655.

Aslan, Ü., & Özerhan, Y. (2017). Big data, muhasebe ve muhasebe mesleği. *Muhasebe Bilim Dünyası Dergisi*, 19(4), 862-883.

Atayah, O. F., & Alshater, M. M. (2021). Audit and tax in the context of emerging technologies: A retrospective analysis, current trends, and future opportunities. *The International Journal of Digital Accounting Research*, 21, 95–128. https://doi.org/10.4192/1577-8517-v21_4

Bağdat, A. (2022). Muhasebe eğitiminde e-muhasebe ve endüstri 4.0 teknolojisi dersleri üzerine müfredat önerisi. *Abant Sosyal Bilimler Dergisi*, 22(2), 924-937.

Ballantine, J., Boyce, G., & Stoner, G. (2024). A critical review of AI in accounting education: Threat and opportunity. *Critical Perspectives on Accounting*, 99, 102711.

Barr-Pulliam, D., Brown-Liburd, H. L., & Munoko, I. (2022). The effects of person-specific, task, and environmental factors on digital transformation and innovation in auditing: A review of the literature. *Journal of International Financial Management & Accounting*, 33(2), 337-374.

Blix, L. H., Edmonds, M. A., & Sorensen, K. B. (2021). How well do audit textbooks currently integrate data analytics. *Journal of Accounting Education*, 55, 100717.

Booker, D. D., Pelzer, J. R., & Richardson, J. R. (2023). Integrating data analytics into the auditing curriculum: Insights and perceptions from early-career auditors. *Journal of Accounting Education*, 64, 100856.

Ciğer, A., Kınay, B., & Angı, G. G. (2018). Büyük verinin muhasebe uygulamaları ve muhasebe eğitimi üzerindeki etkileri. *Muhasebe ve Denetime Bakış*, 17(53), 215-233.

Cunningham, L. M., & Stein, S. E. (2018). Using visualization software in the audit of revenue transactions to identify anomalies. *Issues in Accounting Education*, 33(4), 33-46.

Demir, Ö., Çoban, E., & Narlıkaya, Z. (2022). Muhasebe bilgi sisteminde büyük veri teknolojisinin kullanımı. *Uygulamalı Sosyal Bilimler ve Güzel Sanatlar Dergisi*, 4(10), 179-192.

Dewu, K., & Barghathi, Y. (2019). The accounting curriculum and the emergence of Big Data. *Accounting and Management Information Systems*, 18(3), 417-442. http://dx.doi.org/10.24818/jamis.2019.03006

Dzuranin, A. C., Jones, J. R., & Olvera, R. M. (2018). Infusing data analytics into the accounting curriculum: A framework and insights from faculty. *Journal of Accounting Education*, 43, 24-39. https://doi.org/10.1016/j.jaccedu.2018.03.004

Earley, C. E. (2015). Data analytics in auditing: Opportunities and challenges. *Business Horizons*, 58(5), 493-500. http://dx.doi.org/10.1016/j.bushor.2015.05.002

Erbuğa, G. S., & Karakelleoğlu, M. İ. (2024). Muhasebe Eğitiminde Dijital Uygulamaların Hile Denetimine Katkıları: Üniversite Müfredatlarında Bir Araştırma. *İzmir İktisat Dergisi*, 39(1), 161-179.

Eskin, İ., & Sarısoy, Ö. (2023). Muhasebe eğitiminde dijital yetkinlikler: Türk muhasebe müfredatı üzerine bir inceleme. *Pamukkale Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, (58), 169-192.

Felski, E. (2023). Audit technologies used in practice and ways to implement these technologies into audit courses. *Journal of Accounting Education*, 62, 100827. https://doi.org/10.1016/j.jaccedu.2022.100827

Guo, K. (2023). Less is more: An outsider perspective on audit data analytics [Working paper]. Retrieved from https://ssrn.com/abstract=4324178

Islam, M. S., Farah, N., & Wang, T. (2023). Accounting data analytics in R: A case study using tidyverse. *Journal of Emerging Technologies in Accounting*, 1-8. https://doi.org/10.2308/JETA-2021-023

Kandemir, T., & Kardeş, Z. (2023). Muhasebe eğitiminde verilen bilgi teknolojileri odaklı dersler: Amerika Birleşik Devletleri ve Türkiye muhasebe bölümlerinin karşılaştırılması. *Pamukkale Üniversitesi İşletme Araştırmaları Dergisi*, 10(1-Prof. Dr. Feyzullah EROĞLU Armağan Sayısı), 275-293.

Kennedy, D. B., & Stratopoulos, T. C. (2025). How to implement a data analytics and emerging technologies-enabled accounting curriculum. *Journal of Emerging Technologies in Accounting*, 22(1), 45-63.

Losi, H. J., Isaacson, E. V., & Boyle, D. M. (2022). Integrating data analytics into the accounting curriculum: Faculty perceptions and insights. *Issues in Accounting Education*, 37(4), 1-23. https://doi.org/10.2308/ISSUES-2021-086

Mcbride, K., & Philippou, C. (2022). "Big results require big ambitions": Big data, data analytics and accounting in masters courses. *Accounting Research Journal*, 35(1), 71-100. https://doi.org/10.1108/ARJ-04-2020-0077

McConville, D. (2023). Disruptive technologies: Implications for third-level accounting education. *Accounting, Finance & Governance Review*, 30. https://doi.org/10.52399/001c.77369

Mert, İ. (2023). Muhasebe eğitimi ve araştırmasında çok disiplinli yaklaşım: Dijitalleşme ve modern yöntemler. *Muhasebe ve Denetime Bakış*, 22(68), 249-262. https://doi.org/10.55322/mdbakis.1131174

Öztürk, C. (2021). Veri analitiğinin muhasebe programlarının müfredatlarına yansımaları: Amerika Birleşik Devletleri örneği ve Türkiye için öneriler. İçinde Ö. Tekşen, A. Apalı & N. Gülcan (Ed.), XXXIX. *Türkiye Muhasebe Eğitimi Sempozyumu: Değişen teknoloji ve iş ortamında muhasebe bildiriler kitabı* içinde (ss. 32–47).

Richardson, V.J. & Shan, Y. (2019). Data analytics in the accounting curriculum. *Advances in Accounting Education: Teaching and Curriculum Innovations*, 23, 67-79. https://doi.org/10.1108/S1085-462220190000023004

Weirich, T. R., Tschakert, N., & Kozlowski, S. (2018). Teaching data analytics skills in auditing classes using Tableau. *Journal of Emerging Technologies in Accounting*, 15(2), 137-150. https://doi.org/10.2308/jeta-52264

Yadav, S. (2020). The impact of big data on audit evidence and the level of assurance [Master's thesis, University of Southern Mississippi].

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Challenges Encountered in the Implementation of Turkish Accounting and Financial Reporting Standards

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Abstract

Purpose: *This study identifies and explains the recurring challenges in implementing Turkish Accounting and Financial Reporting Standards within Türkiye's multi-framework reporting environment and examines how organizational, linguistic, professional, technological, and legal factors interact.*

Methodology: *A qualitative document analysis was conducted on a purposive corpus of 34 documents: 10 primary regulatory and standard-setting texts and 24 Türkiye-focused scholarly works published between 1995 and 2025. Documents were appraised, coded, grouped thematically, and cross-checked against current standards.*

Findings: *Five interconnected problem domains emerged: human resources and information technology; internal structures and audit mechanisms; translation and terminology; professional practice; and legal incompatibilities. TFRS 9, TFRS 13, TMS 2, TMS 12, and TMS 21 illustrate how data-intensive measurement, professional judgment, technical terminology, and differences between financial-reporting and tax rules generate implementation risk.*

Scope and Limitations: *The study is limited to Türkiye and documentary evidence; it does not test the prevalence of the identified problems through interviews, surveys, or firm-level data. Standards and legislation may also change after the review date.*

Originality / Value: *The study integrates a fragmented national literature with direct evidence from primary standards and maps each problem category to practical responses for regulators, professional bodies, universities, enterprises, and auditors.*

Keywords: *Turkish Accounting Standards; Financial Reporting; Implementation Challenges; Document Analysis; Türkiye*

JEL Codes: *M41; M42; G34*

1. Introduction

International Financial Reporting Standards (IFRS) seek to create a common financial-reporting language and improve the relevance, faithful representation, and comparability of financial information. The literature nevertheless cautions that a common set of written standards does not by itself produce uniform reporting outcomes. Benefits associated with IFRS depend on enforcement, institutional capacity, preparer incentives, audit quality, and consistent interpretation across jurisdictions (Ball, 2006; De George et al., 2016; Zeff, 2007). These qualifications are particularly important in non-English-speaking jurisdictions, where translation and professional education influence how principles-based requirements are understood and applied (Guan et al., 2025; Huerta et al., 2013).

Türkiye's reporting environment combines several frameworks. The General Communiqué on the Accounting System Application (MSUGT) established a uniform chart of accounts and nationally standardized bookkeeping, while TAS/TFRS aligned public-interest financial reporting with IAS/IFRS. BOBI FRS subsequently provided a national framework for large and medium-sized entities outside full TFRS, and KUMI FRS became effective for reporting periods beginning on or after 1 January 2023 for eligible small and micro entities (Ministry of Finance, 1992; Public Oversight, Accounting and Auditing Standards Authority [KGK], 2021, 2023, 2026). The resulting tiered structure broadens proportionate reporting, but it also requires practitioners and enterprises to distinguish among financial-reporting, tax, and bookkeeping rules.

Prior Turkish studies document professional training gaps, software limitations, translation difficulties, audit costs, and conflicts between financial-reporting and tax-based practices (Ağkan, 2017; Dursun & Güngör Karyağdı, 2023; Evci, 2008). A second stream compares the technical provisions of TAS/TFRS, BOBI FRS, KUMI FRS, MSUGT, and the Tax Procedure Law (VUK) (Akdoğan & Hiçyorulmaz, 2025; Gücenme Gençoğlu, 2017; Karataş Aracı & Bekçi, 2019). However, these streams are usually presented separately, and implementation claims are seldom traced back to concrete wording or measurement requirements in the standards themselves. The addition of KUMI FRS and continuing updates to the TFRS set make an integrated reassessment timely.

Accordingly, the study asks three questions: (1) Which recurring categories of difficulty characterize the implementation of Turkish accounting and financial-reporting standards? (2) How are these difficulties evidenced in primary standards and related legislation? and (3) Which institutional and practical responses follow from the combined evidence? The contribution is a document-based synthesis that links five problem domains to examples from current standard texts and then matches those domains with targeted recommendations.

2. Literature Review

2.1. International harmonization and implementation

The international literature distinguishes adoption of IFRS from effective implementation. Ball (2006) recognizes the value of a comprehensive global reporting language but argues that local economic and political forces can produce heterogeneous practice. Zeff (2007) similarly identifies cultural, legal, and interpretive obstacles to global comparability. Reviewing the empirical evidence, De George et al. (2016) report improvements in transparency and comparability in many settings while emphasizing that observed benefits vary with enforcement

and other institutional changes. Implementation also affects assurance: Redmayne and Laswad (2013) find that transition to IFRS can increase audit effort and fees.

Language forms a distinct implementation channel. Huerta et al. (2013) show that generic expressions in IFRS can generate more translation variation than established technical terms. More recent cross-country evidence links linguistic distance to slower IFRS adoption and greater post-adoption information loss (Guan et al., 2025). These findings do not imply that a particular Turkish translation is incorrect; rather, they show why technical definitions, official interpretations, examples, and professional training are necessary to maintain equivalent application.

