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Modeling the Role of Accounting in Enhancing Financial Performance, Technological Innovation, and Sustainability of Knowledge-Based Companies: A Structural Equation Modeling (SEM) Approach

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A B S T R A C T

The objective of this study is to model the role of accounting in enhancing financial performance, technological innovation, and sustainability of knowledge-based companies. Considering the importance of these companies in a knowledge-driven economy and the existing challenges related to financial transparency, capital attraction, and sustainable development, examining the role of accounting systems can open new horizons for improving managerial decision-making and strengthening competitive capabilities. This research is applied in purpose and descriptive–survey and quantitative in method. The statistical population in the qualitative phase consisted of accounting faculty members with more than ten years of executive experience, who were selected through purposive sampling. Semi-structured interviews were conducted until theoretical saturation was reached. In the quantitative phase, the statistical population included all accountants working in knowledge-based companies. Using the Krejcie and Morgan table, a sample of 384 participants was selected. The data collection tool was a researcher-designed questionnaire with 25 items across five main dimensions of the study. Its validity was confirmed by subject-matter experts, and its reliability was verified with a Cronbach's alpha coefficient greater than 0.8. Data analysis was conducted using Structural Equation Modeling (SEM) with SPSS and AMOS software. The findings showed that accounting has a positive and significant effect on the financial performance, technological innovation, and sustainability of knowledge-based companies. In other words, the presence of transparent and efficient accounting systems can not only improve financial management and attract capital but also create conditions for the development of innovative activities and enhancement of organizational sustainability.

Keywords: *Accounting; Financial Performance; Technological Innovation; Sustainability; Knowledge-Based Companies.*

1. Introduction

The global shift toward a knowledge-based economy has profoundly redefined the dynamics of competitiveness, innovation, and sustainable growth in organizations. Knowledge-based companies (KBCs), as crucial actors in this evolving landscape, leverage intellectual capital and technology-driven strategies to deliver high-value products and services (Karimi et al., 2024; Khayatian, 2016). These firms are increasingly viewed as engines of economic development, particularly in emerging markets, where they act as drivers of productivity and innovation ecosystems (Mehrshad & Naderi, 2024). However, despite their potential, many KBCs face challenges related to resource optimization, technological complexity, and maintaining financial stability while pursuing innovation (Shahroudi, 2024; Shahroudi et al., 2024). Addressing these challenges requires robust, adaptable accounting and financial management frameworks that can support both performance enhancement and strategic growth (Ghorbani, 2025; Moradi, 2024).

Accounting has historically served as the backbone of corporate reporting and decision-making (Beaver & Ryan, 2000; Lev & Zarowin, 1999). Yet, its conventional focus on historical financial data and compliance-based reporting is increasingly inadequate for KBCs, which operate in environments characterized by high uncertainty and technological disruption (Barth & Gee, 2024; Bushman & Landsman, 2010). Recent research emphasizes the need for accounting systems to evolve beyond mere stewardship to become dynamic, knowledge-enabling platforms capable of supporting innovation, sustainability, and strategic decision-making (Norooz Zadeh & Abas Zadeh Asl, 2022; Smith et al., 2024). These systems must not only ensure transparency and reduce information asymmetry but also integrate advanced technologies and predictive capabilities that inform managerial actions in real time (Bani Mahd, 2012; Lambert et al., 2007).

Transparency in financial reporting has been highlighted as a fundamental enabler of investor confidence and firm performance, particularly in technology-oriented and innovation-driven companies (Smith et al., 2024). By mitigating information asymmetry and enhancing disclosure quality, transparent accounting reduces the cost of capital and improves firms' ability to attract long-term investment (Bushman & Landsman, 2010; Lambert et al., 2007). This becomes crucial for KBCs, where intangible assets and research and development (R&D) investments dominate financial structures (Beaver & Ryan, 2000; Lev & Zarowin, 1999). Additionally, high-quality accounting information supports strategic alignment and resource allocation in rapidly changing environments, allowing managers to balance risk and opportunity effectively (Bani Mahd, 2012; Lotfi, 2023).

