

THE ROLE OF INDUSTRY 5.0 IN IMPROVING INTERNAL CONTROL AND FINANCIAL MANAGEMENT IN CULTURAL ORGANIZATIONS

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Abstract

Industry 5.0, characterized by advanced technologies such as artificial intelligence (AI), blockchain and Big Data, offers a revolutionary chance to enhance internal and financial control in cultural organizations. This era shifts the focus from simple automation to a synergistic collaboration between humans and machines, increasing operational efficiency and strategic decision-making. In cultural sectors, where financial management and internal control play a crucial role in maintaining transparency and trust, these technologies bring transformative benefits. AI and ERP facilitate real-time data collection and transaction tracking, improving the accuracy and reliability of financial reporting. Blockchain provides security and transparency, especially in the management of intellectual property, while Big Data analytics provides detailed insights into financial performance, allowing cultural organizations to make informed decisions. However, the integration of these technologies also brings challenges, such as the need for specialized skills and robust internal controls to prevent fraud and ensure compliance. This summary highlights the essential role of adapting to Industry 5.0 technologies in improving financial governance in cultural organizations, ensuring their sustainability in an ever-changing digital landscape. By improving financial management practices, cultural entities can gain greater accountability, operational efficiency, and trust from stakeholders, aligning with broader sustainable development goals in the digital age.

Also, the case study presents research with the help of the SPPS program to observe the ERP program most used by expert accountants to help them mention control over all the operations performed in the system.

Keywords

internal control, audit, industry 5.0, financial accounting, cultural organizations

JEL Classification

M41, M42, M15

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Introduction

One of the most significant transformations of humanity in the last 50 years has been remarkable technological progress, especially with the advent of the internet (Kamal et al., 2019). Today, almost everyone uses the internet on their devices, and students frequently access it to obtain information and as a learning resource (Sudibjo et al., 2019). In the last decade, digital technology has revolutionized our lives, changing us from an industrial, production-centric society to one based on information.

We are surrounded by digital data and information technology, which allow us to develop and share ideas, creating new businesses (H-UTokyo Lab., 2020). However, Purnamasari et al. (2019) raise the question of whether we are ready to adapt to the new digital era, not only in the industrial sector, but also in the process of transforming society into Society 5.0.

Information technology plays a crucial role in accounting and business, facilitating the automation of repetitive tasks, reducing errors, and increasing data accuracy. Within Industry 6.0, the use of ERP systems and cloud solutions contributes to optimizing processes and improving cross-departmental collaboration (Gèrvalla, M., 2021).

In the context of accelerated change, accounting and accounting professionals have a significant opportunity to adapt and positively influence. Accounting is not just a professional technique; It is also a social and moral practice that can play an essential role in creating a better world. It has a much greater influence on our lives than we realize, and in line with the principles of sustainability and Era 5.0, it can contribute significantly to the development of society. (Carnegie, 2022)

Internal control plays a crucial role in ensuring the integrity and accuracy of financial and accounting information. In the context of Industry 5.0, the adoption of advanced technologies, such as artificial intelligence and machine learning, amplifies the ability to identify anomalies and prevent fraud. The main objective of internal audit is to ensure compliance with accounting standards and financial regulations, protect the organization's assets and prevent fraud. In the era of new technologies, these goals are achieved through the automation of processes and the use of predictive analytics (Suprihastini, E. et al., 2017).

Cultural organizations are characterized by their hybrid nature, frequently receiving funding from both public and private sources, and prioritizing the advancement of artistic, historical, and educational objectives in addition to profit. In contrast to other kinds of organizations, they usually administered intangible assets like cultural heritage and intellectual property rights.

Professional accountants play a key role in preparing and auditing financial statements, ensuring that they accurately reflect the entity's financial position. In the digital age, they must be able to use new technologies and adapt quickly to legislative and technological changes.

The annual financial statements must be approved by the entity's management and published by the legal provisions. Digital technologies facilitate the verification and publication process, ensuring transparency and accessibility of financial information.

The new technologies specific to Industry 5.0 significantly affect information management in cultural entrepreneurship. The automation of accounting processes, the use of artificial intelligence for data analysis and the implementation of blockchain to

secure transactions are just a few examples of technologies that are transforming the way we work in this field.