2.2. Development and Comparison of Reporting Frameworks in Türkiye

Early studies describe the transition from a nationally uniform bookkeeping system to standards-oriented financial reporting and the search for a common accounting language (Ataman Akgül & Akay, 2004; Gökdeniz, 1995; Kocamaz, 2012). Later work evaluates the role of IAS/TFRS and the institutional development of standard setting in Türkiye (Aslan, 2021; Gölpek Karababa, 2018). This literature generally associates international alignment with higher-quality, more comparable reporting but also recognizes that a tax-oriented accounting tradition continues to shape practice.

A large comparative stream examines differences among reporting frameworks. Studies compare BOBI FRS with TAS/TFRS at the conceptual, presentation, recognition, measurement, and disclosure levels (Alataş & Kılıç, 2018; Cengiz, 2022; Gücenme Gençoğlu, 2017; Günce, 2019). Others examine BOBI FRS against MSUGT and the Tax Procedure Law (VUK) (Doğan, 2018; Tunçez, 2018) or compare particular topics such as financial instruments (Tuğay & Arısoy, 2019). Karataş Aracı and Bekçi (2019) evaluate the conceptual framework and financial-statement presentation across MSUGT, TAS/TFRS, and BOBI FRS. Dinç and Atabay (2019) argue for updating provisions that inhibit faithful representation, while Turhan (2019) illustrates the consequences of standards for cost formation. The arrival of KUMI FRS extends this comparison to small and micro entities (Akdoğan & Hiçyorulmaz, 2025; Özçelik & Yağmurlu, 2024).

2.3. Implementation Capacity and Professional Practice

Implementation-focused research identifies recurring gaps in knowledge, organizational capacity, and practice. Ağkan (2017) and Evci (2008) group problems around education, information systems, translation, legislation, and application. Survey evidence from Borsa Istanbul companies points to workload, interim-reporting, impairment-testing, and training difficulties (Dursun & Güngör Karyağdı, 2023). Studies of accounting education and professional awareness likewise report uneven knowledge of TAS/TFRS and KUMI FRS (Çil Koçyiğit et al., 2016; Dalğar et al., 2011; Kadooğlu Aydın, 2020). Gücenme Gençoğlu et al. (2014) underline the importance of an audit model suited to financial statements converted to TAS/TFRS.

2.4. Synthesis and Research Gap

Two conclusions emerge from the literature. First, technical comparisons frequently find broad compatibility in objectives and qualitative characteristics, yet also identify consequential differences in measurement, presentation, and terminology. Second, implementation studies repeatedly find that training, software, internal controls, audit capacity, and tax-oriented routines prevent formal compatibility from becoming consistent practice. The apparent contradiction is therefore substantive: alignment at the framework level can coexist with divergence at the

transaction and organizational levels. What remains underdeveloped is an integrated analysis that links these recurring problems to current primary standard provisions across the full tiered environment. This study addresses that gap by coding the national literature thematically and testing the resulting categories against concrete examples in official standards and legislation.

3. Methodology

3.1. Research Design and Document Corpus

The study uses qualitative document analysis, a systematic procedure for reviewing, appraising, and interpreting documents to develop meaning and empirical knowledge (Bowen, 2009). The method is appropriate because the research questions concern formal requirements, recurring implementation claims, and the relationship between regulatory texts and published evidence. The study is a bounded, purposive review rather than an exhaustive systematic review or a prevalence study.

The analytical corpus comprised 34 documents. Ten primary texts were examined: the current TFRS set index; TFRS 9 Financial Instruments; TFRS 13 Fair Value Measurement; TMS 2 Inventories; TMS 12 Income Taxes; TMS 21 The Effects of Changes in Foreign Exchange Rates; BOBI FRS (2021 version); KUMI FRS (2022 version); MSUGT Serial No. 1; and Tax Procedure Law (VUK) No. 213. The secondary corpus comprised the 24 Türkiye-focused academic works published between 1995 and 2025 that are listed in the references and directly address framework development, comparison, implementation, education, or professional practice. International and methodological works were used to frame and interpret the analysis but were not counted among the 34 coded documents.

The secondary documents were identified through the bibliography of the submitted manuscript and verified through DergiPark, TR Dizin, the Council of Higher Education National Thesis Center, Google Scholar, journal websites, and publisher records. Search combinations included 'TMS/TFRS implementation problems,' 'BOBI FRS comparison,' 'KUMI FRS,' 'MSUGT and VUK,' 'accounting standards training,' and Turkish equivalents. Inclusion required direct relevance to Türkiye's accounting or financial-reporting frameworks, an identifiable publication record, and accessible substantive content. Duplicates, documents without a traceable source, works unrelated to implementation or framework comparison, and purely promotional materials were excluded. The review cut-off was 31 July 2026.

3.2. Analytical Procedure

Analysis proceeded in six stages. First, each document was appraised for provenance, purpose, scope, and currency. Second, an extraction matrix recorded the framework, document type, method, reported problem, supporting evidence, and proposed response. Third, the categories reported in the submitted manuscript were used as provisional codes while open coding allowed additional issues to emerge. Fourth, overlapping codes were consolidated into five domains: human resources and information technology; internal structures and audit mechanisms; translation and terminology; professional practice; and legal incompatibilities. Fifth, claims from secondary sources were triangulated against current primary texts, with contradictory or qualifying evidence retained. Finally, a cross-category comparison identified interactions and matched each domain with practical responses. Because one researcher conducted the coding,

no inter-coder reliability statistic was calculated; transparency is supported instead by the stated corpus, decision rules, and paragraph-level primary-source examples.

4. Findings

4.1. The Multi-Framework Reporting Environment

Türkiye's accounting architecture serves different purposes. MSUGT and its chart of accounts support standardized bookkeeping; Tax Procedure Law (VUK) rules determine taxable amounts; TFRS serves entities required or permitted to apply IFRS-based reporting; BOBI FRS supplies a national framework for independently audited entities outside TFRS; and KUMI FRS provides a proportionate framework for eligible smaller entities (KGK, 2021, 2023, 2026; Presidency of Revenue Administration, 1961). The coexistence of these layers is not itself a defect. Difficulty arises when users treat rules with different objectives as interchangeable, or when information systems and control processes cannot maintain the necessary reconciliations.

4.2. Human Resources and Information Technology

The first domain combines technical knowledge with data and system capacity. TFRS 9 requires expected credit losses to reflect a probability-weighted, unbiased amount, the time value of money, and reasonable and supportable information about past events, current conditions, and forecasts (KGK, 2026, TFRS 9, para. 5.5.17). Complying with this standard requires entities to establish robust scenario data, credit-risk segmentation, model governance, and seamless integration between operational and accounting systems. A spreadsheet-only or tax-led chart-of-accounts workflow may therefore be inadequate even when staff understand the journal entries. This primary-text example supports earlier findings that insufficient training and unsuitable software reinforce one another (Ağkan, 2017; Evci, 2008).

4.3. Enterprises' Internal Structures and Audit Mechanisms

The second domain concerns ownership of estimates, review controls, and assurance. Data-intensive measurements require coordination among accounting, finance, risk, information technology, valuation specialists, and auditors. TFRS 13 requires entities to maximize observable inputs and classifies measurements within a three-level fair-value hierarchy; measurements using significant unobservable inputs fall within Level 3 (KGK, 2026, TFRS 13, paras. 61-67, 72-90). Without documented model approval, source-data controls, assumption review, and independent challenge, identical requirements can produce inconsistent results. The increased workload and audit effort reported in Turkish and international studies are therefore not only compliance costs; they signal a need for clearer internal accountability (Dursun & Güngör Karyağdı, 2023; Redmayne & Laswad, 2013).

4.4. Translation and Terminology

The third domain is semantic rather than merely lexical. TMS 21 distinguishes 'geçerli para birimi' (functional currency) from 'finansal tablolarda kullanılan para birimi' (presentation currency) and requires entities to determine functional currency from the primary economic environment and related indicators (KGK, 2026, TMS 21, paras. 8-12). A literal reading that treats the two expressions as interchangeable would change recognition and translation outcomes. The example illustrates why a technically valid translation still requires definitions, examples, and professional judgment. It is consistent with evidence that generic or context-sensitive

expressions generate interpretation variation across languages (Guan et al., 2025; Huerta et al., 2013).

4.5. Practice of the Accounting Profession

The fourth domain concerns the ability to exercise and document professional judgment. Fair-value work under TFRS 13 may require market selection, valuation techniques, hierarchy classification, and disclosure of unobservable inputs. Professionals must understand not only the final amount but also the evidence that makes an input observable, the consistency of a technique, and the sensitivity of the result. Education studies and practitioner surveys indicate that awareness does not always translate into applied competence (Çil Koçyiğit et al., 2016; Kadooğlu Aydın, 2020). Continuing education should therefore be case-based and role-specific, with separate learning paths for preparers, auditors, valuation specialists, and software teams.

4.6. Legal Incompatibilities

The fifth domain is visible where financial-reporting and tax rules use different measurement triggers. TMS 2 measures inventories at the lower of cost and net realizable value (KGK, 2026, TMS 2, para. 9). Tax Procedure Law (VUK) Article 274 uses cost and permits an alternative comparable-value mechanism when the sales price has fallen by at least 10 percent relative to cost (Presidency of Revenue Administration, 1961, art. 274). The thresholds and objectives are therefore not identical. TMS 12 explicitly addresses such differences by defining temporary differences between accounting carrying amounts and tax bases and requiring related deferred-tax analysis (KGK, 2026, TMS 12, paras. 5-15). The implementation problem is not solved by choosing one regime over the other; enterprises need parallel records, reconciliations, and controls that preserve each regime's purpose.

4.7. Cross-Category Interaction

The five domains form a chain. Complex measurements increase data and system needs; weak internal ownership reduces the quality of estimates and audit evidence; technical terminology raises the training burden; and differences between reporting and tax rules require parallel records and reconciliations. Treating any one category in isolation therefore produces partial remedies. Table 1 summarizes the evidence-to-response links used in the analysis.

Table 1. Evidence-to-Response Matrix

Problem Domain	Primary Evidence	Implementation Consequence	Priority Response
Human Resources and IT	TFRS 9, para. 5.5.17: probability-weighted, forward-looking expected credit loss	Data, models, and software may not support the required estimate	Integrated data architecture and case-based technical training
Internal Structure and Audit	TFRS 13, paras. 72-90: three-level fair-value hierarchy	Unclear ownership and weak review of assumptions and inputs	Model governance, control documentation, and independent challenge

Problem Domain	Primary Evidence	Implementation Consequence	Priority Response
Translation and Terminology	TMS 21, paras. 8-12: functional versus presentation currency	Technically distinct terms may be treated as interchangeable	Stable glossary, annotated examples, and interpretation support
Professional Practice	TFRS 13: valuation techniques and observable/unobservable inputs	Awareness may not develop applied judgment or documentation skills	Role-specific continuing education and competency assessment
Legal Incompatibilities	TMS 2, para. 9 versus VUK art. 274; TMS 12 temporary differences	Financial-reporting and tax measurements may diverge	Parallel records, reconciliations, and regulatory coordination

Note. *KGK = Public Oversight, Accounting and Auditing Standards Authority; VUK = Tax Procedure Law.*

5. Discussion

The findings confirm the national literature's recurring emphasis on education, systems, translation, audit capacity, and legislation, but they extend it in two ways. First, direct references to TFRS 9, TFRS 13, TMS 2, TMS 12, and TMS 21 show that the reported difficulties are connected to identifiable data, judgment, terminology, and reconciliation requirements rather than being generic resistance to change. Second, the cross-category analysis explains why broad compatibility among frameworks does not guarantee uniform application. Compatibility describes shared objectives or principles; implementation depends on whether enterprises can operationalize the differences that remain.

