





TRANSFORMING ACCOUNTING THROUGH DIGITALIZATION-A NEW ERA FOR THE PROFESSION

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Abstract:

Digitalization is transforming companies more fundamentally than the business world has ever seen. The accounting industry has created a new trend known as accounting engineering, which involves rethinking the profession in way of technological advancement such as digital transformation, artificial intelligence, and the 4th Industrial Revolution (I4.0). While many of these changes have been theoretically integrated into scientific literature, their practical application in business operations is lacking. In this sense, this paper aims to highlight the aforementioned issues through the lens of implementing the achievements of digital transformation and to provide a clearer understanding of accounting engineering and its impact on the profession in the digital age, offering practical insights into the relationship between digital advancements and labor market trends for accounting professionals.

Keywords:

accounting engineering, digital transformation, artificial intelligence, 4th Industrial Revolution (I4.0).

1. INTRODUCTION

Recent technological revolution in data and communication systems enables us to generate and share data much faster than ever before (Pramanik M.I., 2017). In this new era, the influence of digitalization is evident across nearly all areas of social life. Digital technologies are reshaping every facet of modern existence and professions are compelled to adapt to the global landscape. Due to that fact, businesses must explore new models to remain competitive because digitalization is no longer optional for professions, it has become essential.

Like many other fields, the accounting profession is undergoing significant transformation, and it is undeniable that the future language of accounting will be shaped by digitalization and technology. In response to advancements, the profession must evolve by integrating modern technologies, ensuring that it is well-prepared to meet the demands of the future.

Accounting engineering aims to equip the accounting profession with engineering skills, allowing it to evolve in step with technological advancements. It represents the reimagining of the profession in response to innovations like digitalization, artificial intelligence, and the Fourth Industrial Revolution (I4.0). To prepare for the accountancy profession for the future, Accounting Engineering is redesigning the profession within the framework of engineering ability (Tekbas, 2018).

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The rapid advancement of IT technologies is driving their large-scale integration into accounting systems and business information support, a process that can be facilitated through various engineering tools. However, practical implementation of these tools requires a deep adaptation to the characteristics of the existing accounting and economic procedures, allowing preserving and strengthening the analytical and practical possibilities of information files, to combine them with the legal norms and requirements (Belousov A.I., 2017).

Emerging technologies are reshaping the way of working in ways far beyond improvements, such as robotic process automation which has already streamlined many routine accounting tasks, also the influence of advanced technologies like cloud computing and big data which are set to redefine the future accounting. Among all digital innovations, artificial intelligence is expected to have the most profound impact. AI's ability to analyze vast amounts of accounting data and detect patterns can significantly enhance companies decision-making processes and provide stakeholders with valuable tools for conducting more in-depth financial analyses.

Current studies focus on several key areas: the influence of AI on the accounting profession, the existing limitations of AI for handling specific accounting tasks, and how AI-based accounting systems might redefine the role of accountants in the future. As AI becomes more integrated, accountants will shift from traditional task-based roles to more strategic positions, leveraging technology to add greater value to business operations. Despite AI's promise, there are ongoing discussions about ethical considerations, potential skill gaps, and the readiness of the profession to fully embrace AI-driven systems.

The purpose of this paper is to examine the current impact of modern technologies and digitalization on the finance and accounting sector. Specifically, it aims to address the present state of digital transformation and assess the agility of businesses in adopting modern technologies and tools. Certain conclusions regarding the impact of technological innovations and digitalization were reached based on research conducted between July-August 2024.

2. LITERATURE REVIEW

In recent years, terms such as 'Big Data,' 'Data Analytics,' and 'Artificial Intelligence (AI)' have become prominent buzzwords in the accounting profession, signaling a significant shift in how accounting is practiced. As technology rapidly advances, the skills of accounting professionals have evolved from basic tools such as pencil and paper, typewriters, and calculators to the use of spreadsheets and sophisticated accounting software. Today, data analytics has emerged as a relatively new but increasingly essential skill set, gaining importance across all areas of the profession.

