CAP CONTEMPORARY ACCOUNTING PERSPECTIVES
AN INTERNATIONAL PEER-REVIEWED JOURNAL
RESEARCH ARTICLE

VOLUME: 1 • ISSUE: 1 • YEAR • 2026
DOI: https://doi.org/10.68656/pm5rvc26
Pages | 54–73
Submitted | 3 August 2026
Accepted | 14 September 2026
Published | 1 October 2026

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

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**Suggested Citation:** Şardağ Karabulut, M. (2026). Integration of Data Analytics and Information Technologies in Graduate Accounting Education: A Curriculum Review in Türkiye. *Contemporary Accounting Perspectives*, 1(1), 54–73. https://doi.org/10.68656/pm5rvc26

**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).

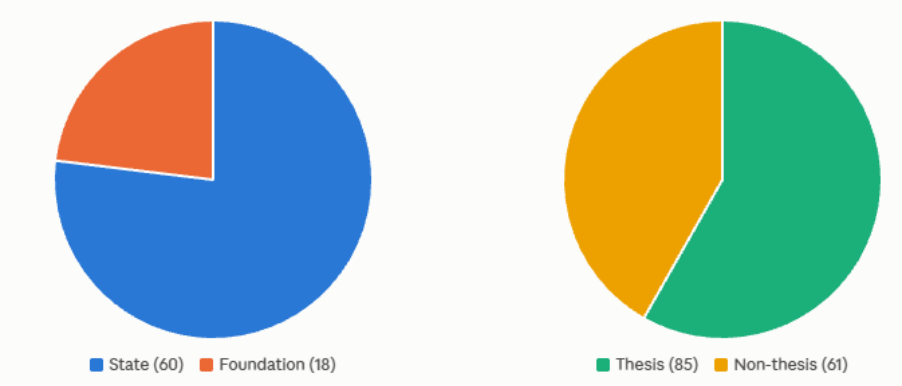



**Figure 1.**
**Distribution of sampled universities by institutional type (state vs. foundation) and programs by degree track (thesis vs. non-thesis)**

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.** |
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| **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. |

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