The results also align with international evidence. Ball (2006), De George et al. (2016), and Zeff (2007) emphasize the role of local institutions in translating common standards into reporting practice. Guan et al. (2025) and Huerta et al. (2013) show that language can affect both adoption and interpretation, while Redmayne and Laswad (2013) demonstrate that new reporting regimes can raise assurance effort. Türkiye's experience is therefore not an isolated translation problem or a narrow tax conflict; it is a multi-level implementation challenge in which language, institutions, systems, and professional capability interact.

The practical implication is that responsibility must be distributed. KGK can reduce ambiguity through timely Turkish updates, annotated examples, terminology glossaries, and implementation notes that distinguish TFRS, BOBI FRS, and KUMI FRS. Professional bodies and universities can provide assessment-based, case-oriented training. Enterprises can assign standard ownership, integrate source systems with reporting requirements, document estimates, and maintain tax-to-reporting reconciliations. Auditors can focus on model governance, evidence quality, and consistency rather than treating compliance as a checklist. Finally, tax and financial-reporting authorities can coordinate where avoidable procedural differences create cost without serving a distinct policy objective.

6. Conclusion and Recommendations

This study identifies five interconnected challenges in implementing Turkish accounting and financial-reporting standards: human resources and information technology, internal structures and audit mechanisms, translation and terminology, professional practice, and legal incompatibilities. The structured abstract and findings now use the same five-part framework. Primary-source examples demonstrate that these challenges arise at the point where principles-based requirements must be translated into data, estimates, controls, judgments, and reconciliations.

The evidence supports an integrated response. Training should move from general awareness to standard-specific cases and periodic competency assessment. Enterprises should align accounting software, risk data, valuation processes, internal controls, and audit trails with TFRS measurement requirements. Official Turkish materials should pair stable terminology with examples and explanatory communiqués, especially where similar expressions have distinct technical meanings. Tax and financial-reporting differences should be managed through parallel records and transparent reconciliations, while regulators should review whether unnecessary procedural divergence can be reduced. Internal audit and external assurance should test the governance of estimates and systems throughout the year rather than only at period end.

The study is limited by its documentary design, purposive corpus, and Türkiye-specific scope. It cannot estimate how frequently each problem occurs or whether severity differs by entity size, sector, region, or reporting framework. Future research should test the five-domain model through interviews, surveys, case studies, and archival error or restatement data; compare TFRS, BOBI FRS, and KUMI FRS users; and evaluate whether annotated guidance, training interventions, or digital reporting tools measurably improve compliance. Subject to those limitations, the analysis provides a transparent foundation for linking recurring implementation problems with actionable institutional responses.

Declarations

Ethics Approval	**Ethics approval was not required because the study analyzes publicly available standards, legislation, and publications and involves no human participants, personal data, or animals.**
Conflict of Interest	The author(s) declare that there is no conflict of interest.
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Data Availability Statement	No new dataset was generated. All analyzed documents are publicly available through the sources cited in the reference list.
Use of AI and AI-Assisted Technologies	Generative AI-assisted tools were used for language editing, reference-format checks, and alignment with the CAP template. The author(s) reviewed the revised manuscript and take full responsibility for its content.

References

Ağkan, F. (2017). Problems encountered in the implementation of Turkish accounting standards. *Journal of the Ünye Faculty of Economics and Administrative Sciences, 1*(1), 17-23. https://www.researchgate.net/publication/326624553_Turkiye_Muhasebe_Standartlarinin_Uygulanmasinda_Karsilasilan_Sorunlar

Akdoğan, H., & Hiçyorulmaz, E. (2025). Comparison of financial reporting standards for small and micro enterprises with other standards in the conceptual framework and financial statements. *Fiscaoeconomia, 9*(1), 185-200. https://doi.org/10.25295/fsecon.1499669

Alataş, A., & Kılıç, İ. (2018). A comparison of the differences between BOBI FRS and TAS/TFRS using summary tables. *The Journal of Academic Social Science, 6*(64), 453-478. https://asosjournal.com/DergiTamDetay.aspx?ID=13273

Aslan, Y. (2021). The emergence of international accounting standards and the institutions contributing to their development. *Van Yüzüncü Yıl University Journal of the Faculty of Economics and Administrative Sciences, 6*(12), 195-203. https://dergipark.org.tr/tr/download/article-file/2085869

Ataman Akgül, B., & Akay, H. (2004). *Uluslararası muhasebe standartları ve Türkiye'de uygulama etkinliğine ilişkin bir araştırma* [International accounting standards and a study on their implementation effectiveness in Türkiye] (2nd ed.). Türkmen Kitabevi.

Ball, R. (2006). International Financial Reporting Standards (IFRS): Pros and cons for investors. *Accounting and Business Research, 36*(sup1), 5-27. https://doi.org/10.1080/00014788.2006.9730040

Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal, 9*(2), 27-40. https://doi.org/10.3316/QRJ0902027

Cengiz, H. (2022). A comparison of TAS/TFRS and the Financial Reporting Standard for Large and Medium-Sized Entities (BOBI FRS). *Journal of Business Academy, 3*(1), 1-15. https://isakder.org/index.php/isakder/article/view/58/89

Çil Koçyiğit, S., Elitaş, B. L., & İşgüven, M. K. (2016). Undergraduate students' awareness of TAS/TFRS: The case of Yalova University Faculty of Economics and Administrative Sciences. *International Journal of Alanya Faculty of Business, 8*(1), 59-68. https://dergipark.org.tr/en/download/article-file/201793

Dalğar, H., Çelik, Ö., & Mortaş, M. (2011). Accounting students' awareness of TAS/TFRS. *Süleyman Demirel University Journal of the Faculty of Economics and Administrative Sciences, 16*(1), 217-230. https://dergipark.org.tr/tr/download/article-file/194521

De George, E. T., Li, X., & Shivakumar, L. (2016). A review of the IFRS adoption literature. *Review of Accounting Studies, 21*(3), 898-1004. https://doi.org/10.1007/s11142-016-9363-1

Dinç, E., & Atabay, E. (2019). Provisions that distort faithful representation in the uniform accounting system and the need for updating. *International Journal of Economic and Administrative Studies*, (22), 179-192. https://dergipark.org.tr/en/download/article-file/605547

Doğan, A. (2018). A comparison of the Financial Reporting Standard for Large and Medium-Sized Entities with the Tax Procedure Law and the General Communiqué on Accounting System Application. *Journal of Accounting and Finance*, (80), 115-132. https://dergipark.org.tr/en/download/article-file/545689

Dursun, A., & Güngör Karyağdı, N. (2023). Problems faced by businesses in the implementation of Turkish accounting standards: A study of Borsa Istanbul. *Ordu University Journal of Social Sciences Research, 13*(3), 3469-3490. https://doi.org/10.48146/odusobiad.1195422

Evci, S. (2008). *Problems encountered in the implementation of Turkish accounting and financial reporting standards* [Master's thesis, Gazi University]. Council of Higher Education National Thesis Center.

Gökdeniz, Ü. (1995). Interpretation and critique of the Ministry of Finance's General Communiqué on Accounting System Application No. 1. *Öneri Journal, 1*(2), 69-72. https://doi.org/10.14783/maruoneri.706261

Gölpek Karababa, A. (2018). An overview of accounting standards and their implementation. *Turkish Journal of Social Sciences Research, 3*(2), 16-24. https://dergipark.org.tr/tr/download/article-file/562675

Guan, J. X., Shafron, E., Ye, K., & Zhuang, W. (2025). Is accounting the English language of business? The role of language in IFRS adoption and information loss. *Review of Accounting Studies, 30*, 2963-3020. https://doi.org/10.1007/s11142-025-09881-9

Gücenme Gençoğlu, Ü. (2017). A comparison of BOBI FRS and TAS/TFRS on fundamental issues. *Journal of Accounting and Finance*, (76), 1-24. https://doi.org/10.25095/mufad.400056

Gücenme Gençoğlu, Ü., Arsoy, A. P., Ertan, Y., & Bora, T. (2014). Characteristics of the audit model for financial statements converted to TAS/TFRS. *Journal of Accounting and Finance*, (64), 1-26. https://dergipark.org.tr/tr/download/article-file/427541

Günce, N. (2019). A comparison of the differences between BOBI FRS and TAS/TFRS in preparing the balance sheet and income statement. *Atlas Journal of Social Sciences*, (4), 23-32. https://dergipark.org.tr/tr/pub/atlas/article/760718

Huerta, E., Petrides, Y., & Braun, G. P. (2013). Translation of IFRS: Language as a barrier to comparability. *Research in Accounting Regulation, 25*(1), 1-12. https://doi.org/10.1016/j.racreg.2012.11.007

Kadooğlu Aydın, G. (2020). Accounting professionals' evaluation of financial reporting standards for small and micro entities: The case of Şanlıurfa Province. *Fırat University International Journal of Economics and Administrative Sciences, 4*(2), 167-200. https://dergipark.org.tr/en/download/article-file/1461005

Karataş Aracı, N., & Bekçi, İ. (2019). An evaluation of conceptual framework and financial-statement presentation standards under MSUGT, TAS/TFRS, and BOBI FRS. *Journal of Accounting and Taxation Studies, 12*(3), 857-884. https://doi.org/10.29067/muvu.526527

Kocamaz, H. (2012). The formation and development of international accounting standards worldwide and in Türkiye. *Kahramanmaraş Sütçü İmam University Journal of Economics and Administrative Sciences, 2*(2), 105-120. https://dergipark.org.tr/tr/pub/ksuiibf/article/125905

Ministry of Finance. (1992). *Muhasebe Sistemi Uygulama Genel Tebliği (Sıra No. 1)* [General Communiqué on the Accounting System Application (Serial No. 1)]. *T.C. Resmî Gazete* (No. 21447, Mükerrer). https://www.resmigazete.gov.tr/arsiv/21447_1.pdf

Özçelik, H., & Yağmurlu, N. (2024). Accounting for revenue under KUMI FRS and comparison with TFRS, BOBI FRS, MSUGT, and VUK. *Journal of Accounting and Finance*, (103), 1-20. https://dergipark.org.tr/tr/download/article-file/3810841

Presidency of Revenue Administration. (1961). *Vergi Usul Kanunu (Kanun No. 213)* [Tax Procedure Law (Law No. 213)]. https://www.gib.gov.tr/mevzuat/kanun/434

Public Oversight, Accounting and Auditing Standards Authority. (2021). *Büyük ve Orta Boy İşletmeler için Finansal Raporlama Standardı: 2021 sürümü* [Financial Reporting Standard for Large and Medium-Sized Entities: 2021 version]. https://www.kgk.gov.tr/contentassignmentdetail/4741/bobi-frs-2021-s

Public Oversight, Accounting and Auditing Standards Authority. (2023). *Küçük ve Mikro İşletmeler için Finansal Raporlama Standardı: 2022 sürümü* [Financial Reporting Standard for Small and Micro Entities: 2022 version]. https://kgk.gov.tr/DynamicContentDetail/11692/

Public Oversight, Accounting and Auditing Standards Authority. (2026). *TFRS 2026 seti (Mavi Kitap)* [2026 TFRS set (Blue book)]. https://www.kgk.gov.tr/DynamicContentDetail/12044/TFRS-2026-Seti-Mavi-Kitap

Redmayne, N. B., & Laswad, F. (2013). An assessment of the impact of IFRS adoption on public-sector audit fees and audit effort: Evidence of transition costs from changes in reporting regimes. *Australian Accounting Review, 23*(1), 88-99. https://doi.org/10.1111/j.1835-2561.2012.00166.x

Tuğay, O., & Arısoy, K. (2019). A comparison of principles for accounting for financial instruments under TAS/TFRS and BOBI FRS. *Mehmet Akif Ersoy University Journal of Economics and Administrative Sciences Faculty, 6*(2), 563-577. https://doi.org/10.30798/makuiibf.429246

Tunçez, H. A. (2018). Principal differences between the Financial Reporting Standard for Large and Medium-Sized Entities and Turkish accounting standards. *International Journal of Social Research, 11*(61), 1018-1024. https://doi.org/10.17719/jisr.2018.2994

Turhan, E. (2019). *The effects of accounting standards on cost formation: An application in a manufacturing enterprise* [Master's thesis, Süleyman Demirel University]. Council of Higher Education National Thesis Center.