The rise of digital transformation and Fourth Industrial Revolution technologies further accelerates the need for adaptable accounting systems (Karimi et al., 2024; Kholdarov & Khatamova, 2025). Digital tools such as artificial intelligence (AI), blockchain, and integrated information platforms are transforming the timeliness, reliability, and security of financial data (Johri, 2025; Pratiwi & Ermaya, 2024). Blockchain technology, for instance, enhances the transparency and immutability of transactions, thereby increasing trust among stakeholders and reducing fraud risks (Pratiwi & Ermaya, 2024). AI-driven systems improve data accuracy and analytical capability, allowing companies to forecast performance outcomes and detect anomalies proactively (Johri, 2025; Kholdarov & Khatamova, 2025). For KBCs, these advances not only strengthen internal decision-making but also enable compliance with evolving regulatory and investor expectations regarding environmental, social, and governance (ESG) performance (Al-Hattami & Kabra, 2024; Barth & Gee, 2024).

Knowledge management (KM) represents another critical domain where accounting plays an enabling role (Al-Dmour et al., 2023). Modern KM practices depend heavily on accurate, timely, and relevant accounting information to measure intellectual capital, evaluate innovation outcomes, and support long-term capability building (Norooz Zadeh & Abas Zadeh Asl, 2022). The integration of KM processes with accounting information systems (AIS) enhances business performance by turning data into actionable insights (Al-Dmour et al., 2023; Moradi, 2024). Furthermore, the ability to quantify and report intangible resources such as research output, human capital, and collaborative networks allows KBCs to communicate their value creation mechanisms beyond traditional financial statements (Lev & Zarowin, 1999; Lotfi, 2023).

Despite these advances, KBCs still encounter difficulties in aligning their financial management structures with innovation-driven strategies (Rasyid et al., 2024; Shahroudi, 2024). Technological complexity in R&D activities often creates uncertainty in valuation and reporting, complicating resource allocation decisions and risk assessment (Shahroudi et al., 2024). Integrating modern management

accounting techniques, such as activity-based costing, strategic performance measurement, and sustainability accounting, can bridge this gap by linking operational innovation metrics to financial performance (Ghorbani, 2025; Malek Hosseini et al., 2025). These tools support managers in balancing short-term profitability with long-term technological advancement and sustainability objectives (Al-Hattami & Kabra, 2024; Kim & Park, 2024).

Sustainability has become a vital strategic concern for KBCs due to increasing environmental regulations, social responsibility expectations, and the necessity for resource-efficient growth (Karimi et al., 2024; Kim & Park, 2024). Accounting systems that integrate sustainability metrics and ESG indicators enable companies to assess and communicate their environmental and social impact alongside economic performance (Barth & Gee, 2024; Smith et al., 2024). By doing so, firms strengthen stakeholder trust and ensure long-term viability in competitive markets. Sustainability-focused accounting also facilitates the measurement of innovation outcomes that contribute to green technologies, circular economy models, and knowledge transfer across industries (Kim & Park, 2024; Norooz Zadeh & Abas Zadeh Asl, 2022).

The capital market perspective provides further insight into the significance of high-quality accounting for KBCs. Studies have shown that characteristics of capital market transactions directly influence the pricing of accounting valuation models (Meyzari Hormozabadi & Naderi Bani, 2017). High disclosure quality and reduced earnings manipulation lower the risk premium demanded by investors and improve market-based valuation (Bani Mahd, 2012; Beaver & Ryan, 2000). This is particularly critical for companies that rely on venture capital or equity financing to fund R&D and market expansion (Bushman & Landsman, 2010; Lambert et al., 2007). Furthermore, corporate reporting regulation remains a double-edged sword; while it enhances comparability and reliability, it may also impose compliance costs that discourage agile innovation (Bushman & Landsman, 2010). Thus, developing tailored reporting frameworks that balance regulation with the flexibility needed by innovative firms is essential.

The interplay between board governance and management accounting also shapes financial outcomes in innovation-driven contexts (Malek Hosseini et al., 2025). Effective board oversight ensures the adoption of modern management accounting techniques, enabling firms to monitor complex innovation projects and maintain accountability (Rajan et al., 2007). Conservatism in accounting—while providing stability—must be balanced with forward-looking measures that capture growth potential and intangible asset creation (Lev & Zarowin, 1999; Rajan et al., 2007). This balance is key to supporting strategic investment decisions in uncertain technological landscapes.