Information technology is fundamentally changing the way we work in all sectors of the economy, including cultural entrepreneurship. The digitization of processes and the use of emerging technologies allow for increased efficiency, flexibility and innovation.

E-commerce is a clear example of the influence of information technology on business (Bulsara, H. P., & Vaghela, P. S., 2020). As part of Industry 5.0, e-commerce platforms are integrating artificial intelligence and big data to provide personalized experiences to consumers and optimize supply chains.

Globalisation and digitalisation pose significant challenges for accounting systems, which need to adapt to manage the volume and complexity of cross-border financial data. The implementation of international standards and the use of cutting-edge technologies are essential to meet these challenges.

In the current context of financial accounting, the continuous advancement of internet technologies and the implementation of accounting information systems represent an essential strategic direction for the future development of companies, being increasingly adopted by them. The integration of accounting information systems not only increases the efficiency of the accounting staff's work but also has a significant impact on the financial management of the organization. In the ERP environment, optimizing the internal control of accounting information systems becomes a central element of our research.

Accounting information for cultural entities must be accurate, complete and accessible, ensuring relevance, reliability and comparability, to support transparency and trust of stakeholders. Advanced accounting systems facilitate real-time data collection and analysis, providing managers with essential information for strategic decision-making. In the context of the financial and accounting information system, they have a crucial role in supervising financial performance and ensuring compliance with the regulations in force (Cihureanu, A. T. & Balteş, N., 2011).

Traditionally, financial accounting based on manual records involved a significant number of staff and a large workload, which generated considerable costs and increased risks of error. The implementation of information technologies in financial accounting brings significant benefits, including reducing financial management errors, improving the quality of accounting processes, and decreasing operational costs by reducing personnel requirements.

The use of computer technology ensures a high level of accuracy in calculation and facilitates the recording and management of accounting data, thus contributing to more efficient financial management. It minimizes the risk of incorrect transactions, recording errors or omissions and optimizes the account verification process, thus improving the overall quality of the company's financial accounting. At the same time, excessive attention to marketing strategies and neglect of internal accounting activities can lead to significant deficiencies in the processing of financial transactions, negatively affecting the optimization and improvement of the business management model.

Research objectives:

1. Examine how cutting-edge technologies (AI, IoT, blockchain, and big data) affect financial management and internal control in the cultural industry.
2. Use a survey of professional accountants working in the cultural field to find relevant patterns and connections in the use of these technologies.

Research hypotheses:

1. Financial reporting is made more efficient and human error is greatly decreased by integrating Industry 5.0 technology.
2. In cultural organizations, advanced technologies help to improve resource allocation and financial governance.

1. Review of the scientific literature

According to estimates by the International Telecommunication Union (ITU), in 2023, about 67% of the global population, or around 5.4 billion people, had access to the Internet (Figure no. 1). This reflects a significant increase of 45% compared to 2018, when internet access was extended to an additional 1.7 billion people. Still, around 2.6 billion people remain unconnected, highlighting persistent challenges in ensuring global connectivity.

The data points to a significant digital disparity, especially in low-income countries, where less than a third of people have access to the internet. Even though internet use has increased in these areas, there is a need to improve infrastructure, increase accessibility and digital education to guarantee equitable access to digital resources for all.