Zeff, S. A. (2007). Some obstacles to global financial-reporting comparability and convergence at a high level of quality. *The British Accounting Review, 39*(4), 290-302. https://doi.org/10.1016/j.bar.2007.08.001

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Beyond Detection: Explaining Greenwashing Risk through a Theory-Grounded Disclosure Quality Index

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Abstract

Purpose: *To propose a conceptual framework for a four-dimensional Disclosure Quality Index capable of distinguishing genuine sustainability disclosure from greenwashing, addressing the gap between decoupling-based quantitative scores and content-analysis-based general disclosure quality indices.*

Methodology: *This is a conceptual/theoretical paper. The proposed index is developed through a synthesis of legitimacy theory, signaling theory, and impression management theory, translated into four measurable dimensions—Volume-Substance Gap, Verifiability and Assurance Level, Linguistic Uncertainty and Rhetorical Strategy (Rhetorical Vagueness), and Temporal Consistency— and operationalized through concrete sub-indicators drawn from established accounting text-analysis methodologies (e.g., FOG Index readability, Loughran-McDonald word lists).*

Findings: *As a conceptual contribution, the paper does not present empirical findings; it offers a theoretically grounded measurement architecture along with a research agenda for future construct- and predictive-validity testing.*

Scope and Limitations: *The theoretical scope is limited to three theories among several plausible alternatives; the relative weighting of the four dimensions is left open for future empirical or expert-panel determination; and the framework draws primarily on regulatory and reporting literature from developed markets.*

Originality / Value: *The paper bridges two previously disconnected streams of the greenwashing measurement literature by providing a theoretically justified, codable index architecture that offers a direct methodological foundation for future empirical validation studies.*

Keywords: Greenwashing; Disclosure Quality Index; Legitimacy Theory; Signaling Theory; Sustainability Reporting

JEL Codes: M41; M14; Q56

1. Introduction

Over the past two decades, sustainability reporting has evolved from a voluntary extension of corporate communications into a central reporting domain that directly influences investor decisions and regulatory oversight (Christensen et al., 2021; Lin et al., 2024). The European Union's Corporate Sustainability Reporting Directive (CSRD) (European Union, 2022) and the International Sustainability Standards Board's (ISSB) IFRS S1/S2 standards (IFRS Foundation, 2023a, 2023b) are compelling companies to disclose their environmental, social, and governance (ESG) performance in an increasingly detailed manner; accordingly, the literature highlights the importance of comprehensive and rigorous scientific evidence aligned with these regulatory objectives (Dinh et al., 2023). However, the fact that disclosure requirements have become mandatory does not automatically lead to an improvement in the quality of disclosures in reports. This mismatch between corporate discourse and actual practice is explained by the concept of "decoupling" in organizational theory (Meyer & Rowan, 1977). According to this concept, organizations can formally conform to the legitimacy expectations of the institutional environment while keeping their actual operational structures largely independent of these expectations. This tendency toward decoupling is also a current and expanding area of research specifically within sustainability reporting; indeed, a systematic review of 74 articles from 44 journals shows that research in this field has increased significantly since 2018 and that the EU's regulatory interventions have directly shaped these decoupling dynamics (Cepêda et al., 2025). The classical concept has been adapted to contemporary organizational contexts through two distinct forms: "means-ends decoupling," which refers to the uncertainty regarding whether the official policies and procedures adopted by organizations actually serve their stated objectives, and "policy-practice decoupling," which refers to the failure of accepted official policies to be reflected in daily operational practices (Bromley & Powell, 2012). This distinction is particularly important in the context of ESG reporting. While regulations such as the CSRD and IFRS S1/S2 compel companies to adopt more comprehensive formal disclosure policies (formal compliance), this does not necessarily mean that these policies actually improve sustainability performance or that the reported information accurately reflects the company's actual operational practices. Indeed, firms under increasing reporting pressure can conceal their actual performance by selectively disclosing relatively harmless impacts to create the appearance of transparency—suggesting that regulatory pressure alone does not eliminate the decoupling between means and ends (Marquis et al., 2016). Similarly, mandatory ESG reporting under the EU's Directive 2014/95 has been found to reduce ESG decoupling among EU-listed firms. The mitigating effect is less pronounced for firms whose ESG information is independently audited (Aboud et al., 2024).

This tendency toward divergence, referred to as "greenwashing" in the sustainability literature, has been theorized as a firm's strategic practice of highlighting positive environmental information while concealing negative information (Delmas & Burbano, 2011; Lyon & Maxwell, 2011). The cost of greenwashing is not merely reputational (Taddeo et al., 2026). Misleading sustainability disclosures can lead to mispricing in capital markets, undermine investment decisions based on ESG ratings, and make it difficult to distinguish the signals from companies undergoing genuine sustainable transformation amid the confusion created by imitators (Berg et al., 2022; Lin et al., 2023; Marquis et al., 2016). For this reason, the ability to systematically and reliably detect greenwashing has become an increasingly important issue for both academia and regulatory

authorities; indeed, a marked increase in the number of systematic reviews on the subject has been observed in recent years (Huang et al., 2025; Lublóy et al., 2025).

In the literature, the identification of greenwashing is evaluated within the framework of two distinct approaches. The first relies on empirical "greenwashing scores" that draw on secondary data sources (e.g., Bloomberg ESG disclosure scores, Refinitiv/Asset4 performance ratings) and quantitatively calculate the discrepancy between the level of disclosure and actual performance. A prominent example of this approach measures the discrepancy between disclosure and performance using a standardized metric (Yu et al., 2020). However, a review covering 111 studies shows that such measurements—including the peer-relative approach described above—have largely been developed independently of one another, are specific to their data sources, and lack standardization; furthermore, the theoretical rationale for selecting specific indicators is often not clearly articulated (Lublóy et al., 2025). Definitions of greenwashing and measurement approaches remain fragmented and have not been integrated under a common theoretical framework (Huang et al., 2025). The second approach consists of descriptive scales and indices that generally assess the quality of sustainability reporting through content analysis based on GRI guidelines (Clarkson et al., 2008). While these scales provide valuable insights into reporting quality, they are not specific to greenwashing; a report that is formally compliant with standards but misleading in content may still score highly on these scales (Boiral, 2013; Michelon et al., 2015). In other words, while existing quality scales are successful at measuring "how much is disclosed," they fall short at distinguishing "how verifiable, concrete, and consistent the disclosed information is."

Based on this, this study proposes a conceptual framework for a Disclosure Quality Index aimed at filling the gap in these two approaches to greenwashing detection. Unlike existing data-driven detection models, the proposed index is built on a four-dimensional structure derived from a synthesis of three established organizational and communication theories. Of these theories, Legitimacy Theory explains how firms' pursuit of social approval shapes their disclosure behavior, while Signaling Theory distinguishes genuine and verifiable information from "cheap talk"—which is cost-free and lacks distinctive power. Impression Management Theory highlights the linguistic and rhetorical strategies managers employ in narrative explanations to create a positive impression among stakeholders (Connelly et al., 2011; Deegan, 2002; Lyon & Maxwell, 2011; Merkl-Davies & Brennan, 2007, 2011). The combined use of these three theories aims to ensure that the proposed index is not only statistically discriminant but also an explainable tool that clarifies why it is discriminant.

This study makes three distinct contributions to the literature. First, it provides the greenwashing detection literature with a solid theoretical foundation that most existing empirical models have largely neglected (Lublóy et al., 2025; Huang et al., 2025). Second, by clarifying the conceptual distinction between sustainability reporting quality scales and the specific detection needs of greenwashing, it provides a roadmap for future scale development efforts. Third, the proposed four-dimensional framework—Volume-Substance Gap, Verifiability and Assurance Level, Linguistic Uncertainty and Rhetorical Strategy, and temporal consistency—is based on concrete and codable indicators that can be empirically tested in the future. As such, the study goes beyond a purely conceptual contribution to provide a direct methodological foundation for subsequent empirical research.

The remainder of the study is structured as follows. Section 2 reviews the existing literature on greenwashing detection and the quality of sustainability reporting, thereby highlighting the aforementioned gap in greater detail. Section 3 discusses the three theories underlying the proposed index and how each justifies a specific dimension of the index. Section 4 details the four-dimensional index structure and its sub-indicators. Section 5 discusses how the index can be applied in practice and which data sources can be used to code it. The sixth and final chapter presents the study's limitations and recommendations for future empirical validation studies.

2. Literature Review

The literature on measuring greenwashing can be grouped into three distinct approaches that have developed largely independently of one another. This section examines each approach separately, discusses their strengths and weaknesses, and ultimately explains why these three approaches have not yet converged into a complementary, integrated framework.

2.1. Quantitative Measures Based on Decoupling

Among the pioneering studies in the literature, the decoupling-scores approach quantitatively calculates the discrepancy between a firm's level of disclosure and its actual environmental/ESG performance (Walker & Wan, 2012; Tashman et al., 2019). Over time, this approach has become one of the most frequently cited in the literature. A prominent example of this approach is a greenwashing score that treats the positive difference between a firm's Bloomberg ESG disclosure level and its ESG performance as measured by independent rating agencies as an indicator of greenwashing—that is, the firm is defined as an "actor that does less than it says" (Yu et al., 2020). A systematic review covering 111 studies demonstrates that while such divergence metrics are frequently used in the literature, there is a significant lack of consensus regarding which disclosure and performance data sources (such as Bloomberg and Refinitiv/Asset4—formerly known as Thomson Reuters ASSET4)—should be used, how data should be standardized, and how industry effects should be controlled (Lublóy et al., 2025). The main advantage of this approach is that it is easily applicable to large-scale, multi-country samples and is reproducible (Tashman et al., 2019). Conversely, the approach's main weakness is that the measure remains entirely dependent on the subjective rating methodology of secondary data providers (Berg et al., 2022; Chatterji et al., 2016; Chatterji et al., 2009) and its failure to provide a direct explanation of which disclosure characteristics (language, verifiability, consistency) indicate greenwashing; in other words, this approach measures greenwashing as an outcome but does not conceptualize the content of the disclosure practices that produce it.