Regional and contextual studies further highlight that KBCs in emerging economies face additional obstacles, including limited access to advanced digital infrastructure, insufficient accounting expertise, and fragmented innovation ecosystems (Karimi et al., 2024; Mehrshad & Naderi, 2024). Tailored models that integrate local entrepreneurial ecosystems with global best practices in accounting and innovation management can significantly enhance competitiveness (Johri, 2025; Kholdarov & Khatamova, 2025). At the same time, developing economies have the opportunity to leapfrog traditional accounting systems by adopting AI and blockchain-driven frameworks that support both regulatory compliance and strategic agility (Johri, 2025; Pratiwi & Ermaya, 2024).

Building on these insights, the present study models the role of accounting in enhancing financial performance, technological innovation, and sustainability within knowledge-based companies. It investigates how transparent, adaptive, and technology-enabled accounting systems can reduce uncertainty, guide strategic investments, and foster long-term resilience. By integrating advanced AIS, KM practices, and sustainability reporting, this research contributes to a deeper understanding of how accounting transcends its traditional role and becomes a strategic enabler of competitive advantage in the knowledge-driven economy (Barth & Gee, 2024; Moradi, 2024; Norooz Zadeh & Abas Zadeh Asl, 2022; Smith et al., 2024). The objective of this study is to model the role of accounting in enhancing financial performance, technological innovation, and sustainability of knowledge-based companies.

2. Methods and Materials

This research is applied in purpose and descriptive–survey and quantitative in nature and method, and to test the conceptual model of the study, the Structural Equation Modeling (SEM) approach was employed.

In the qualitative stage, the research population consisted of accounting faculty members with more than ten years of executive experience, who were purposively selected to conduct semi-structured interviews. The interviews continued until theoretical saturation was reached, and in the end, 15 experts were studied.

In the quantitative stage, the statistical population included all accountants employed in knowledge-based companies. Since the exact size of the population was unknown, the sample size was determined as 384 individuals based on the Krejcie and Morgan table. To ensure sufficient return of questionnaires, 390 questionnaires were distributed, and finally, 380 valid questionnaires were collected and used for statistical analysis.

The data collection tools in this study included semi-structured interviews in the qualitative part and a structured questionnaire in the quantitative part. The designed questionnaire consisted of two sections: the first part addressed the demographic characteristics of the respondents (such as age, education, and work experience), and the second part included 25 questions related to the study variables, categorized into five main dimensions: financial management and planning, auditing and compliance, technology and innovation in accounting, strategic and business development dimension, and development of knowledge-based companies.

Responses were measured using a five-point Likert scale ranging from "strongly disagree" to "strongly agree." To ensure the questionnaire's validity, the content of the questions was confirmed by supervisors and subject-matter experts, and the Content Validity Ratio (CVR) was calculated. Additionally, the reliability of the questionnaire was assessed using Cronbach's alpha, which yielded values greater than 0.8 for all dimensions, indicating desirable reliability of the data collection instrument.

In the qualitative phase, the Fuzzy Delphi method and Interpretive Structural Modeling (ISM) were applied to screen and categorize the factors. In the quantitative phase, the collected data were analyzed using SPSS (version 24) and AMOS (version 24) to validate and test the conceptual model of the study.

3. Findings and Results

In the findings section, first, the descriptive statistics of the demographic characteristics of the sample are reported. Among the 380 collected questionnaires, 208 respondents were male (54.7%) and 172 were female (45.3%), indicating a relatively balanced gender distribution among participants.

Regarding the level of education, 220 respondents (57.9%) held a bachelor's degree, and 160 respondents (42.1%) held a master's degree or higher. This distribution indicates that a significant portion of the sample had advanced academic education. Examining the age of respondents revealed that the largest age group was 25 to 35 years, with 159 individuals (41.8%). This was followed by 111 individuals (29.2%) aged 36 to 45, 84 individuals (22.1%) aged 46 to 55, and finally, 26 individuals (6.8%) over 55 years old. This distribution reflects the relatively young nature of a large portion of the sample and their active presence in knowledge-based companies. Regarding work experience, the largest share belonged to individuals with less than 10 years of executive experience (163 individuals, 42.9%). Additionally, 155 individuals (40.8%) had 10 to 20 years of work experience, and only 62 individuals (16.3%) had more than 20 years of executive experience. These results show that most respondents have considerable work experience, but a relatively high proportion are mid-career professionals with moderate experience levels. Table 1 shows the mean, standard deviation, skewness, and kurtosis of the research variables. The abbreviations of the variables are also presented in this section.