Big Data, in particular, has transformed the accounting landscape by offering unprecedented volumes of information, which, when properly analyzed, can reveal critical insights into business operations. The ability to sift through massive datasets, identify patterns, and forecast trends is now crucial for accounting professionals. This skill goes beyond the traditional use of numbers, positioning accountants as strategic advisors who can translate raw data into actionable business insights.

As businesses seek to remain competitive in an ever-evolving digital economy, accounting professionals who excel in data analytics and can effectively interpret big data will be at the forefront of the twenty-first-century business world. These individuals will not only help organizations make financial decisions but will also contribute to shaping long-term strategies.

In this new paradigm, accountants are no longer confined to retrospective financial reporting but are becoming proactive partners in shaping business outcomes. Those who master the tools and techniques of data analytics will find themselves in high demand, as their ability to translate complex data into compelling strategic narratives becomes an invaluable asset for organizations navigating an increasingly data-driven marketplace. Therefore, accounting professionals can capitalize on numerous opportunities in this rapidly evolving, disruptive, but ultimately advantageous environment by embracing big data, data analytics, and artificial intelligence (AI) to stay ahead of the competition (Bose S., 2022).

Big data analysis holds significant potential for improving decision-making processes, garnering increasing attention from both academics and practitioners alike. Big data (BD) refers to huge datasets and the software tools used to capture, store, manage, and analyze this information. These datasets are generated from various sources, including customer interactions, social media, transactional data, and operational processes, making BD a vital component across all business functions and industries.

The integration of big data into business operations can lead to more informed and strategic decisions, as organizations are equipped to uncover patterns and trends that were previously obscured in smaller datasets. By leveraging advanced analytics, businesses can gain insights into consumer behavior, market dynamics, and operational efficiencies, thereby enhancing their competitive edge.

In summary, the significance of big data analysis in enhancing decision-making processes cannot be overstated, as it transforms the way organizations leverage information to achieve their goals and respond to the dynamic landscape of modern business.



Examples of big data used cases are fraud detection, log analytics, sentiment analysis and social media, energy sector, risk modeling and management (Omolora A.E., 2018). The expeditious and stupendous increasing rate in applied soft computing worldwide has a major contribution toward the total output of big data application to financial crime detection (Omolora A.E., 2018).

Forensic accounting has become a critical area within the accounting profession, encompassing a range of specialized practices that address various financial irregularities and disputes. This field includes fraud examinations, anti-corruption and anti-bribery efforts, business valuation, litigation support, expert witnessing, and cyber security measures. As organizations increasingly face complex financial challenges, the demand for forensic accountants has grown significantly.

The demand for forensic account services is growing as businesses, regulators and investors have continued to raise concerns about fraud, financial irregularities, corruption, and bribery cases (Rezaee Z, 2018). With the increase in the amount of digital data, there is growing need for providing support for digital forensic in big data application domains (Zawoad S., 2015). Data analytics with the use of Big Data has been employed to transform unstructured data into useful, structured, and relevant information for decision-making (Rezaee Z., 2018).

Big Data refers to data sets that are so voluminous and complex that traditional data processing application software is inadequate to deal with them (Minovski Z., 2020). Generally, Big Data is defined by the key characteristic known as “five Vs”: variety, velocity, volume, veracity, and value. These categories have further several types of challenges that need to be considered by the business organizations and managerial staff members of accounting departments while using big data analytics and other data analytical approaches in business organizations. Velocity and value represent important challenges while working on decision-making processes regarding the use of accounting systems for preparing financial reports with advanced accounting (Aziz, 2023).

Variety. Big Data encompasses a diverse range of sources, including web pages, network and process logs, social media posts, emails, documents, and data generated from various sensors.

Volume. In the era of Big Data, organizations are managing enormous quantities of information, often measured in terabytes and petabytes. The sheer volume of data collected can be overwhelming, requiring advanced storage solutions and analytical tools to process and interpret this information effectively.

Velocity. The speed of data refers not only to the speed at which the latest information is generated from various systems but also to the rapid flow of data within those systems.

Veracity. Veracity pertains to the accuracy and reliability of the information being analyzed. It involves considerations of data quality, governance, and metadata management, as well as addressing privacy and legal issues.