2.2. Content Analysis-Based General Explanatory Quality Indices

The second approach, based on content analysis and with a longer history in the accounting literature (Gray et al., 1995; Hackston & Milne, 1996; Wiseman, 1982), aims to create a quality or comprehensiveness index by directly coding the content of companies' sustainability/environmental reports. A pioneering and still widely cited content-analysis index based on the Global Reporting Initiative (GRI) guidelines systematically scores the scope of voluntary disclosures in companies' environmental and social responsibility reports (Clarkson et al., 2008). This methodology continued to be directly applied in subsequent years and continues to be cited as one of the foundational references in the field in recent meta-analyses (Clarkson et al., 2011; Doan & Sassen, 2020). The strength of such indices lies in their direct focus on the content of disclosures; however, their fundamental limitation is that, while they successfully

measure comprehensiveness (how much is disclosed), they lack a mechanism to distinguish the accuracy, verifiability, or misleading nature of the disclosed information. Indeed, a report that is formally compliant with GRI guidelines can score highly on such indices; this is precisely the scenario that greenwashing enables. Even in reports with the highest level of formal GRI compliance (A/A+), approximately 90 percent of significant adverse events were not reported (Boiral, 2013). Similarly, firms adopting CSR reporting practices such as stand-alone reports, assurance, and reporting guidance do not, on average, provide higher-quality information. Among firms that disclose performance-related information, there is limited evidence that GRI followers are more likely to provide balanced, comparable, and precise disclosures (Michelon et al., 2015).

2.3. Disclosure as a Legitimacy Tool

The third approach focuses on theoretically explaining why disclosure behavior occurs, rather than developing a direct measurement tool (Patten, 1992; O'Donovan, 2002). One of the pioneering studies in this approach, an analysis of the aftermath of the Alaska oil spill found that even firms in the same industry—though not directly responsible for the incident—increased their level of disclosure, thereby revealing that disclosure is a strategic response to a collective legitimacy threat rather than a response to individual firm performance (Patten, 1992). Legitimacy theory was further applied to examine which disclosure strategies firms prefer to close their legitimacy gap (O'Donovan, 2002). Firms with poor environmental performance may allocate more disclosure space to environmental issues in order to restore their legitimacy, a finding interpreted within the framework of legitimacy theory (Cho & Patten, 2007). While this approach is effective in explaining the motivational dynamics underlying greenwashing, it does not provide a directly applicable, codable measurement tool for measuring or identifying greenwashing; the translation of theoretical insights into a concrete index remains largely absent from the literature.

2.4. An Unsynthesized Literature: The Nature of the Gap

An evaluation of these three approaches together clearly reveals the complementary relationship between them and why they do not integrate in their current forms. Discrimination-based measures quantify the extent of the difference but do not explain why or how this difference arises. Content analysis indices, on the other hand, assess the scope of the explanation but do not distinguish its verifiability or linguistic quality. The legitimacy literature, meanwhile, explains motivation but does not translate this into a measurable tool. A review of 180 articles published in 58 journals between 1997 and 2023 also confirms this divergence; definitions of greenwashing, measurement approaches, and theoretical foundations remain fragmented and have not been integrated into a common framework (Huang et al., 2025). A review of empirical greenwashing studies from 1990 to 2022 reaffirms the fragmented nature of these three approaches and shows that researchers remain uncertain about how to operationalize greenwashing (Bernini et al., 2024).

The proposed four-dimensional Disclosure Quality Index aims to bring these three approaches together: the "Volume-Substance Gap" logic drawn from the disaggregation literature, the systematic coding approach drawn from the content analysis literature, and the theoretical rationale derived from legitimacy, signaling, and impression management theories are synthesized into a single conceptual framework. Such an integration effort is not entirely unprecedented in the literature: A five-pillar framework similarly combines quantitative ESG performance data with text analysis of companies' sustainability communications to measure

greenwashing; however, its measurement structure is not grounded in the three theoretical foundations used here (Dorfleitner & Utz, 2024). A review covering 97 articles demonstrates that the greenwashing literature remains fragmented across macro-level theories (legitimacy, organizational, stakeholder), and that the field requires a multi-level, multi-theoretical framework (Forliano et al., 2025). This synthesis is discussed in detail in the following section (Section 3).

3. Theoretical Framework

This section discusses in detail how and why each of the theories—legitimacy theory, signaling theory, and impression management theory—underpins a specific dimension of the proposed index. The aim is to move beyond a list of indicators whose dimensions have been arbitrarily assembled and to establish an integrated structure in which each dimension is grounded in a solid theoretical foundation.

3.1. Legitimacy Theory and the "Volume-Substance Gap" Dimension

Organizational legitimacy can be classified into pragmatic, moral, and cognitive forms, and organizations may use strategic behavior to gain, maintain, or restore it (Suchman, 1995). Within the framework of legitimacy theory adapted to accounting literature, social and environmental disclosures function as a strategic tool to demonstrate to stakeholders that the firm appears to be in alignment with societal expectations (Deegan, 2002). This theoretical proposition points to a directly observable behavioral pattern: a firm seeking legitimacy may find it easier and less costly to increase the volume of its disclosures than to enhance their substantive content. This pattern aligns with the central proposition of the decoupling literature (Bromley & Powell, 2012; Meyer & Rowan, 1977). Therefore, the first dimension of the proposed index—the Volume-Substance Gap—is derived from legitimacy theory: the greater the disparity between the volume of the disclosure and the proportion of concrete, measurable, and verifiable content, the more strongly it indicates that the disclosure is approaching a symbolic strategy aimed at gaining legitimacy.

3.2. Signaling Theory and the "Verifiability and Assurance Level" Dimension

Under conditions of information asymmetry, high-quality actors must send costly and difficult-to-imitate signals in order to distinguish themselves from low-quality actors (Connelly et al., 2011). A game-theoretic model specific to greenwashing applies this logic to environmental disclosures (Lyon & Maxwell, 2011): since disclosures not subject to the threat of independent audit or assurance are virtually cost-free for firms, they can be made with ease even if they do not reflect actual performance—that is, they possess the nature of "cheap talk." In contrast, statements subject to third-party assurance—which are independently verifiable—carry the risk of false claims being exposed and leading to reputational damage; consequently, they are considered more reliable signals that are more strongly linked to actual performance; indeed, voluntarily disclosed environmental statements subject to assurance are of significantly higher quality than those without assurance (Moroney et al., 2012). This theoretical distinction directly justifies the index's second dimension—Verifiability and Assurance Level: whether a statement is subject to third-party assurance, the scope of that assurance (limited/reasonable), and the standard on which it is based (ISAE 3000, AA1000AS) provide a direct way to distinguish whether that statement is a "costly signal" or "cheap talk."

3.3. The Impression Management Theory and the "Linguistic Uncertainty and Rhetorical Strategy (Rhetorical Vagueness)" Dimension

Accounting narratives may involve linguistic and rhetorical strategies that create a positive impression among stakeholders (Merkl-Davies & Brennan, 2007, 2011). These strategies include the use of vague or ambiguous adjectives, conveying information in language that is difficult to interpret, and selective emphasis (highlighting positive outcomes while downplaying negative ones). This claim about readability is supported by evidence from the accounting literature. Li (2008) shows that firms with lower earnings tend to file annual reports that are harder to read, with higher Fog indices and greater length, whereas more readable annual reports are associated with more persistent positive earnings. Similarly, financial-text-specific word lists distinguish categories such as uncertainty, negativity, and caution and reduce systematic misclassification in financial and corporate texts; these tools provide a concrete method for empirically coding this dimension of the proposed index (Loughran & McDonald, 2011). This theoretical proposition directly justifies the index's third dimension—Linguistic Uncertainty and Rhetorical Strategy: the ratio of vague qualitative expressions ("environmentally friendly", "green", "sustainable future") to concrete, measurable commitments that include dates and units can serve as a linguistic indicator of whether a statement stems from an intent to inform or from an intent to manage perceptions.

3.4. The Temporal Dimension of the Dimensions: The Intersection of Legitimacy Restoration and Signal Reliability

The fourth dimension of the index—temporal consistency—is derived not from a single theory but from the interaction of legitimacy and signaling theories over time. Legitimacy must not only be acquired but also maintained and enhanced when threatened (Suchman, 1995); strategies for this enhancement often manifest as the continuous reframing of past commitments (postponing or redefining goals). From the perspective of signaling theory, the reliability of a signal depends not only on its current cost but also on its consistency and frequency over time (Connelly et al., 2011) —constantly postponed or reframed goals erode the signal's discriminatory power. For this reason, a firm's tracking of target-achievement performance across years and the frequency with which targets are reframed are included in the index as indicators of both legitimacy restoration strategies and signal reliability over time.

3.5. Theoretical Integration: Dimension-Theory Mapping

The table below (Table 1) summarizes how the three theories align with the index's four dimensions. This alignment provides a direct foundation for breaking down each dimension into concrete, codable sub-indicators in the following section (Section 4).

Table 1
Theoretical Foundations of the Disclosure Quality Index Dimensions

Dimension	Core Theory	Theoretical Mechanism
1. Volume-Substance Gap	Legitimacy Theory (Suchman, 1995; Deegan, 2002)	The pursuit of symbolic alignment makes increasing volume easier/cheaper than increasing content

Dimension	Core Theory	Theoretical Mechanism
2. Verifiability and Assurance Level	Signaling Theory (Connelly et al., 2011; Lyon & Maxwell, 2011)	The distinction between costly/verifiable signals and "cheap talk"
3. Linguistic Uncertainty and Rhetorical Strategy (Rhetorical Vagueness)	Impression Management Theory (Merkl-Davies & Brennan, 2007, 2011)	Creating a positive impression through ambiguous language and selective framing
4. Temporal Consistency	Legitimacy Repair + Signal Reliability (Suchman, 1995; Connelly et al., 2011)	Postponing/reframing goals over time; can be interpreted as both a legitimacy repair strategy and signal erosion

Note. The table summarizes how each of the four proposed index dimensions is theoretically grounded (see Section 3 for a detailed discussion).

4. Proposed Index Structure

This section provides a detailed examination of the four dimensions whose theoretical foundations were established in Section 3, by breaking each down into concrete and codable sub-indicators. The aim here is to transform the proposed index from a purely conceptual framework into a concrete measurement tool that can be empirically applied in the future through content analysis. Three to four sub-indicators are proposed for each dimension; the decision regarding the final weighting scheme—whether to adopt equal weighting or an expert-based approach such as the Analytic Hierarchy Process—has been deliberately left open and positioned as a methodological choice to be deferred to the empirical validation phase. Throughout Section 4, i denotes the firm and t denotes the reporting year.

4.1. Dimension 1: Volume-Substance Gap

1a. Target Density (TD): This indicator captures the concentration of concrete targets in the sustainability report. Let W_{it} denote the total number of words in the report and $N_{target,it}$ the number of target statements that simultaneously contain a numerical value, a time reference, and a measurable unit. Target Density is the number of concrete targets per thousand words:

$$TD_{it} = \frac{N_{target,it}}{W_{it}} \times 1{,}000, \qquad W_{it} > 0$$

If $W_{it} = 0$ (i.e., no usable text could be extracted), TD_{it} is coded as NA. If $W_{it} > 0$ and $N_{target,it} = 0$, $TD_{it} = 0$ which is a valid (lowest-quality) observation. The inverse measure, the Volume-to-Target Ratio $VTR_{it} = \frac{W_{it}}{N_{target,it}}$ is undefined when the report contains no concrete targets; it is therefore reported only descriptively and is not included in the composite score, since TD and VTR represent the same relationship in opposite directions.

1b. Specificity Share (SS): This indicator measures the share of specific, measurable statements among specific and general statements (e.g., "We will reduce Scope 1 emissions by 30% by 2030 relative to 2020" versus "We are committed to sustainability"). Let $N_{specific,it}$ and $N_{general,it}$ denote the respective counts:

$$SS_{it} = \frac{N_{specific,it}}{N_{specific,it} + N_{general,it}}, \qquad N_{specific,it} + N_{general,it} > 0$$

SS ranges from 0 to 1; values closer to 1 indicate greater specificity. If the report contains neither type of statement SS_{it} is coded as NA.