Individuals using the Internet

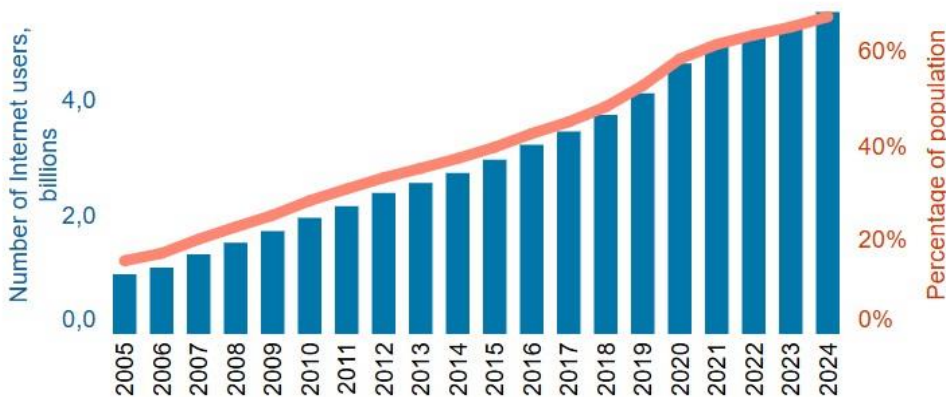


Figure no. 1-Individual using the internet

Source: <https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx>

Diemer, A. and Dierickx, F. (2022) emphasize the close link between accounting and the different facets of organizational management, highlighting the essential role of accounting not only in financial reporting but also in the strategic decision-making process. They highlight the interdependence between accounting, management control and organizational performance, showing how crucial their integration is to ensure efficiency and transparency within an organization. This integrated approach provides a clearer view of the entity's financial position and supports the development of long-term sustainable plans.

Schmid and Waldburger (2021) observe the transition from Industry 5.0 to Industry 6.0, highlighting the possibility of these stages coexisting in the current economic and business context. Industry 6.0 focuses on sustainable development and the advanced integration of emerging technologies, challenging businesses to adapt to new requirements.

Industry 5.0 research in accounting explores the implementation of advanced technologies and the adaptation of accounting systems to the requirements of the ever-evolving digital economy. Industry 5.0 places particular emphasis on the use of disruptive technologies, such as artificial intelligence and advanced robotics, which fundamentally transform accounting processes.

Srivastava, Kumari and Pathania (2024) argue that the COVID-19 pandemic has accelerated the shift to Industry 5.0, fostering the rapid adoption of advanced technologies and digital systems in various sectors. This transition is marked by a deep integration of digital solutions, artificial intelligence and automation, which are essential to cope with the economic and social changes generated by the pandemic.

Artificial intelligence (AI) has brought significant changes in accounting, offering innovative solutions that increase the accuracy and efficiency of processes, crucial aspects in Industry 5.0. Thanks to its ability to analyse large volumes of data and automate repetitive tasks, AI is increasingly used in accounting, allowing professionals to focus on strategic and consulting activities instead of routine administrative ones. Artificial intelligence can also manage tasks such as reconciling accounts and generating financial reports, reducing time and the risk of human error. AI-based systems (Figure no.2) help prevent fraud by detecting unusual patterns in transactions, using machine learning algorithms.

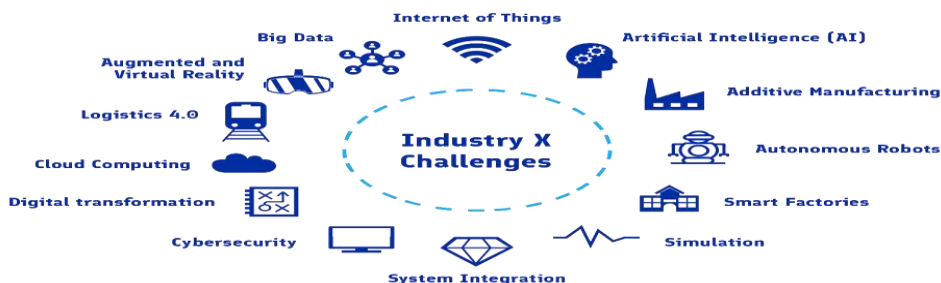


Figure no. 2- Challenges of Industry 5.0

Source: Oy, B. F. (2021). From industry x to industry 6.0., p. 18

As early as the 1990s, Abdolmohammadi (1987) stressed the importance of decision support systems (DSS) and knowledge-based expert systems (KES) in auditing, appreciating them as key tools for improving the efficiency of audit decision-making. These systems are seen as ideal for supporting auditors in decision-making, giving them access to a vast knowledge base and extensive experience, like a significant accumulation of professional experience.