Value. Value refers to the ability to turn the data into a value. The availability of big data can reveal previously unknown insights from data and this understanding leads to the value (Zawoad S., 2015).

Appropriate selection and use of quick data analytics and business intelligence tools can enhance the overall probability of taking effective decisions based on the previous information for future business operations. According to the research findings, an important benefit associated with the use of that analytic is improvement in the accuracy and efficiency of financial reporting systems (Aziz, 2023). The probability of human error in financial accounting systems can be reduced by enhancing accuracy in automated accounting systems by using advanced software and accounting programs (Alshaikh, 2022). Information stored in these software and accounting programs can be used in data analysis for future decision-making processes. While working on manual calculations, managers can have errors and challenges to deal with complex data or information sources regarding a scenario. Apart from all this, manual systems of accounting cannot provide information about fraud and manipulation by the accountants under miscellaneous funds or any inappropriate account. However, such a reduction is possible using advanced accounting systems with data analysis techniques and modern technologies for data storing and management. According to the research findings advanced data analytics provide an opportunity to finance professionals and accountants for higher quality services in their business while working on predictions and forecasting of future market trends (Aziz, 2023).

One of the traditional roles of management accountants has been to interpret and elucidate data, enabling them to grasp the big picture and effectively communicate insights to senior management. This responsibility remains just as important today as it has in the past, necessitating that management accountants not only understand data analytics but also communicate their findings clearly. Examples of activities where management accountants can utilize data analytics (depending on the size and scope of the organization, could be inventory management, production planning, error rates, quality assurance, logistics, market segmentation, price optimization, resource management and so on (ACCA Global, 2023).

Forwarding the obtained information invention of modern technologies is also causing transformation in the accounting systems as companies are now relying more on automation as compared to human resources and finance professionals.



Such a situation can have negative consequences for the economic development of a country as it replaces human employment opportunities with automated systems (Aziz, 2023).

Cloud computing is becoming a powerful and valuable tool for companies and has been identified as one of the key technology trends that accountants should stay abreast of over the next decade (Corkern M. S., 2015). Cloud-based Accounting Information System integrates all essential information required for accounting processes into a single platform. This system allows various stakeholders such as client companies, accountants, and auditors to access the system concurrently, enabling them to collaborate on real-time accounting processes transparently.

Cloud computing in the field of accountancy has many benefits:

- Less costs, 24/7 Accessibility to All Accounting Information, Real-Time Information Updating, Security of Financial Information, Scalability, Automatic Data Back-Up and Restoration, Automatic Software Updates (Minovski Z., 2020).

Artificial Intelligence (AI), can be defined as any machine or device which has the human ability to think, learn, solve problems and take decisions (Rane P., 2020). Artificial Intelligence refers to computer programs designed to think and learn, with the primary objective of creating software that can efficiently and effectively solve specific tasks. AI processes inputs into outputs and can adapt necessary methodologies, analyze information, prepare reports, and automate many tedious processes without relying on predefined commands. In the field of accountancy, particularly within Accounting Information Systems, AI is already being utilized and is progressively advancing in automating various functions, such as saving, retrieving, storing, processing, and analyzing financial data. Artificial intelligence is particularly applicable and with automation can replace routine tasks like accounting (bookkeeping), audit, taxation, analysis, and calculation of indicators etc. In the era of artificial intelligence, with the popularization of intelligent accounting software, accounting presents the characteristics of intelligence and automation (Minovski Z., 2020).

Implementation of AI in Accounting and Finance has to the following benefits for the companies:

- Audit and Reduce Fraud
- Streamline data entry and analysis
- Automation of the processes for the monthly, quarterly, or yearly closing procedures
- Inventory and Supply Chain Management
- Payables and Receivables Management
- Expense Management

- Artificial Intelligence Chatbots for Customer Relationship Management
- Value Creation and Addition (Rane P., 2020)

3. METHODOLOGY

The research data was collected through an online survey conducted between July and September 2024, in which questions were asked about digitalization in finance and accounting. A total of twenty-seven representatives, as employees from different business entities, provided complete responses. The research content and graphics are based on these samples.