Table 1

Descriptive Statistics of Research Variables

Variable	Mean	SD	Skewness	Kurtosis	Minimum	Maximum	N
Financial Management and Planning	3.652	0.719	-0.334	0.655	1.00	5.00	380
Auditing and Compliance	3.481	0.647	-0.140	-0.166	1.00	5.00	380
Technology and Innovation in Accounting	3.522	0.702	0.080	0.017	1.00	5.00	380
Strategic and Business Development in Accounting	3.277	0.644	-0.215	-0.623	1.00	5.00	380
Development of Knowledge-Based Companies	3.325	0.523	0.198	0.541	1.00	5.00	380

Based on the results in the table, the skewness and kurtosis of all variables are within the range of -2 to +2; therefore, the variables have a normal distribution.

In this section, inferential statistical techniques are applied to analyze the data collected by the research questionnaire, with the aim of testing and examining the study hypotheses.

In this study, Structural Equation Modeling (SEM) was used. SEM is a statistical modeling technique that integrates other methods such as multivariate regression, factor

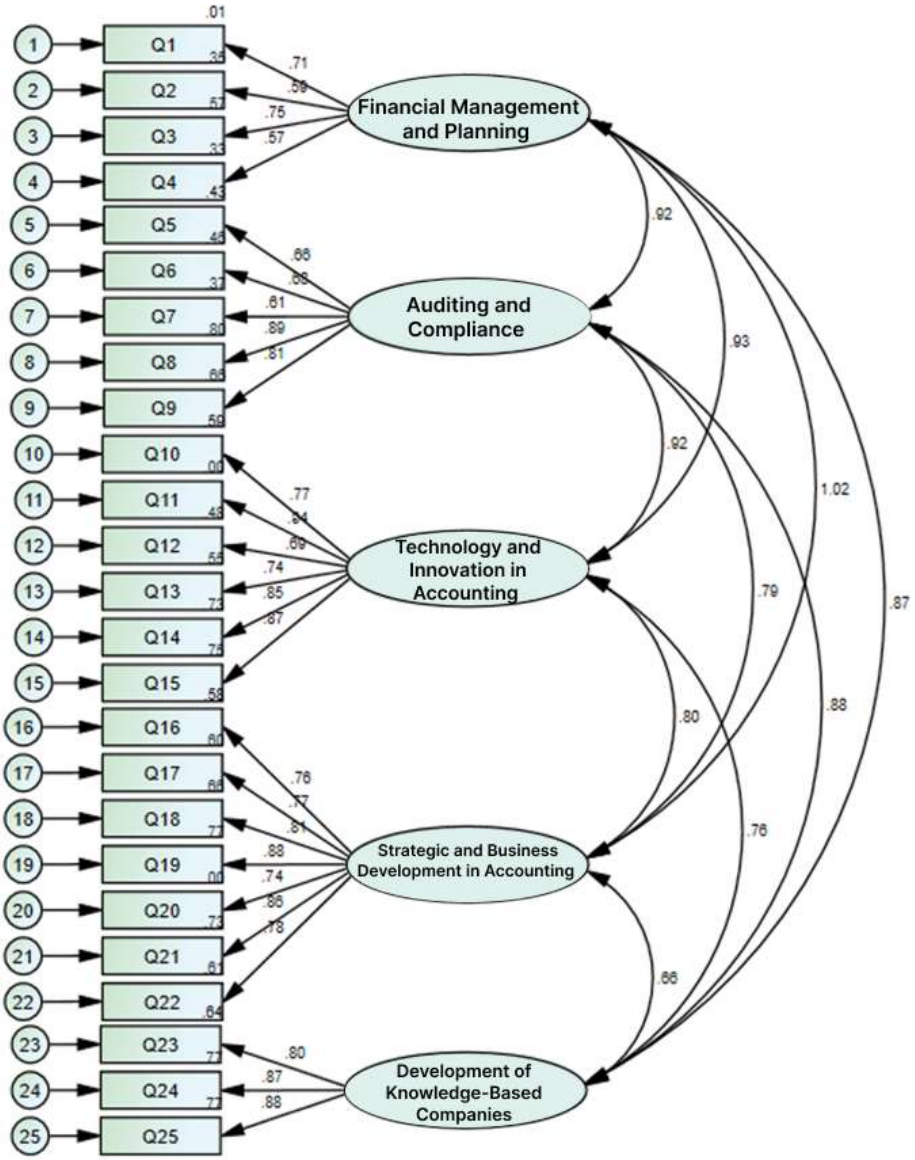
analysis, and path analysis, with a primary focus on latent variables defined through measurable indicators and observed variables.