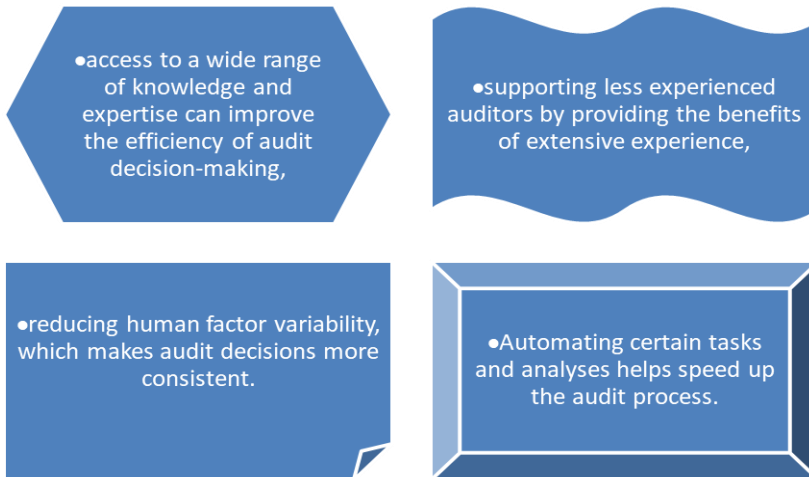


Figure no.3 - Benefits of Using AI in Auditing

Source: author's conceptualization

While these systems offer many advantages, their use also comes with challenges and limitations: high costs for developing and maintaining complex systems, difficulties in capturing and properly representing the knowledge of human experts, and the need to constantly adapt systems to changes in the audit environment. In case of system problems, errors or incorrect recommendations may occur.

Artificial intelligence brings precision and efficiency to the management of financial transactions. The automation of accounting tasks, such as account reconciliation and financial reporting, is facilitated by AI systems, saving time and reducing the risks of human error. In this way, accountants can focus their efforts on strategic and complex tasks, thus improving the quality of audit and financial reporting processes (Figure no. 3).

Fraud prevention is another area where AI is demonstrating its major impact on accounting. Machine learning algorithms allow AI systems to detect unusual patterns in transactions, preventing financial losses and increasing confidence in the accuracy of financial processes. AI also plays a crucial role in predictive analytics, helping businesses make informed decisions by forecasting cash flows and financial results. The ability to anticipate and adjust plans according to emerging trends allows for more effective management of financial risks.

Thus, the integration of AI into accounting processes leads to more informed financial decisions and increased operational efficiency, highlighting the essential role of artificial intelligence in the evolution of the industry and the transition to Industry 5.0.

2. Research methodology

This study uses a quantitative methodology to examine the impact of Industry 5.0-specific technologies, such as artificial intelligence (AI), Internet of Things (IoT), blockchain, and Big Data, on internal control and financial management in the cultural sector. The research is based on a questionnaire applied to financial managers, internal auditors, accountants and chartered accountants at the local level, to collect data on the evolution of accounting, the age of respondents and the software used in their work. The data obtained is then processed and analysed using SPSS to identify relevant trends and correlations in the field.

The questionnaire was distributed to a sample of 50 professionals in the accounting sector from both the public and private accounting sectors of public interest from the South Muntenia Region, selected based on their experience in the use of modern technologies in accounting and financial management. The respondents included external service providers (licensed accountants and auditors) as well as internal staff members of cultural organizations (both public and private). The sample was stratified to include various professional roles (financial managers, internal auditors, accountants) and to ensure adequate representation of different types of cultural institutions.

To assess the perceptions and use of advanced technologies in the accounting and internal control processes of cultural entities, a structured survey was conducted. It was distributed to professionals in the field and collected essential data on age, position within the organization, the perceived importance of advanced technologies, their impact on reducing human errors, and the software used for financial and accounting management.

Data Collection

The data was gathered through an online questionnaire, which included both open-ended and closed-ended questions. Structured to capture demographic data and qualitative information about respondents' opinions and attitudes towards advanced technologies, the questionnaire had as its main purpose to identify the degree of acceptance and integration of these technologies in practice.

Data Analysis

After collection, the data was imported and processed using SPSS, an advanced software for statistical analysis. SPSS was used to generate descriptive graphs and analyse data trends and distributions. The analysis included:

- Frequency distributions to understand software preferences and demographic responses.
- Central trend analyses to assess the perceived importance of advanced technologies and their impact on accounting processes.
- Comparative analyses between different demographic groups to identify differences in perception and use.

The generated graphs and tables were interpreted in the context of the research objectives, providing a detailed picture of how advanced technologies are integrated into the cultural sector.

Limitations of the study

It is important to emphasize that the study is based on a limited sample of participating cultural entities. Thus, the results cannot be extended to all organizations in the field. Also, the perceptions and attitudes of respondents can be influenced by the specific characteristics of each organization, which can introduce a certain subjectivity in the answers.

