The Perspective of Accounting in Modern Science and Technology

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ABSTRACT

The rapid advancement of modern science and technology has significantly transformed the accounting profession and expanded its relevance to contemporary organizations. Accounting is no longer restricted to the traditional functions of recording, classifying, summarizing, and reporting financial transactions. It has become an information-based discipline that supports decision-making, innovation, risk management, business intelligence, technological investment, and sustainable development. Emerging technologies such as artificial intelligence, block chain, cloud computing, big-data analytics, robotic process automation, and enterprise resource planning systems are changing the way accounting information is generated, processed, analyzed, and communicated. This article examines the perspectives of accounting in modern science and technology, focusing on technological transformation, artificial intelligence, data analytics, block chain, cloud accounting, auditing, cybersecurity, sustainability, professional competencies, and the future of the accounting profession. The article argues that the future of accounting will depend on the profession's ability to integrate accounting principles with technological competence, analytical thinking, ethical judgment, and continuous professional development.

KEYWORDS

Accounting, science, technology, artificial intelligence, block chain, big data, cloud accounting, auditing, innovation, digital transformation

I. INTRODUCTION

Accounting is one of the oldest disciplines associated with the management of economic resources. Traditionally, its primary functions involved recording financial transactions, preparing financial statements, determining profit or loss, safeguarding assets, and providing financial information to users. However, the emergence of modern science and technology has fundamentally changed the nature, scope, and practice of accounting.

The contemporary business environment is increasingly characterized by digitalization, automation, globalization, artificial intelligence, cloud computing, block chain, big-data analytics, and interconnected information systems. These developments have created both opportunities and challenges for accountants and accounting institutions. According to the International Accounting Standards Board (IASB, 2018), the fundamental objective of financial reporting is to provide useful financial information to existing and potential investors, lenders, and other creditors. Technology has now made it possible to generate and communicate such information more rapidly and in increasingly sophisticated forms.

The perspective of accounting in modern science and technology therefore involves understanding how accounting is evolving from a largely historical and transaction-oriented discipline into a forward-looking, analytical, technological, and strategic profession. Appelbaum et al. (2017) observe that technological developments and business analytics are expanding the role of accountants in organizational decision-making. The contemporary accountant is increasingly expected to understand not only financial transactions but also information systems, data analytics, cybersecurity, artificial intelligence, digital platforms, and strategic management. Consequently, the future of accounting will depend on the ability of accounting professionals to combine conventional accounting knowledge with technological and analytical capabilities.

II. CONCEPT OF ACCOUNTING IN THE MODERN TECHNOLOGICAL ENVIRONMENT

Accounting can be defined as the systematic process of identifying, measuring, recording, classifying, analyzing, interpreting, and communicating economic information to interested users. In the modern environment, however, accounting extends beyond traditional bookkeeping. Modern accounting provides information for planning, investment decisions, cost management, performance evaluation, risk assessment, taxation, governance, and strategic decision-making. Management accounting, for example, provides managers with information that supports planning and control (Horngren et al., 2015).

Technology has increased the speed, volume, and complexity of accounting information. Transactions can now be captured electronically and processed automatically through accounting information systems. Romney and Steinbart (2018) explain that accounting information systems collect, record, store, process, and communicate information about an organization's economic activities. Therefore, the modern perspective of accounting views accountants as information professionals who use financial and non-financial data to support organizational decisions.

III. ACCOUNTING AS AN INFORMATION-BASED DISCIPLINE

One of the most important perspectives of accounting in modern science and technology is its transformation into an information-based discipline. Organizations generate enormous quantities of financial and non-financial data through sales, purchases, production, payroll, customer interactions, digital transactions, and online activities. Accounting provides mechanisms for transforming relevant data into useful information. Modern accounting systems can integrate information from different departments and provide managers with real-time or near-real-time information.

This development has strengthened the strategic importance of accounting. Accountants can use information generated by technological systems to identify trends, evaluate performance, forecast future outcomes, and support organizational planning. Appelbaum et al. (2017) emphasize the growing significance of business analytics in management accounting and strategic decision-making.