Through this method, it is possible to infer causal relationships among variables that are not directly observable, while considering measurement errors, and to examine the correlation and effect size between them. Like regression techniques, SEM quantifies the relationships between independent and dependent variables; however, unlike regression parameters that describe empirical correlations, structural parameters explain causal relationships.

Before fitting the structural model, it is necessary to examine whether the 25 observed items in the questionnaire (the questionnaire questions) adequately represent the five constructs (research variables). The overall fit of the measurement model was determined using Confirmatory Factor Analysis (CFA). After running the proposed model, some modifications suggested by the software were implemented to improve and optimize the model fit. These modifications involved freeing the covariance between certain error terms. The revised measurement model with these adjustments is presented in the next figure.

Figure 1

Revised Measurement Model with Standardized Coefficients



In this section, the structural model of the research is fitted to examine and test the main hypotheses. This model is shown in the following figure.

Figure 2

Structural Model of the Research

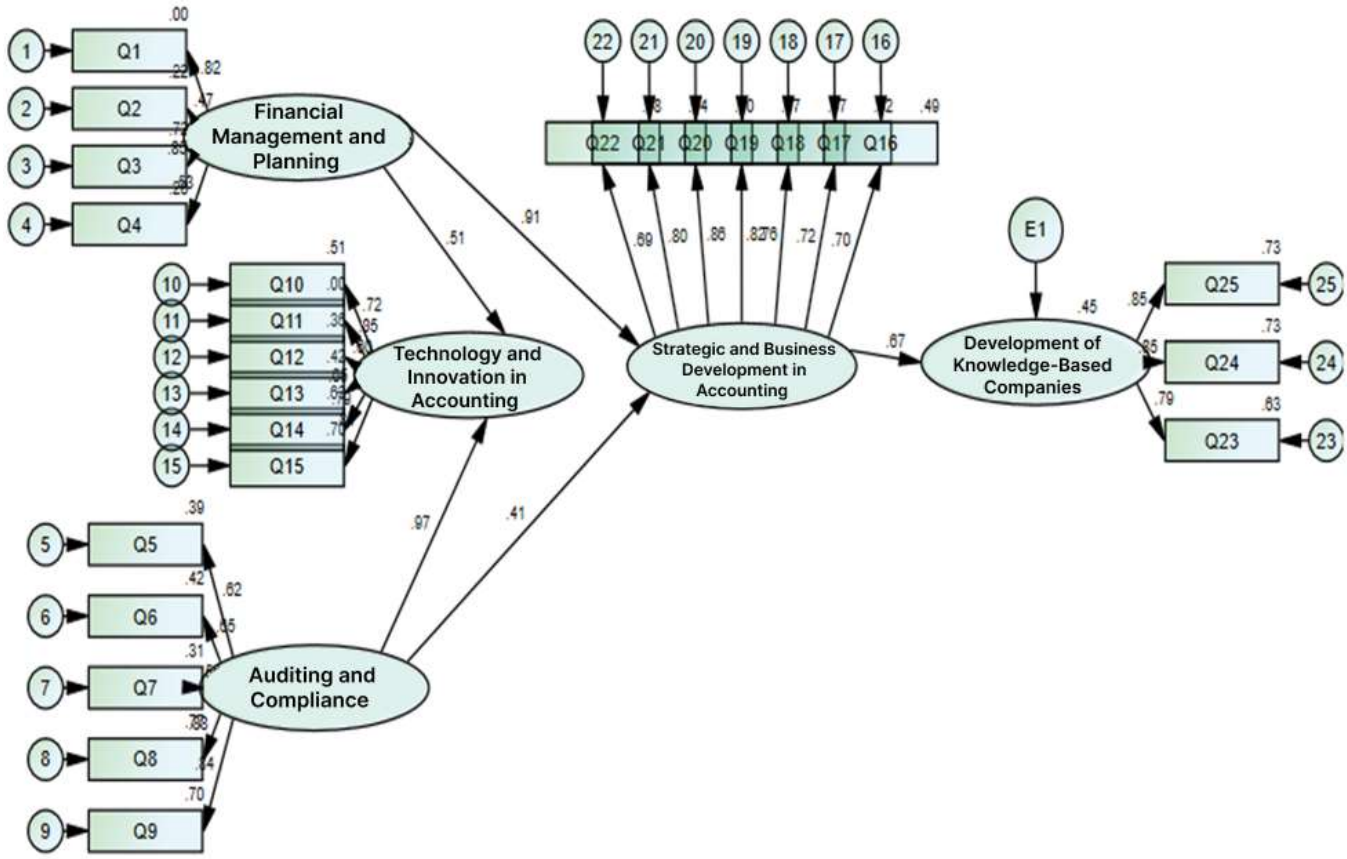


Table 2 presents the fit indices of the above model. If the values of the fit indices fall within the acceptable range, it indicates that the model fits well with the collected data. This table, titled "Fit Indices of the Research Model," evaluates the goodness-of-fit of the main research model and includes several key indices commonly used in statistical analysis and structural modeling. The first row shows the different fit indices, including RMSEA, NFI, CFI, TLI, IFI, GFI, and the CIM/df ratio.

Table 2

Fit Indices of the Research Model

Model Fit Index	CIMIN/df	GFI	IFI	TLI	CFI	NFI	RMSEA
Main Model	3.728	0.982	0.921	0.945	0.981	0.930	0.005
Acceptable Range	1 to 5	> 0.9	> 0.9	> 0.9	> 0.9	> 0.9	< 0.05

RMSEA (Root Mean Square Error of Approximation): This index shows the degree of error in the model fit. The obtained value of 0.005 is far below the acceptable threshold, indicating an excellent model fit.

NFI (Normed Fit Index): With a value of 0.930, which is higher than the acceptable threshold of 0.9, this indicates a good fit of the model to the data.

CFI (Comparative Fit Index): The value of 0.981 shows that the model fits the data very well (acceptable > 0.9).

TLI (Tucker-Lewis Index): The value of 0.945 exceeds the acceptable level of 0.9, confirming a good model fit.

IFI (Incremental Fit Index): The value of 0.921 indicates a suitable fit of the model to the data.