Age Group Distribution

The first graph (Figure 4) of the study illustrates the age distribution of respondents. Most of them come from the 35-44 and 25-34 age groups, reflecting the opinion of an actively professionally involved adult population. The dominance of these age groups indicates a significant interest from the mature generations in the integration of advanced technologies in accounting and internal control, significantly influencing adoption decisions within their organizations.

What is your age?

- Under 25 years
- 25-34 years
- 35-44 years
- 45-54 years
- 55-64 years
- 65 years and over

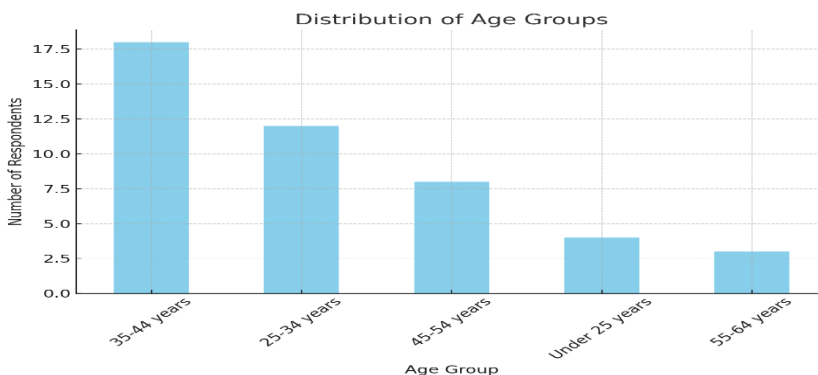


Figure no. 4. Relevance of advanced technologies

Source: author’s own research

The second graph (Figure no. 4) explores respondents’ opinions on the relevance of advanced technologies (AI, IoT, blockchain, Big Data) within accounting and internal

control processes. The majority of respondents consider the integration of these technologies to be extremely important. This reflects a strong interest in the adoption of modern technological solutions, indicating that they are perceived as essential for increasing efficiency and accuracy in financial management.

The favourable perception of advanced technologies underscores the considerable potential of these solutions to transform traditional accounting methods. Respondents recognize the crucial role of these technologies in mitigating errors and optimizing processes, which can drive greater adoption in the future.

How important do you consider the integration of advanced technologies (AI, IoT, blockchain, Big Data) in the accounting and internal control processes within your entity(fig.no.5)?

- Not important at all
- Slightly important
- Moderately important
- Very important
- Extremely important

Importance of Advanced Technologies in Accounting and Control

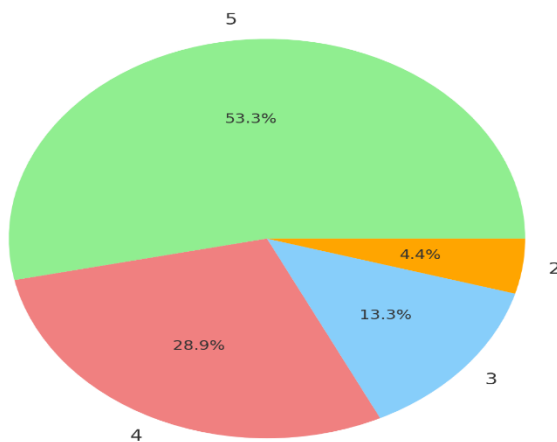


Figure no. 5: Relevance of advanced technologies (AI, IoT, blockchain, Big Data)

Source: author’s own research

Impact of AI and IoT on Error Reduction

The third chart (Figure no.6) looks at how much AI and IoT contribute to reducing human error in financial reporting. The responses show that a considerable number of participants appreciate that these technologies have a significant impact, from moderate to high, in decreasing errors. This result underlines the high confidence in the

effectiveness of these technologies for increasing the accuracy and reliability of financial information.

The results indicate that accounting professionals are aware of the benefits of AI and IoT, especially in reducing human error. This is particularly important in a context where precision is fundamental for compliance with legal norms and organizational success.

To what extent do you believe that AI and IoT technologies contribute to reducing human errors in financial reporting?