IV. PERSPECTIVE THEORY

A. Perspective of Artificial Intelligence in Accounting

Artificial intelligence (AI) represents one of the most significant technological developments influencing accounting. AI involves the use of computer systems capable of performing tasks that traditionally require human intelligence, including pattern recognition, prediction, classification, and decision support. In accounting, AI can be applied to transaction processing, fraud detection, financial forecasting, audit procedures, invoice processing, tax analysis, and customer-service functions. Kokina and Davenport (2017) argue that artificial intelligence and automation are changing auditing and accounting activities by reducing the amount of routine work performed manually. This development does not necessarily eliminate the accounting profession; instead, it can shift accountants toward activities requiring professional judgment, interpretation, communication, and strategic thinking. From this perspective, future accountants will increasingly supervise and interpret technological systems rather than perform every accounting procedure manually.

B. Perspective of Big Data Analytics

The growth of digital technologies has created unprecedented quantities of data. Big-data analytics provides tools for processing and interpreting these large datasets.
Accounting professionals can use data analytics to examine financial trends, detect anomalies, evaluate costs, forecast revenue, assess risks, and support strategic decisions. Rather than examining only a small sample of transactions, modern analytical systems can potentially examine entire populations of transactions. Appelbaum et al. (2017) note that business analytics can enhance the role of management accountants by providing insights that support organizational decision-making. The future perspective of accounting is therefore strongly associated with data literacy. Accountants will need to understand how to collect, clean, analyse, interpret, and communicate data effectively.

C. Perspective of Block Chain Technology

Block chain technology has the potential to transform transaction recording, verification, and auditing. Block chain is a distributed ledger technology that enables transactions to be recorded in a shared digital ledger. Dai and Vasarhelyi (2017) suggest that block chain technology can have important implications for accounting and assurance because transactions can be recorded in a manner that supports transparency and traceability. The use of block chain could potentially reduce some traditional reconciliation activities and facilitate more continuous approaches to auditing. Smart contracts may also automate transactions when predefined conditions are satisfied. However, block chain technology does not eliminate the need for accountants. Professional judgment, regulatory compliance, interpretation, governance, and verification of information entering the block chain will remain important.

D. Perspective of Cloud Accounting

Cloud computing has changed how accounting software and financial information are accessed. Traditional accounting systems often required organizations to install software on local computers and maintain their own infrastructure. Cloud accounting enables authorized

users to access accounting applications and information through internet-connected devices. This can facilitate collaboration between accountants, managers, auditors, and other stakeholders. Cloud accounting may be particularly beneficial to small and medium-sized enterprises because it can reduce the need for substantial investments in physical information technology infrastructure. Nevertheless, cloud accounting raises important concerns about cybersecurity, data privacy, system availability, data ownership, and dependence on service providers. Consequently, appropriate controls and governance mechanisms are necessary.

E. Perspective of Robotic Process Automation

Robotic process automation (RPA) involves using software robots to perform repetitive and rule-based activities. Accounting contains many processes suitable for automation, including data entry, invoice processing, bank reconciliation, report generation, and routine account matching. Automation can improve processing speed and reduce errors associated with repetitive manual activities. It can also allow accounting professionals to devote more time to analysis and decision-making. The future perspective of accounting therefore involves a gradual shift from manual transaction processing toward supervision, exception management, analysis, and advisory services.

F. Perspective of Technology in Auditing

Auditing has also been significantly influenced by modern technology. Traditional auditing frequently relied on manual procedures and sampling. Contemporary audit environments increasingly use data analytics, automated testing, continuous monitoring, and digital evidence. Technology can enable auditors to analyse large volumes of transactions and identify unusual patterns that may require further investigation. This can improve audit efficiency and potentially strengthen fraud-risk assessment. Kokina and Davenport (2017) explain that automation is changing audit processes and the skills required by auditors. Auditors therefore need technological knowledge in addition to traditional auditing expertise. The future audit profession is likely to become increasingly data-driven, with auditors combining professional scepticism and judgment with sophisticated analytical tools.