GFI (Goodness of Fit Index): The value of 0.982 shows an excellent overall model fit.

CIM/df (Chi-square divided by degrees of freedom): The value of 3.728 falls within the acceptable range of 1 to 5, indicating that the model is adequate according to the chi-square criterion.

Overall, all the reported indices show that the research model fits the data well and is statistically sound and reliable.

As shown in Table 3, all fit indices fall within an acceptable range. Therefore, the structural analysis model is confirmed as having a good fit with the collected data. Based on the results of the research structural model, the next step involves interpreting the path analysis results for the study hypotheses.

To examine the research hypotheses, the simultaneous significance of the relationships among variables must be analyzed. For the mediating role of a variable to be meaningful in the relationship between two other variables, the relationships among the variables must simultaneously be statistically significant. In other words, if the mediating role of y in the relationship between z and x is to be confirmed, both the relationship between y and x and the relationship between z and y must be statistically significant.

Table 3

Path Analysis Results of the Research Model

Path	Standardized Coefficient	Standard Error	t-value	p-value
Auditing and Compliance → Strategic and Business Development in Accounting	0.406	0.056	8.803	0.000
Financial Management and Planning → Strategic and Business Development in Accounting	0.914	0.128	9.637	0.000
Auditing and Compliance → Technology and Innovation in Accounting	0.967	0.043	19.651	0.000
Financial Management and Planning → Technology and Innovation in Accounting	0.515	0.061	7.006	0.000
Technology and Innovation in Accounting → Development of Knowledge-Based Companies	0.669	0.076	10.904	0.000

Based on the structural equation modeling analysis and the very small p-values in this table, all relationships between the variables are statistically significant.

Specifically, the effect of auditing and compliance on strategic and business development in accounting is significant, with a standardized coefficient of 0.406 and a t-value of 8.803, indicating a positive impact. Financial management and planning show a very strong and significant effect on strategic and business development in accounting, with a standardized coefficient of 0.914 and a t-value of 9.637.

The effect of auditing and compliance on technology and innovation in accounting is also highly significant, with a standardized coefficient of 0.967 and a t-value of 19.651, indicating its critical role. Financial management and planning exert a significant influence on technology and innovation in accounting as well, with a coefficient of 0.515 and a t-value of 7.006.