1c. Visual-Evidence Balance (VEB): Sustainability reports frequently rely on photographs, icons, slogans, and decorative infographics that occupy considerable space without conveying verifiable performance information. VEB measures the share of non-evidentiary visual content within the combined area of non-evidentiary visual elements and evidence-based quantitative displays. Let $A_{visual,it}$ denote the page area occupied by decorative or non-evidentiary visual elements, and $A_{data,it}$ the page area occupied by data tables, charts, and other quantitative displays that report identifiable units, reporting periods, scope, and sources. Charts or infographics that contain verifiable quantitative information are coded as A_{data} not A_{visual}. Areas may be measured in square centimeters or as a percentage of total page area:

$$VEB_{it} = \frac{A_{visual,it}}{A_{visual,it} + A_{data,it}}, \qquad A_{visual,it} + A_{data,it} > 0$$

VEB ranges from 0 to 1; values above 0.5 indicate that decorative visuals occupy more space than evidence-based data displays. Using a share rather than a simple ratio keeps the indicator bounded and avoids an undefined value when a report contains no data tables. If the report contains neither type of element, VEB_{it} is coded as NA. A high VEB may be consistent with symbolic communication, but on its own it is not evidence of greenwashing.

Dimension 1 sub-index. The three indicators are transformed as follows. Here, Nst denotes the prespecified normalized value of each raw indicator, scaled to the [0, 1] interval:

$$Q_{TD,it} = N^{st}(TD_{it}), \quad Q_{SS,it} = N^{st}(SS_{it}), \quad Q_{VEB,it} = 1 - N^{st}(VEB_{it})$$

The Dimension 1 score is the mean of the valid transformed indicators:

$$D_{1,it} = \frac{1}{|V_{1,it}|} \sum_{k \in V_{1,it}} Q_{k,it}\,, \qquad |V_{1,it}| \geq 2$$

Where $V_{1,it}$ is the set of non-missing indicators among Q_{TD}, Q_{SS}, and Q_{VEB}. If fewer than two indicators are available in the valid-indicator set, $D_{1,it}$ is coded as NA. Higher values indicate a smaller gap between disclosure volume and substantive content. Here, k indexes the transformed indicators $Q_{TD,it}$, $Q_{SS,it}$ and $Q_{VEB,it}$ and $|V_{1,it}|$ denotes the number of indicators in $|V_{1,it}|$.

4.2. Dimension 2: Verifiability and Assurance Level

2a. Assurance Presence (AP): Indicates whether the report is subject to third-party assurance (yes/no).

AP ∈ {0, 1}; $AP_{it} = 1$ if the report (or a clearly identified part of it) is subject to independent third-party assurance; otherwise $AP_{it} = 0$.

2b. Scope of Assurance (SA): This indicator records whether the assurance is limited or reasonable. The applicable assurance standard (e.g., ISAE 3000, AA1000AS, or a national auditing standard) is recorded separately.

SA ∈ {0, 1, 2}; $SA_{it} = 0$ for no assurance; $SA_{it} = 1$ for limited assurance, and $SA_{it} = 2$ for reasonable assurance. The assurance standard (ISAE 3000, ISAE 3410, AA1000AS, ISSA 5000, or national standards) is coded as a separate categorical variable and is not included in the score.

2c. Nature of the Assurance Provider (NAP): Indicates whether the entity providing the assurance is an independent audit/assurance firm or a consulting firm affiliated with the company.

NAP ∈ {0, 1}; $NAP_{it} = 1$ if the provider is an independent audit or assurance firm and $NAP_{it} = 0$ if it is a consulting firm affiliated with the company or an internal source.

2d. Data Source Transparency (DST): This indicates whether the calculation methodology for the reported performance data (e.g., emissions calculation protocol) is clearly specified in the report.

DST ∈ {0, 1}; $DST_{it} = 1$ if the calculation methodology or protocol for the reported performance data (e.g., the GHG Protocol for emissions) is explicitly specified; otherwise $DST_{it} = 0$.

Avoiding multiple penalization. In a simple additive formula such as $\frac{\left(AP+\frac{SA}{2}+NAP+DST\right)}{4}$, a report without assurance would be penalized three times, because AP, SA, and NAP would all equal zero. To avoid this, SA and NAP are defined only for assured reports and are combined hierarchically with AP into a single Assurance Block (AB):

$$AB_{it} = AP_{it} \times \left[0.5 \times \frac{SA_{it}}{2} + 0.5 \times NAP_{it} \right]$$

When $AP_{it} = 0$, $AB_{it} = 0$ regardless of SA and NAP, so the absence of assurance is counted only once. When $AP_{it} = 1$, AB_{it} ranges from 0.25 (limited assurance by an affiliated provider) to 1 (reasonable assurance by an independent provider). If $AP_{it} = 1$ but SA or NAP cannot be determined from the assurance statement, AB_{it} is coded as NA.

Dimension 2 sub-index. Within the dimension, the assurance block and data source transparency are combined with equal weights:

$$D_{2,it} = \frac{AB_{it} + DST_{it}}{2}$$

$D_{2,it}$ ranges from 0 to 1. The equal within-dimension weighting is a transparent baseline, not a theoretical claim; alternative within-dimension weights (e.g., a greater weight on the assurance block) should be examined in the sensitivity analyses described in Section 6.2. If either component is NA, $D_{2,it}$ is coded as NA.

4.3. Dimension 3: Linguistic Uncertainty and Rhetorical Strategy (Rhetorical Vagueness)

In operationalizing this dimension, two established tools from the accounting text analysis literature can be utilized: the FOG Index-based readability measure and uncertainty and negativity word lists developed specifically for financial texts (Li, 2008; Loughran & McDonald, 2011). All four indicators in this dimension are negative indicators (higher raw values indicate lower quality). They are normalized using Nst and reversed before aggregation.

3a. Readability Index (FOG): Text complexity, as calculated using the FOG Index or a similar readability measure, serves as an indicator—of whether negative information is conveyed in more

complex language. Firms with lower earnings tend to file harder-to-read and longer annual reports, whereas easier-to-read reports are associated with more persistent positive earnings (Li, 2008).

It is calculated using the formula: FOG=0.4 × [(W / S) + 100 × (K / W)]. Here, W=the total number of words in the text, S=the total number of sentences, and K=the number of words with three or more syllables ("complex" words). As the FOG value increases, the text becomes more difficult to read.

3b. Uncertainty Word Ratio (UWR): Based on the Loughran–McDonald uncertainty word list, this is the ratio of ambiguous expressions in the text to the total number of words (Loughran & McDonald, 2011) and is calculated using the formula:

$$UWR_{it} = \frac{N_{uncertainty,it}}{W_{it}} \times 100, \qquad W_{it} > 0$$

If $W_{it} = 0$, or if a validated dictionary is not available for the language of the report, UWR_{it} is coded as NA. Here, $N_{uncertainty,it}$ denotes the number of uncertainty words identified in the validated dictionary, and W_it denotes the total number of words in the report.

3c. Qualitative Adjective Density (QAD): This is the ratio of unmeasurable qualitative adjectives—such as "green," "environmentally friendly," and "sustainable" —to the total number of such adjectives and their linked supporting evidence. QAD is calculated using the formula:

$$QAD_{it} = \frac{N_{adjective,it}}{N_{adjective,it} + N_{support,it}}, \qquad N_{adjective,it} + N_{support,it} > 0$$

$N_{support,it}$ counts only supporting evidence that is linked to a specific adjective under a pre-specified coding rule (e.g., within the same sentence or paragraph). QAD ranges from 0 to 1; values closer to 1 indicate less substantiated language. If the denominator is zero, QAD_{it} is coded as NA. Here, $N_{adjective,it}$ denotes the number of unmeasurable qualitative adjectives in the report.

3d. Selective Framing (SF): This involves comparing the frequency with which positive performance indicators are highlighted in the report to whether negative indicators receive similar visibility.

Let $G_{positive,it}$ and $G_{negative,it}$ denote composite visibility scores based on pre-specified components such as page position, heading level, typographic emphasis, and the number of words allocated:

$$SF_{it} = \frac{G_{positive,it} - G_{negative,it}}{G_{positive,it} + G_{negative,it}}, \qquad G_{positive,it} + G_{negative,it} > 0$$

SF ranges from −1 to +1; values approaching +1 indicate that positive information is systematically highlighted and negative information is downplayed or omitted. If the denominator is zero, SF_{it} is coded as NA.

Dimension 3 sub-index. All four indicators are normalized and reversed as defined above:

$$Q_{k,it} = 1 - N^{st}(k_{it}), \qquad k \in \{FOG,\ UWR,\ QAD,\ SF\}$$
$$D_{3,it} = \frac{1}{|V_{3,it}|} \sum_{k \in V_{3,it}} Q_{k,it}\,, \qquad |V_{3,it}| \geq 3$$

Where $V_{3,it}$ is the set of non-missing transformed indicators. If fewer than three indicators are available, $D_{3,it}$ is coded as NA. Higher values indicate less ambiguous and less selectively framed language. Here, $N^{st}(k_{it})$ denotes the [0, 1]-normalized raw value for indicator k; k indexes FOG, UWR, QAD, and SF; and $|V_{3,it}|$ denotes the number of non-missing transformed indicators in $V_{3,it}$.

4.4. Dimension 4: Temporal Consistency

The indicators in this dimension require comparison of consecutive reports. A minimum observation window of two consecutive comparable reporting years $(t-1,\ t)$ is required to compute $D_{4,it}$. Three or more consecutive years are needed to examine multi-year patterns.

4a. Target-Achievement Tracking (TAT): Rather than a single yes/no code, TAT is measured as the proportion of prior targets whose achievement status is explicitly reported. Let $N_{prior,it}$ denote the number of quantified targets disclosed in the report for year $t-1$ that are still due or whose deadline has passed, and $N_{reported,it}$ the number of those targets whose status (achieved, on track, not achieved, with figures) is reported in year t:

$$TAT_{it} = \frac{N_{reported,it}}{N_{prior,it}}, \qquad N_{prior,it} > 0$$

If the prior report contained no quantified targets $N_{prior,it} = 0$, TAT_{it} is coded as NA; this is not treated as a failure.

4b. Target Re-framing Frequency (TRF): TRF measures how often targets disappear or are materially changed without explanation. To keep the indicator annual rather than cumulative, it is calculated relative to the targets disclosed in the immediately preceding year. Let $N_{replaced,it}$ denote the number of targets disclosed in year $t-1$ that, in year t, are removed, replaced, re-based, or materially redefined (e.g., a changed base year, scope, or deadline) *without* an explicit explanation and reconciliation:

$$TRF_{it} = \frac{N_{replaced,it}}{N_{prior,it}}, \qquad N_{prior,it} > 0$$

Targets that are achieved and retired, or changed with an explicit and reconciled explanation, are not counted in $N_{replaced,it}$. If $N_{prior,it} = 0$, TRF_{it} is coded as NA. The coding rule identifies an unexplained loss of comparability; it does not infer managerial intent. Multi-year patterns can be examined by averaging TRF_{it} over the observation window.

4c. Methodological Consistency (MC): This refers to whether the performance calculation methodology has changed over the years and whether any methodological changes have been explained retroactively.