- Not at all
- To a small extent
- To a moderate extent
- To a great extent

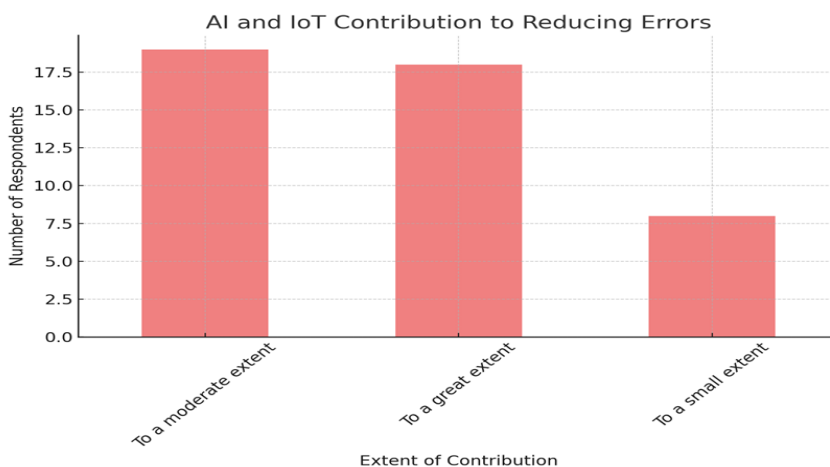


Figure no.6: How Industry 5.0 contributes to reducing errors

Source: author’s own research

The last graph (Figure no.7) presented in this study highlights the software used for financial and accounting management by cultural entities. After adjusting and normalizing the data, it is found that the preferred platforms are SAGA and SAP, being used by most respondents, which reflects a wide trust and familiarity with these software solutions. SMARTBIL software is also used but to a lesser extent.

This preference for SAGA and SAP suggests that these platforms offer robust functionalities capable of meeting the complex requirements of users in the cultural sector. Familiarity with these programs indicates consistent use and can pose a challenge in adopting newer technologies, which could influence plans to implement new technology solutions.

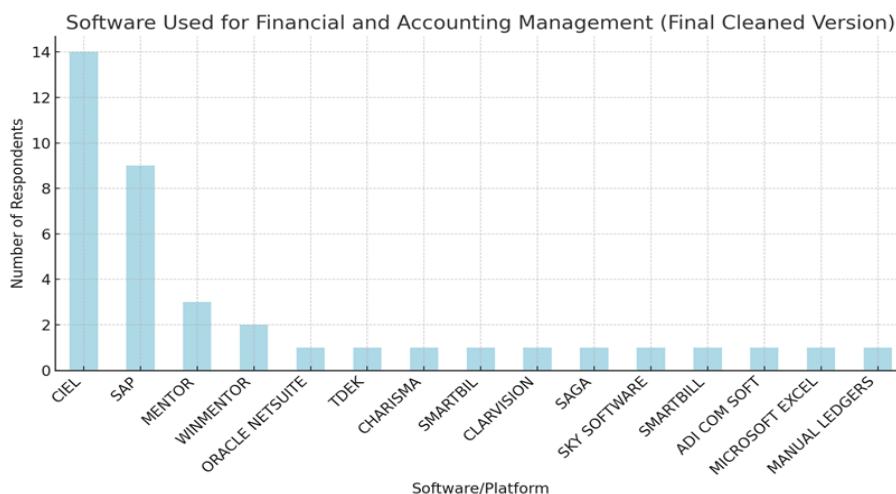


Figure no. 7 - Software used in the accounting of cultural entities

Source: author's own research

3. Results and discussions

The analysis highlighted some key findings regarding the impact of Industry 5.0 technologies on financial and accounting processes in cultural entrepreneurship:

The results of the quantitative analysis show that integrating AI and IoT into accounting processes significantly reduces human error and increases the efficiency of financial reporting. Automated systems facilitate tasks such as processing transactions and collecting financial data, leading to faster and more accurate reporting.

The integration of IoT devices and AI algorithms allows for real-time monitoring of financial transactions and resource management. This gives cultural entities the ability to make more informed and timely decisions, improving financial governance and resource allocation.

Blockchain technology has proven highly effective in increasing the transparency and security of financial transactions, especially in the management of intellectual property and copyright. The immutable nature of blockchain ensures traceability and protection of transactions, building trust between the parties involved.