Finally, technology and innovation in accounting significantly affect the development of knowledge-based companies, with a standardized coefficient of 0.669 and a t-value of 10.904.

These high levels of statistical significance confirm the strength and reliability of the relationships in the model.

4. Discussion and Conclusion

The results of this study confirmed that accounting exerts a strong and statistically significant influence on the financial performance, technological innovation, and sustainability of knowledge-based companies (KBCs). The path analysis demonstrated that financial management and planning, alongside auditing and compliance, act as foundational drivers for the strategic development of accounting-related business models and the integration of innovative technologies. Furthermore, technological and innovation capabilities in accounting emerged as a crucial predictor of sustainable organizational development in KBCs. These findings reinforce the evolving view of accounting as a strategic enabler rather than a mere reporting tool (Ghorbani, 2025; Moradi, 2024).

One of the most prominent findings was the significant path coefficient linking financial management and planning to the strategic and business development dimension of accounting. The strength of this relationship suggests that well-structured financial planning not only ensures short-term liquidity and capital efficiency but also empowers companies to invest in innovative processes and maintain market competitiveness (Kim & Park, 2024; Smith et al., 2024). This aligns with the argument that modern accounting frameworks reduce information asymmetry and enable better resource allocation (Bani Mahd, 2012; Lotfi, 2023). Previous studies also suggest that robust financial planning frameworks mitigate risk, attract investors, and facilitate sustainable scaling, particularly in high-uncertainty environments like knowledge-based sectors (Bushman & Landsman, 2010; Lambert et al., 2007).

The findings further revealed that auditing and compliance significantly affect both strategic development and technology and innovation in accounting. This outcome underscores the critical role of internal control and compliance systems in establishing reliable data environments and reducing uncertainty for decision-makers (Al-Hattami & Kabra, 2024; Beaver & Ryan, 2000). As prior research indicates, auditing not only assures the accuracy of financial information but also improves managerial confidence in implementing complex and innovation-driven strategies (Bushman & Landsman, 2010; Lev & Zarowin, 1999). The present study's results converge with (Al-Dmour et al., 2023), who found that knowledge management processes gain effectiveness when supported by high-quality, reliable accounting data. Compliance structures also seem to play an enabling role by ensuring that technological innovation, such as the adoption of advanced information systems, is integrated within regulatory and ethical boundaries (Rasyid et al., 2024).

A particularly notable outcome is the strong and highly significant relationship between technology and innovation in accounting and the development of KBCs. This suggests that when organizations adopt advanced accounting technologies, such as AI-driven data analytics or blockchain-based transaction systems, they enhance their adaptability, transparency, and overall sustainability (Johri, 2025; Pratiwi & Ermaya, 2024). These findings are consistent with the view that digital transformation of accounting processes drives not only internal efficiency but also external stakeholder trust and market reputation (Barth & Gee, 2024; Kholdarov & Khatamova, 2025). Additionally, as (Karimi et al., 2024) argued, digital integration is indispensable for competitiveness in the Fourth Industrial Revolution era. The integration of such technologies into accounting enables real-time insights, predictive modeling, and improved decision support, creating an agile environment for innovation and growth (Johri, 2025).

The study also confirmed the mediating role of technology and innovation in linking traditional financial and auditing practices with the sustainable growth of KBCs. This finding enriches the theoretical understanding of how accounting evolves from a backward-looking reporting function to a forward-looking strategic system (Ghorbani, 2025; Moradi, 2024). It aligns with (Norooz Zadeh & Abas Zadeh Asl, 2022), who emphasized that dynamic accounting information systems act as catalysts for sustainable competitiveness by integrating knowledge flows into decision-making frameworks. Furthermore, the integration of sustainability-focused reporting within accounting systems appears to directly support environmental and social accountability (Barth & Gee, 2024; Kim & Park, 2024). The results validate claims that sustainability accounting provides measurable indicators for long-term value creation and innovation outcomes (Lev & Zarowin, 1999; Lotfi, 2023).

Another important aspect of the findings is their reinforcement of the capital market perspective on the importance of transparent, high-quality accounting. As demonstrated, strong auditing and financial management systems reduce the perceived risk of investment and facilitate external financing (Beaver & Ryan, 2000; Meyzari Hormozabadi & Naderi Bani, 2017). Transparency in reporting, as shown by (Smith et al., 2024), directly influences investor confidence and performance, particularly in tech and knowledge-driven enterprises. The confirmation of these effects in the context of KBCs suggests that robust accounting not only strengthens internal decision-making but also builds credibility in capital markets, fostering access to vital external funding (Bushman & Landsman, 2010; Lambert et al., 2007).