G. Perspective of Cybersecurity and Accounting

The increasing digitalization of accounting creates new cybersecurity risks. Accounting information systems contain sensitive information concerning organizations, employees, customers, suppliers, and investors. Cyberattacks, unauthorized access, data manipulation, ransomware, phishing, and system disruption can result in financial losses and reputational damage. Consequently, cybersecurity has become an important aspect of accounting information management. The Committee of Sponsoring Organizations of the Tredway Commission (COSO, 2013) emphasizes the importance of internal control systems in achieving reliable reporting, operational effectiveness, and compliance. In modern accounting environments, internal controls must increasingly incorporate technological safeguards. Accountants therefore need a working knowledge of cybersecurity risks and controls even when specialized cybersecurity responsibilities are assigned to information technology professionals.

G. Perspective of Accounting Information Systems

Accounting information systems (AIS) represent the connection between accounting and information technology. An AIS collects, processes, stores, and communicates accounting information. Modern AIS can integrate accounting with inventory, purchasing, production, human resources, sales, payroll, taxation, and customer-management systems. Enterprise resource planning systems can therefore provide organizations with an integrated view of their operations. Romney and Steinbart (2018) emphasize the importance of accounting information systems in processing economic transactions and providing information for decision-making. From a future perspective, accounting professionals must understand how information flows through digital systems and how internal controls can protect the reliability and integrity of accounting information.

H. Perspective of Accounting and Scientific Research

Science and technology require financial resources for research, experimentation, innovation, and commercialization. Accounting contributes to the effective management of these resources. Research institutions, universities, pharmaceutical companies, technology companies, and government agencies need accounting systems to monitor research expenditure and evaluate the financial implications of scientific projects. Accounting can help researchers and administrators prepare budgets, monitor expenditure, account for research grants, and assess the financial performance of research projects. Moreover, accounting plays an important role in evaluating research and development expenditure. IAS 38 provides guidance on accounting for intangible assets and distinguishes between research and development activities (IASB, 2021). This demonstrates that accounting is closely connected to the development of scientific knowledge and technological innovation.

I. Perspective of Intangible Assets

Modern economies increasingly depend on intangible resources such as software, patents, intellectual property, algorithms, brands, databases, research knowledge, and organizational capabilities. One major challenge for accounting is measuring and reporting these resources. Traditional accounting systems were developed primarily around tangible assets and observable financial transactions. Consequently, some internally generated intangible resources may not be fully reflected in conventional financial statements. Lev and Gu (2016) argue that the growing importance of intangible resources presents challenges for traditional accounting and financial reporting. The future of accounting will therefore require continuing research into how knowledge-based and technology-driven resources can be measured and communicated effectively.

J. Perspective of Sustainability Accounting

Modern science and technology increasingly focus on environmental sustainability and responsible development. Organizations are under growing pressure to disclose information concerning environmental, social, and governance matters. Sustainability accounting expands the traditional perspective of accounting by considering the broader economic, environmental, and social consequences of organizational activities. The International Sustainability Standards Board (ISSB, 2023) has developed sustainability disclosure

standards intended to provide investors with useful information concerning sustainability-related risks and opportunities. Consequently, future accountants will increasingly participate in sustainability measurement, reporting, assurance, and risk management.

K. Perspective of Accounting and Decision-Making

Accounting has traditionally been described as a language of business because it communicates information about financial activities. In the modern technological environment, its decision-support function has become even more important. Managers need timely information to make decisions concerning pricing, production, investment, financing, technology adoption, human resources, and risk management. Management accounting provides tools such as budgeting, standard costing, variance analysis, activity-based costing, and performance measurement (Horngren et al., 2015). Modern technology enhances these tools by allowing accounting information to be processed rapidly and combined with other forms of organizational data.

L. Perspective of Accounting Education

The transformation of accounting through technology has significant implications for accounting education. Traditional accounting education remains important because fundamental accounting principles, standards, ethics, and financial reporting provide the foundation of professional practice. However, accounting students must also develop technological competencies. These include:

a) Data analytics
b) Artificial intelligence
c) Accounting information systems
d) Block Chain
e) Cloud computing
f) Cybersecurity
g) Business intelligence
h) Digital reporting;
i) Statistical analysis and
j) Technology ethics

The International Federation of Accountants (IFAC, 2020) emphasizes the importance of technological competence and adaptability as the accounting profession evolves. Universities and professional accounting bodies therefore need to continuously revise their curricula to reflect changes in the technological environment.