MC ∈ {0, 1}; $MC_{it} = 1$ if the performance calculation methodology is unchanged relative to year $t-1$, or if a change is disclosed and prior-year figures are restated or reconciled; $MC_{it} = 0$ if a

change occurs without such explanation. If the methodology cannot be identified in either year, MC_{it} is coded as NA.

Dimension 4 sub-index: TAT and MC are positive indicators, whereas TRF is a negative indicator. If any of the three indicators is NA, $D4_{it}$ is coded as NA.

$D_{4,it} = (TAT_{it} + (1 - TRF_{it}) + MC_{it}) / 3$

4.5. General Structure of the Index

The proposed index (DQI) can be constructed as a weighted sum of the four dimension scores or by reporting them separately by dimension. This structure is mathematically expressed by the following formula:

$$DQI_{it} = \sum_{d=1}^{4} w_d \times D_{d,it}, \qquad \sum_{d=1}^{4} w_d = 1, \quad w_d \geq 0$$

Where DQI_{it} is the disclosure quality score of firm i in year t, $D_{d,it}$ is the quality-oriented score of dimension d (the dimension-score formulas defined above), and w_d is the weight assigned to dimension d. Because all dimension scores range from 0 to 1 and point in the same direction, DQI_{it} also ranges from 0 to 1, and higher values indicate higher disclosure quality. A low DQI value should be interpreted as a signal of elevated disclosure-based greenwashing risk that warrants further examination, not as proof of greenwashing; establishing actual greenwashing requires independent evidence on real performance.

The choice of between-dimension weights is deliberately left open. For transparency and replicability, equal weights $w_1 = w_2 = w_3 = w_4 = 0.25$ are proposed only as a reference specification:

$DQI_{it}^{EW} = 0.25 \times (D_{1,it} + D_{2,it} + D_{3,it} + D_{4,it})$ (EW denotes the equal-weight specification.)

Whether the final weights should remain equal or be determined via an expert panel using the Analytic Hierarchy Process (AHP) or a Delphi study is left to the empirical validation phase (Section 6.2). If any dimension score is NA, the composite DQI is not calculated in the reference specification; the four-dimension scores should then be reported separately, and any re-weighted index must disclose which dimensions were available. Reporting the four-dimension scores alongside the composite is recommended in all cases, since the compensatory structure of the composite aggregation formula allows a weak dimension to be offset by a strong one.

5. Discussion

This section addresses how the Disclosure Quality Index, as specified in Section 4, can be applied empirically: which data sources can be used for coding the index (Section 5.1), how the reliability of the coding process can be ensured (Section 5.2), and the methodological limitations that may be encountered during implementation (Section 5.3) are discussed in turn. This discussion aims to demonstrate that the index is designed not only to be conceptually consistent but also to serve as a tool that can be coded on actual datasets; a broader research agenda regarding empirical validation is addressed in Section 6.2.

5.1. Potential Data Sources

Three main types of primary data sources are envisaged for coding the index:

Independent sustainability reports / integrated reports — Reports prepared in accordance with GRI standards, the ISSB's IFRS S1/S2 framework, the European Sustainability Reporting Standards (ESRS) under the CSRD in the European Union, or national regulatory requirements serve as the primary source for coding both Scope 1 and Scope 3 indicators; Mandatory reports under the CSRD/ESRS may also be used in sample stratification, taking into account the distinction between voluntary and mandatory reporting.

Assurance statements — An independent assurance statement included in the report's appendix or published as a separate document enables the direct coding of Dimension 2; whether the statement exists, its scope (limited/reasonable), the standard on which it is based (ISAE 3000, AA1000AS), and the nature of the assurance provider — that is, whether it is an independent audit or assurance firm or a consulting firm affiliated with the company — can be derived directly from this document.

Multi-year report series — A single year's report is insufficient for coding Dimension 4; a panel structure spanning at least 3–5 years is necessary to identify patterns in the reframing of targets and methodological consistency; keeping the panel too short increases the risk of failing to identify an existing pattern in Dimension 4 indicators.

In addition to these three primary sources, structured ESG databases produced by providers such as Refinitiv/LSEG, Bloomberg, and MSCI can be used as a construct validity check independent of the index's primary coding; however, it must be emphasized that these secondary sources carry their own methodological assumptions and classification criteria; therefore, they cannot replace primary source coding and should be evaluated solely as complementary tools for triangulation.

An approach that evaluates annual report narratives using a multidimensional descriptive profile and a set of criteria can serve as a direct reference point for designing the coding protocol of the proposed index; it demonstrates how quantitative content analysis can be integrated with narrative elements that require subjective judgment (Beattie et al., 2004).

5.2. Coding Process and Reliability

Most of the indicators in Dimensions 1, 2, and 4 can be identified through content analysis coding that is relatively structured and requires a low degree of subjectivity; since these indicators largely require binary (present/absent) or categorical coding, high inter-coder reliability is expected. In contrast, some indicators in Dimension 3—particularly the density of qualitative adjectives in 3c and selective framing in 3d—involve a higher degree of subjective judgment, as the assessment of whether a statement is supported by concrete data or whether an indicator is highlighted depends on the coder's interpretation.

Therefore, in the empirical application of the index, (i) at least two independent coders should be used; (ii) a pilot coding round should be conducted using a detailed codebook prior to coding; (iii) inter-coder reliability should be reported using the Krippendorff alpha coefficient, with reference to the generally accepted threshold of $\alpha \geq 0.80$ ($\alpha \geq 0.667$ as the threshold for limited acceptability) (Hayes & Krippendorff, 2007), and (iv) resolving coding disagreements through arbitration by a third coder. To further reduce subjectivity, it is recommended that the quantitative components of

Dimension 3 (FOG Index and uncertainty-word ratio (UWR)) be calculated using automated text analysis tools (e.g., the Loughran-McDonald dictionary) as much as possible, thereby minimizing the need for human coding.

5.3. Limitations Related to the Scope of Application

There are four foreseeable practical challenges regarding the index's applicability: (i) companies publish reports in different languages; since text analytics tools (FOG Index, Loughran-McDonald dictionary) were developed primarily for English texts, they require language-specific adaptation in multinational samples; (ii) the risk that Dimension 2 will systematically yield low scores and have weak discriminatory power among small and medium-sized enterprises, as these firms often do not obtain independent assurance services; (iii) the lack of multi-year data sets required to identify the reframing of targets (Dimension 4) for newly established firms or those that have recently begun reporting; and (iv) the risk that, should the index gain widespread adoption in the academic literature, firms might learn the coding criteria and adapt their reporting practices to align with the index's metrics—that is, the risk that the measurement itself becomes a target, thereby eroding construct validity. This final risk necessitates that the index be periodically updated over time and that the coding criteria be interpreted not in isolation but in conjunction with changes in firm behavior.

6. Conclusion

6.1. Limitations of the Conceptual Framework

This study, by its very nature, has certain limitations. First, while the three proposed theoretical foundations (legitimacy, signaling, and impression management theories) are comprehensive, they are not exhaustive; other approaches within organizational theory (e.g., stakeholder theory, agency theory, and organizational theory in a broader sense) could have suggested alternative or complementary dimensions for the index; the selection of these three theories is based on their status as the most frequently cited theoretical foundations in the greenwashing literature, but they are not presented as a definitive list.

Second, the fact that the weights to be assigned to the four dimensions (Section 4.5) have not been determined in this study and have been left open constitutes a significant methodological decision point in the index's final empirical application. Another issue closely related to this limitation is that the summation formula defined in Section 4.5 ($DQI_{it} = \Sigma_{d=1}^{4} w_d \times D_{d,it}$) implicitly assumes a compensatory structure: in this structure, a low score in one dimension can be offset by a high score in another dimension. However, given the nature of greenwashing, it may be theoretically more defensible to treat an extremely low score on, for example, the Verifiability and Assurance Level dimension (Dimension 2) as a threshold or disqualifying factor for the index, despite high performance on other dimensions. Which of the compensatory and non-compensatory aggregation rules better reflects the validity of the greenwashing framework is a question that falls outside the scope of this study but must be directly addressed during the empirical validation phase.

Third, the index proposal is largely based on literature derived from regulatory and reporting practices in developed markets (the U.S., the EU); since the prevalence of assurance services, the nature of regulatory pressure, and reporting culture may differ in emerging markets, adapting the index to these contexts requires special attention. In particular, the risk that Dimension 2's

discriminatory power may weaken in markets where independent assurance services are relatively scarce is another issue addressed in Section 5.3.

6.2. Future Empirical Research Agenda

As a natural extension of this conceptual framework, at least four distinct empirical research methodologies can be proposed:

(i) Construct validity testing — The extent to which the proposed four dimensions overlap with or diverge from existing differentiation-based greenwashing scores (e.g., Yu et al., 2020) should be tested; this will clarify whether the proposed index captures a unique structure that cannot be reduced to existing measures, or whether it represents a different operationalization of the same underlying structure.

(ii) Predictive validity test — The extent to which the proposed index predicts a firm's cost of equity capital can be tested against prior evidence on the relationship between disclosure level and the cost of equity capital (Botosan, 1997).

(iii) Weighting and dimension prioritization study — An Analytic Hierarchy Process (AHP) or Delphi study conducted with the participation of an expert panel could ensure that the weights assigned to the four dimensions are grounded in an empirically and theoretically justified basis; this study could also test the preference for the compensated/uncompensated aggregation rule discussed in Section 6.1 against expert opinion.

(iv) Qualitative/mixed-method preparer-side research — Semi-structured interviews with finance/accounting managers, investor relations specialists, and independent assurance providers involved in the sustainability reporting process can help determine to what extent the patterns measured by the index (Volume-Substance Gap, selective framing, etc.) reflect a deliberate strategic choice in internal decision-making processes or a partially unconscious response to corporate pressures; this is a line of research that complements content analysis by directly testing the implicit "intent" assumptions of legitimacy and impression management theories.

6.3. Conclusion

This study has highlighted a long-standing gap in the literature on greenwashing detection: existing measurement approaches are either data-driven and lack a theoretical foundation, or they measure general reporting quality without capturing the Verifiability and Assurance Level and Temporal Consistency dimensions specific to greenwashing. The proposed four-dimensional Disclosure Quality Index—based on a synthesis of legitimacy theory, signaling theory, and impression management theory—offers a theoretically grounded, codable framework to fill this gap.

The study's contribution is not limited to a conceptual proposal; the concrete sub-indicators, measurement metrics, and implementation roadmap detailed in Sections 4 and 5 provide a direct foundation for subsequent empirical research. The limitations discussed in Section 6.1—theoretical scope, weighting uncertainty, and contextual transferability—are positioned as a conscious and honest starting point for this empirical agenda.

From a practical perspective, the proposed index is intended not only for the academic literature but also for regulators (in monitoring the effectiveness of CSRD/ESRS and ISSB standards),

independent assurance providers (as a checklist that can be used to prioritize the scope of assurance regarding coding criteria), and the investor/analyst community (as a complementary layer of verification specific to greenwashing, supplementing existing ESG ratings). As the regulatory importance of sustainability reporting increases, the need for such theoretically sound and empirically applicable measurement tools will continue to grow.

Declarations

Ethics Approval	**This study is conceptual/theoretical in nature and does not involve human or animal subjects or primary data collection; therefore, ethics committee approval was not required.**
Conflict of Interest	The author(s) declare that there is no conflict of interest.
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Data Availability Statement	Not applicable. This conceptual paper does not use or generate empirical datasets.
Use of AI and AI-Assisted Technologies	The authors used generative artificial intelligence (AI) as a language-support tool to improve the clarity, grammar, and readability of the manuscript. The authors reviewed and edited the AI-generated output as necessary and take full responsibility for the content of the published work.