From a governance perspective, the results emphasize the role of modern management accounting techniques and board oversight in shaping the quality and strategic relevance of accounting information (Malek Hosseini et al., 2025). This corresponds to prior findings that boards committed to innovation and risk-aware decision-making encourage the integration of advanced performance measurement tools and sustainability indicators (Rajan et al., 2007). By balancing traditional conservative accounting measures with forward-looking innovation metrics,

organizations can enhance their ability to invest in high-risk, high-reward technological endeavors while maintaining financial stability (Bushman & Landsman, 2010; Lev & Zarowin, 1999).

The observed relationships also reinforce the argument that knowledge management processes and accounting are mutually reinforcing (Al-Dmour et al., 2023). Accounting systems provide reliable quantitative inputs that make knowledge assets measurable and manageable, while knowledge sharing enriches the relevance of accounting data for innovation-related decisions (Norooz Zadeh & Abas Zadeh Asl, 2022). This bidirectional relationship is vital for KBCs that rely heavily on intangible assets and continuous learning for growth (Mehrshad & Naderi, 2024). The research also supports the notion advanced by (Karimi et al., 2024) that competitiveness in knowledge-intensive environments depends on integrating knowledge flow systems with reliable accounting to navigate rapid technological shifts.

Overall, the findings contribute to theory and practice by demonstrating that a strategic approach to accounting — integrating technology, compliance, and knowledge — is essential for the long-term success of knowledge-driven organizations. By validating structural equation modeling results, this study confirms that accounting is no longer an isolated support function but a key organizational capability that drives financial performance, technological agility, and sustainability (Barth & Gee, 2024; Smith et al., 2024).

Despite its contributions, the study has several limitations. First, the data were collected primarily through self-reported questionnaires, which may introduce response bias and limit objectivity in assessing the impact of accounting systems. While statistical controls were applied, the potential for subjective interpretation of organizational performance and innovation outcomes remains. Second, the research was conducted within the specific context of knowledge-based companies in one national setting, which may limit the generalizability of the findings to other regions with different regulatory environments, cultural dynamics, or levels of technological maturity. Third, the cross-sectional design of the study restricts causal inference, as the relationships among financial management, auditing, innovation, and sustainability were measured at one point in time. A longitudinal approach could better capture how accounting interventions influence long-term innovation and growth. Finally, while the study employed advanced analytical techniques such as structural equation modeling, it primarily relied on survey-based indicators and did not incorporate objective financial data or external performance benchmarks that could enhance robustness.

Future research should consider using longitudinal or panel data to trace how accounting practices evolve alongside technological adoption and strategic development over time. This would provide deeper insights into causal dynamics and the temporal sequence of performance improvements. Additionally, comparative studies across different countries or regions could help identify how institutional, cultural, and regulatory differences shape the effectiveness of accounting systems in driving innovation and sustainability. Expanding the scope to include industry-specific analyses could also be valuable, as the role of accounting may differ between technology-intensive sectors and other knowledge-driven domains. Moreover, integrating objective performance metrics such as market value, return on investment, or external innovation indices would complement self-reported data and strengthen the validity of results. Finally, exploring emerging technologies such as generative artificial intelligence, integrated ESG dashboards, and blockchain-based assurance frameworks could offer a forward-looking perspective on the next evolution of accounting for KBCs.

For practitioners, the findings underscore the importance of viewing accounting not merely as a compliance requirement but as a strategic asset. Executives in KBCs should invest in advanced accounting information systems that integrate artificial intelligence, data analytics, and blockchain to ensure reliability and real-time insights. Strengthening internal auditing and compliance frameworks is also crucial, as they support transparency and build the trust needed to secure external financing. Boards of directors should encourage the adoption of modern management accounting tools that link financial performance to innovation and sustainability metrics, facilitating informed strategic decisions. Finally, organizations should promote close collaboration between financial experts and knowledge managers to ensure that intangible assets and innovation outcomes are effectively measured and reported, reinforcing competitive advantage and long-term resilience.

Authors' Contributions

Authors contributed equally to this article.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethics Considerations

In this research, ethical standards including obtaining informed consent, ensuring privacy and confidentiality were considered.

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