M. Perspective of Professional Accountants

The professional accountant of the future is unlikely to be defined solely by the ability to prepare financial statements. Instead, the accountant will increasingly function as a financial analyst, business adviser, data interpreter, risk manager, technology user, and strategic partner. Technology is likely to automate many routine accounting tasks. However, activities requiring professional judgment, ethical reasoning, communication, interpretation, and strategic understanding will continue to require human expertise. Therefore, accountants should not view technology merely as a threat to employment. Instead, they

should regard technological development as an opportunity to improve professional relevance and expand the scope of accounting services.

V. TECHNOLOGY ACCEPTANCE MODEL (TAM)

The Technology Acceptance Model (TAM) was developed by Davis (1989) to explain why individuals accept or reject new information technologies. The model proposes that two major factors determine an individual's intention to use a technological system: Perceived usefulness and perceived ease of use - Perceived usefulness refers to the extent to which an individual believes that using a particular technology will improve job performance, while perceived ease of use refers to the extent to which an individual believes that using the technology will require little effort (Davis, 1989).

A. Application of TAM to Accounting

TAM is relevant to accounting because accountants increasingly interact with computerized accounting systems, enterprise resource planning systems, cloud accounting platforms, data analytics applications, and artificial intelligence tools. For example, an accountant is more likely to adopt a computerized accounting system if the system is perceived to improve accuracy, reduce processing time, facilitate financial reporting, and increase productivity. Similarly, accountants may be more willing to use artificial intelligence and data analytics when these technologies are perceived as useful and easy to operate. The theory therefore suggests that the successful implementation of accounting technology depends not only on the availability of technological infrastructure but also on users' perceptions of the technology. If accountants perceive a new system as complicated or irrelevant to their work, resistance to adoption may occur. Venkatesh and Davis (2000) extended TAM through the development of TAM2, emphasizing additional social and cognitive factors that influence technology acceptance. This indicates that organizational support, professional expectations, and perceived benefits can also influence accountants' willingness to adopt emerging technologies.

VI. DIFFUSION OF INNOVATIONS THEORY

Diffusion of Innovations Theory was developed by Rogers (2003). The theory explains how new ideas, technologies, practices, and innovations spread among individuals and organizations over time. Rogers (2003) identifies five major characteristics that influence the adoption of an innovation:

a) Relative advantage – the extent to which an innovation is perceived as better than an existing practice.
b) Compatibility – the extent to which an innovation is consistent with existing values, experiences, and needs.
c) Complexity – the degree to which an innovation is perceived as difficult to understand or use.
d) Trialability – the extent to which an innovation can be experimented with before full adoption.

e) Observability – the extent to which the benefits of an innovation can be observed by others.

Application to Accounting

The theory is particularly useful in explaining the adoption of technological innovations in accounting. Organizations may adopt cloud accounting because it provides advantages such as remote access, scalability, collaboration, and reduced infrastructure requirements. Similarly, organizations may adopt block chain technology because of its potential to improve transaction traceability and transparency. However, adoption may be slow when users perceive the technology as complex, expensive, incompatible with existing systems, or difficult to regulate. Rogers (2003) further explains that innovation adoption occurs through stages, including knowledge, persuasion, decision, implementation, and confirmation. In accounting, an organization may first learn about artificial intelligence, evaluate its potential benefits, decide whether to adopt it, implement it within accounting processes, and subsequently assess whether the innovation has achieved its expected benefits.