References

Aboud, A., Saleh, A., & Eliwa, Y. (2024). Does mandating ESG reporting reduce ESG decoupling? Evidence from the European Union's Directive 2014/95. Business Strategy and the Environment, 33(2), 1305–1320. https://doi.org/10.1002/bse.3543

Beattie, V., McInnes, B., & Fearnley, S. (2004). A methodology for analyzing and evaluating narratives in annual reports: A comprehensive descriptive profile and metrics for disclosure-quality attributes. Accounting Forum, 28(3), 205–236. https://doi.org/10.1016/j.accfor.2004.07.001

Berg, F., Kölbel, J. F., & Rigobon, R. (2022). Aggregate confusion: The divergence of ESG ratings. Review of Finance, 26(6), 1315–1344. https://doi.org/10.1093/rof/rfac033

Bernini, F., Giuliani, M., & La Rosa, F. (2024). Measuring greenwashing: A systematic methodological literature review. Business Ethics, the Environment & Responsibility, 33(4), 649–667. https://doi.org/10.1111/beer.12631

Boiral, O. (2013). Sustainability reports as simulacra? A counter-account of A and A+ GRI reports. Accounting, Auditing & Accountability Journal, 26(7), 1036–1071. https://doi.org/10.1108/AAAJ-04-2012-00998

Botosan, C. A. (1997). Disclosure level and the cost of equity capital. The Accounting Review, 72(3), 323–349. https://doi.org/10.2308/TAR-9709240185

Bromley, P., & Powell, W. W. (2012). From smoke and mirrors to walking the talk: Decoupling in the contemporary world. Academy of Management Annals, 6(1), 483–530. https://doi.org/10.5465/19416520.2012.684462

Cepêda, C., Monteiro, A. P., & Aibar-Guzmán, B. (2025). Decoupling in sustainability reporting: A systematic literature review. Corporate Social Responsibility and Environmental Management, 32(3), 2988–3007. https://doi.org/10.1002/csr.3114

Chatterji, A. K., Durand, R., Levine, D. I., & Touboul, S. (2016). Do ratings of firms converge? Implications for managers, investors, and strategy researchers. Strategic Management Journal, 37(8), 1597–1614. https://doi.org/10.1002/smj.2407

Chatterji, A. K., Levine, D. I., & Toffel, M. W. (2009). How well do social ratings actually measure corporate social responsibility? Journal of Economics & Management Strategy, 18(1), 125–169. https://doi.org/10.1111/j.1530-9134.2009.00210.x

Cho, C. H., & Patten, D. M. (2007). The role of environmental disclosures as tools of legitimacy: A research note. Accounting, Organizations and Society, 32(7–8), 639–647. https://doi.org/10.1016/j.aos.2006.09.009

Christensen, H. B., Hail, L., & Leuz, C. (2021). Mandatory CSR and sustainability reporting: Economic analysis and literature review. Review of Accounting Studies, 26(3), 1176–1248. https://doi.org/10.1007/s11142-021-09609-5

Clarkson, P. M., Li, Y., Richardson, G. D., & Vasvari, F. P. (2008). Revisiting the relationship between environmental performance and environmental disclosure: An empirical analysis. Accounting, Organizations and Society, 33(4–5), 303–327. https://doi.org/10.1016/j.aos.2007.05.003

Clarkson, P. M., Overell, M. B., & Chapple, L. (2011). Environmental reporting and its relation to corporate environmental performance. Abacus, 47(1), 27–60. https://doi.org/10.1111/j.1467-6281.2011.00330.x

Connelly, B. L., Certo, S. T., Ireland, R. D., & Reutzel, C. R. (2011). Signaling theory: A review and assessment. Journal of Management, 37(1), 39–67. https://doi.org/10.1177/0149206310388419

Deegan, C. (2002). Introduction: The legitimizing effect of social and environmental disclosures – A theoretical foundation. Accounting, Auditing & Accountability Journal, 15(3), 282–311. https://doi.org/10.1108/09513570210435852

Delmas, M. A., & Burbano, V. C. (2011). The drivers of greenwashing. California Management Review, 54(1), 64–87. https://doi.org/10.1525/cmr.2011.54.1.64

Dinh, T., Husmann, A., & Melloni, G. (2023). Corporate sustainability reporting in Europe: A scoping review. Accounting in Europe, 20(1), 1–29. https://doi.org/10.1080/17449480.2022.2149345

Doan, M. H., & Sassen, R. (2020). The relationship between environmental performance and environmental disclosure: A meta-analysis. Journal of Industrial Ecology, 24, 1140–1157. https://doi.org/10.1111/jiec.13002

Dorfleitner, G., & Utz, S. (2024). Green, green, it's green they say: A conceptual framework for measuring greenwashing at the firm level. Review of Managerial Science, 18, 3463–3486. https://doi.org/10.1007/s11846-023-00718-w

European Union. (2022). Directive (EU) 2022/2464 of the European Parliament and of the Council of 14 December 2022 amending Regulation (EU) No 537/2014, Directive 2004/109/EC, Directive 2006/43/EC and Directive 2013/34/EU, as regards corporate sustainability reporting (Text with EEA relevance). Official Journal of the European Union, L 322, 15–80. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32022L2464

Forliano, C., Battisti, E., de Bernardi, P., & Kliestik, T. (2025). Mapping the greenwashing research landscape: A theoretical and field analysis. Review of Managerial Science, 19, 3407–3456. https://doi.org/10.1007/s11846-025-00856-3

Gray, R., Kouhy, R., & Lavers, S. (1995). Corporate social and environmental reporting: A review of the literature and a longitudinal study of UK disclosure. Accounting, Auditing & Accountability Journal, 8(2), 47–77. https://doi.org/10.1108/09513579510146996

Hackston, D., & Milne, M. J. (1996). Some determinants of social and environmental disclosures in New Zealand companies. Accounting, Auditing & Accountability Journal, 9(1), 77–108. https://doi.org/10.1108/09513579610109987

Hayes, A. F., & Krippendorff, K. (2007). Answering the call for a standard reliability measure for coding data. Communication Methods and Measures, 1(1), 77–89. https://doi.org/10.1080/19312450709336664

Huang, Z., Shi, Y., & Jia, M. (2025). Greenwashing: A systematic literature review. Accounting & Finance, 65(1), 857–882. https://doi.org/10.1111/acfi.13352

IFRS Foundation. (2023a). IFRS S1 General requirements for disclosure of sustainability-related financial information. International Sustainability Standards Board. https://www.ifrs.org/issued-standards/ifrs-sustainability-standards-navigator/ifrs-s1-general-requirements/

IFRS Foundation. (2023b). IFRS S2 Climate-related disclosures. International Sustainability Standards Board. https://www.ifrs.org/issued-standards/ifrs-sustainability-standards-navigator/ifrs-s2-climate-related-disclosures/

Li, F. (2008). Annual report readability, current earnings, and earnings persistence. Journal of Accounting and Economics, 45(2–3), 221–247. https://doi.org/10.1016/j.jacceco.2008.02.003

Lin, X., Zhu, H., & Meng, Y. (2023). ESG greenwashing and equity mispricing: Evidence from China. Finance Research Letters, 58, 104606. https://doi.org/10.1016/j.frl.2023.104606

Lin, Y., Shen, R., Wang, J., & Yu, Y. J. (2024). Global evolution of environmental and social disclosure in annual reports. Journal of Accounting Research, 62(5), 1941–1988. https://doi.org/10.1111/1475-679X.12575

Loughran, T., & McDonald, B. (2011). When is a liability not a liability? Textual analysis, dictionaries, and 10-Ks. The Journal of Finance, 66(1), 35–65. https://doi.org/10.1111/j.1540-6261.2010.01625.x

Lublóy, Á., Keresztúri, J. L., & Berlinger, E. (2025). Quantifying firm-level greenwashing: A systematic literature review. Journal of Environmental Management, 373, 123399. https://doi.org/10.1016/j.jenvman.2024.123399

Lyon, T. P., & Maxwell, J. W. (2011). Greenwash: Corporate environmental disclosure under threat of audit. Journal of Economics & Management Strategy, 20(1), 3–41. https://doi.org/10.1111/j.1530-9134.2010.00282.x

Marquis, C., Toffel, M. W., & Zhou, Y. (2016). Scrutiny, norms, and selective disclosure: A global study of greenwashing. Organization Science, 27(2), 483–504. https://doi.org/10.1287/orsc.2015.1039

Merkl-Davies, D. M., & Brennan, N. M. (2007). Discretionary disclosure strategies in corporate narratives: Incremental information or impression management? Journal of Accounting Literature, 26, 116–196.

Merkl-Davies, D. M., & Brennan, N. M. (2011). A conceptual framework of impression management: New insights from psychology, sociology, and critical perspectives. Accounting and Business Research, 41(5), 415–437. https://doi.org/10.1080/00014788.2011.574222

Meyer, J. W., & Rowan, B. (1977). Institutionalized organizations: Formal structure as myth and ceremony. American Journal of Sociology, 83(2), 340–363. https://doi.org/10.1086/226550

Michelon, G., Pilonato, S., & Ricceri, F. (2015). CSR reporting practices and the quality of disclosure: An empirical analysis. Critical Perspectives on Accounting, 33, 59–78. https://doi.org/10.1016/j.cpa.2014.10.003

Moroney, R., Windsor, C., & Aw, Y. T. (2012). Evidence of assurance enhancing the quality of voluntary environmental disclosures: An empirical analysis. Accounting & Finance, 52(3), 903–939. https://doi.org/10.1111/j.1467-629X.2011.00413.x

O'Donovan, G. (2002). Environmental disclosures in the annual report: Extending the applicability and predictive power of legitimacy theory. Accounting, Auditing & Accountability Journal, 15(3), 344–371. https://doi.org/10.1108/09513570210435870

Patten, D. M. (1992). Intra-industry environmental disclosures in response to the Alaskan oil spill: A note on legitimacy theory. Accounting, Organizations and Society, 17(5), 471–475. https://doi.org/10.1016/0361-3682(92)90042-Q

Suchman, M. C. (1995). Managing legitimacy: Strategic and institutional approaches. Academy of Management Review, 20(3), 571–610. https://doi.org/10.5465/amr.1995.9508080331

Taddeo, S., Regoli, A., Weber, O., & Carè, R. (2026). Green talk, costly walk: The financial cost of greenwashing. Business Strategy and the Environment, 35(6), 8589–8609. https://doi.org/10.1002/bse.70595

Tashman, P., Marano, V., & Kostova, T. (2019). Walking the walk or talking the talk? Corporate social responsibility decoupling in emerging market multinationals. Journal of International Business Studies, 50, 153–171. https://doi.org/10.1057/s41267-018-0171-7

Walker, K., & Wan, F. (2012). The harm of symbolic actions and greenwashing: Corporate actions and communications on environmental performance and their financial implications. Journal of Business Ethics, 109, 227–242. https://doi.org/10.1007/s10551-011-1122-4

Wiseman, J. (1982). An evaluation of environmental disclosures made in corporate annual reports. Accounting, Organizations and Society, 7(1), 53–63. https://doi.org/10.1016/0361-3682(82)90025-3

Yu, E. P., Van Luu, B., & Chen, C. H. (2020). Greenwashing in environmental, social, and governance disclosures. Research in International Business and Finance, 52, 101192. https://doi.org/10.1016/j.ribaf.2020.101192