The qualitative analysis also highlights certain challenges, such as the high costs associated with adopting technologies, the need for specialized training, and resistance to change on the part of staff. However, organizations that have successfully implemented these technologies report long-term benefits, including increased compliance with financial regulations and improved internal control mechanisms.

The results highlight the potential of Industry 5.0 technologies to contribute to the sustainable development of the cultural sector. By increasing the accuracy, transparency and efficiency of financial management, these technologies enable cultural entities to operate more sustainably in the digital economy.

The case study presented in this article examines current perceptions and practices regarding the integration of these technologies into cultural entities. For a deeper understanding of the trends and challenges faced by these entities, a survey was conducted among professionals in the field. The collected data was analysed using SPSS software, a robust tool for statistical analysis.

Using SPSS, we analysed in detail the demographic distributions of respondents, the perceived importance of advanced technologies, and their impact on the efficiency and accuracy of accounting processes. The analysis also included an assessment of the software currently used for financial and accounting management, providing a clear insight into current trends.

The study not only highlights the use of these technologies in the cultural sector but also provides valuable insights into how they could influence the future of accounting. Through SPSS, raw data has been transformed into a coherent narrative that supports informed decision-making in this dynamic sector.

Computer technology brings significant improvements in data storage, transforming the way financial accounting information is stored and formatted and setting new standards for its supervision. In the past, accounting documents were stored on paper, but now, in the age of advanced technology, they are kept on magnetic media, which ensures greater accuracy and increased logical consistency. This process not only saves human and material resources, but also streamlines work by automating calculations and checks, reducing the need for large accounting staff. By using automated management technology, accounting tasks are simplified, operational efficiency is increased, and operational costs are decreased, thus supporting the development of the industry. At the same time, it is anticipated that computer technology will continue to develop and refine its practical uses.

Conclusions

The study highlights the crucial role of internal audit and financial accounting information management in cultural institutions, highlighting the need to adopt the new technologies associated with Industry 5.0. By using these technologies, cultural organisations can improve the transparency, accuracy and relevance of financial reporting, thus contributing to sustainable development in the context of the digital economy.

There are many chances to increase financial efficiency and transparency in cultural organizations with Industry 5.0 technologies, particularly blockchain and artificial intelligence.

Fundamental changes are needed in the accounting curriculum to balance traditional accounting knowledge with digital skills relevant to the profession, as suggested by Qasim and Kharbat (2020). Only in this way, accounting professionals will continue to be valuable and strategic human resources in organizations and society, contributing to a humanized society and a sustainable labour market.

In the face of technological challenges, it is necessary for professional accountants to adapt to this technological evolution and transformation. The rapid pace and scale of technological change in accounting pose major challenges and underscore the

importance of extensive collaboration in accounting education to remain relevant to the future of the profession, as noted by Jackson et al. (2022).

The analysis of the data collected from the survey provides useful information on the current level of adoption of technologies in the financial and accounting management of cultural entities. The results show an increased interest and trust in advanced technologies such as artificial intelligence (AI), the Internet of Things (IoT), blockchain and Big Data. These technologies are seen as essential tools for increasing accuracy, reducing human error, and increasing efficiency in financial processes.

Digital infrastructure limitations and resistance to change are key issues that require smart and cooperative solutions.

The preference shown for established software, such as SAGA and SAP, reflects an orientation towards stability and familiarity in the use of digital tools by professionals in the cultural sector. However, this preference may also signal a reluctance to adopt newer technologies, which could limit the potential benefits of innovative solutions in the long term.

Recommendations

1. To encourage acceptance of new technologies, it is important to provide training programs and information campaigns that highlight the benefits and ease of use of these modern solutions. These initiatives should be designed to simplify the learning process and increase trust in new technological tools.
2. Cultural organisations should implement a strategy of gradual introduction of advanced technologies, allowing for the progressive replacement of traditional systems. This approach will facilitate the transition and minimise potential operational disruptions, ensuring a smoother uptake of modern solutions.
3. Constant monitoring of the performance and impact of new technologies is essential. Collecting feedback from users allows for the early identification of problems and provides opportunities for adjustment and improvement, so that technologies best meet the needs of the organization.
4. Cultural organisations can benefit from collaborating with other entities and sharing best practices in the implementation of technologies. This knowledge exchange can drive innovation and provide valuable solutions for the effective adoption of advanced technologies.

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