VII. CHALLENGES ASSOCIATED WITH THE TECHNOLOGICAL FUTURE OF ACCOUNTING

Despite the numerous opportunities associated with modern technology, several challenges remain, viz:

a) Cybersecurity Risks: The increasing dependence on digital accounting systems exposes organizations to cyberattacks, unauthorized access, and data breaches.
b) Skills Gaps: Some accounting professionals may lack the technological and analytical skills required to operate effectively in digital environments.
c) Ethical Concerns: Artificial intelligence and automated decision-making raise questions concerning accountability, transparency, bias, and professional responsibility.
d) Data Quality: Technological systems can process large quantities of information, but poor-quality data can produce misleading results. Therefore, accountants must continue to evaluate the reliability of information.
e) Technological Obsolescence: Rapid technological development means that accounting systems and professional skills can become outdated quickly. Continuous learning is therefore essential.
f) Cost of Technology: Advanced accounting technologies may require substantial investments in software, infrastructure, training, cybersecurity, and maintenance. This may create challenges for smaller organizations.

VIII. FUTURE PERSPECTIVES OF ACCOUNTING IN SCIENCE AND TECHNOLOGY

The future of accounting is likely to be characterized by greater automation, integration, intelligence, and strategic relevance.

- First, artificial intelligence will increasingly automate routine accounting processes and support forecasting and decision-making.

- Second, block chain may facilitate more transparent and traceable transaction records.
- Third, big-data analytics will expand the ability of accountants to identify trends and generate predictive insights.
- Fourth, cloud accounting will make financial information more accessible and collaborative.
- Fifth, sustainability reporting will broaden the scope of accounting beyond purely financial performance.
- Finally, accountants will increasingly work alongside information technology specialists, data scientists, engineers, managers, and other professionals.

These developments suggest that accounting will remain relevant, but the skills required to practice accounting successfully will continue to change.

X. CONCLUSION

The perspective of accounting in modern science and technology is one of transformation, integration, and expansion. Accounting has moved beyond its traditional role of recording historical transactions to become an important component of digital decision-making, innovation, risk management, scientific research, technological investment, and sustainable development. Artificial intelligence, block chain, cloud computing, big-data analytics, robotic process automation, and accounting information systems are changing the processes through which accounting information is produced and used. These technologies offer opportunities to improve efficiency, accuracy, transparency, and decision-making, although they also create challenges relating to cybersecurity, ethics, data quality, professional competence, and technological costs. The future of accounting will therefore not be determined by technology alone. It will depend on how effectively accounting professionals combine technological competence with accounting knowledge, professional judgment, ethical values, critical thinking, and communication skills. In this context, accounting should be viewed not simply as a record-keeping discipline but as a strategic information profession that is essential to the effective development and application of modern science and technology.

REFERENCES

[1] Appelbaum, D., Kogan, A., Vasarhelyi, M. A., & Yan, Z. (2017). Impact of business analytics and enterprise systems on managerial accounting. International Journal of Accounting Information Systems, 25, 29–44.

[2] Friday, I., & Japhet, I. (2020). Information technology and the accountant today: What has really changed? Journal of Accounting and Taxation, 12(1), 48–60. https://doi.org/10.5897/jat2019.0358 Cited by: 124

[3] Committee of Sponsoring Organizations of the Treadway Commission (COSO). (2013). Internal control—Integrated framework. COSO.

[4] Dai, J., & Vasarhelyi, M. A. (2017). Toward blockchain-based accounting and assurance. Journal of Information Systems, 31(3), 5–21.

[5] Horngren, C. T., Datar, S. M., & Rajan, M. V. (2015). Cost accounting: A managerial emphasis (15th ed.). Pearson.
[6] International Accounting Standards Board (IASB). (2018). Conceptual framework for financial reporting. IFRS Foundation.
[7] International Accounting Standards Board (IASB). (2021). IAS 38: Intangible assets. IFRS Foundation.
[8] International Federation of Accountants (IFAC). (2020). Understanding the impact of technology on the accounting profession. IFAC.
[9] International Sustainability Standards Board (ISSB). (2023). IFRS S1 general requirements for disclosure of sustainability-related financial information. IFRS Foundation.
[10] Kokina, J., & Davenport, T. H. (2017). The emergence of artificial intelligence: How automation is changing auditing. Journal of Emerging Technologies in Accounting, 14(1), 115–122.
[11] Lev, B., & Gu, F. (2016). The end of accounting and the path forward for investors and managers. Wiley.
[12] Romney, M. B., & Steinbart, P. J. (2018). Accounting information systems (14th ed.). Pearson.