The survey incorporates a variety of companies from several industry sectors (Production 14.8%, Trade 18.5%, Services 29.6%, Other 37%). Ownership structure shows the share of the private sector 57.7%, public sector 23.1%, 3,8% foreign ownership and rest of 15.4% other types of ownership.

With a share of 37% companies with more than 250 employees make up most of the sample in the survey. For the rest, 18.5% of the participants come from companies with a workforce of between 50 and 250 employees and remaining 22.2% employ less than 50 people.

Of the participators, 66.7% are from Serbia, 22.2% from Germany, 3.7% from Monte Negro, 3.7% from Croatia, and 3.7% from South Africa.

When it comes to the position of respondents in companies, accountants are represented with 25.9%, heads of accounting and controlling with 11.2%, heads of finance 7.4%, economists 11.1 %, sale specialists 3.7%, auditors 3.7%, students 29.6% and tax specialists 7.4%.

Most participants have more than 10 years of work experience 55.6%, 3,7 % between 6-9 years, 3.7 % between 3-5 years, 14.8 % less than 2 years of work experience. Students are represented in volume of 22.2 %. 40.7 % of participants are in age between 18-30, 14.8 % between 31-40. 29.60% between 41-50, 14.08 % between 51-60.

3.1. SYSTEMS AND TECHNOLOGIES

Companies are consistently pushing forward with their efforts to implement fundamental digitalization elements in finance and accounting and considerable progress has, indeed, already been made in this regard. It has been shown in this survey that companies are having intention for technological innovations and digitalization. On the other hand, AI based solutions have yet to fully take hold across the board.

Only 29.6 % of the companies surveyed are using AI learning systems in-house in business today, 14.8 % are using AI from the third parties, while 18.5 % are planning



to implement AI in the near future. Still many companies do not use AI at all (18.5%) or have no intention of using it in the near future (18.5%).

The successful digitalization of the processes can make a significant contribution towards finance and accounting being future-fit. It involves various technologies and tools that can be used to increase efficiency and sustainability in optimizing the processes.

According to the survey's results, only 37% of respondents actively use BI tools in practice. Among these, 33.33 % rated their knowledge as average, 7.4 % as above average and 7.4 % as highest level of knowledge. The remaining respondents stated that they knew very little or nothing at all about BI tools.

Although the previous result shows that BI tools are not widely used in practice, most respondents still expressed the strong opinion that data analytics and BI tools can automate accounting processes.

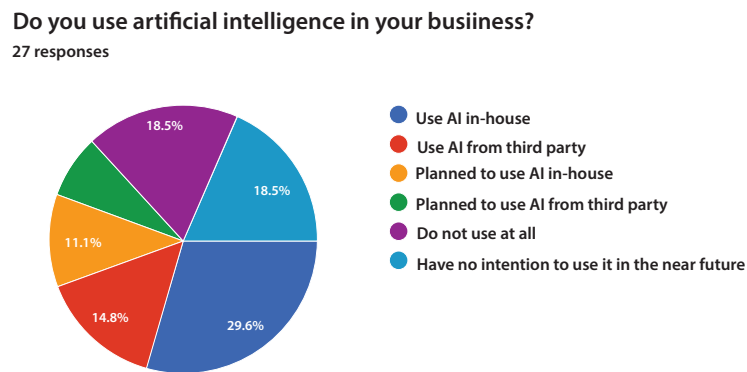
Based on the further survey results, it is presented which digitalization projects companies are currently implementing or have already implemented in their finance and accounting department:

- Most of the companies have already implemented automatic readout of invoices and documents for processing (56% of the participants)

- Automation of the payment process has great progress and 59% of the participants already implemented AI support for this process
- Monitoring of posting of data 44%
- Consistently checking of documentation 52% of the participants
- In contrast, automatic readout of the contracts is not yet advanced in their implementation and only 22% of the participants are using AI to automate this process.
- Improvement of the business processes 41% of the participants.
- Predictive analytical statements 44 % of the participants.

In summary, the greatest progress can be seen in the payment process, automatic readout of invoices and documents for processing and checking documentation, which according to the participant can improve the process in general and reduce different costs. According to the survey's results 38.5% of the companies are currently reducing the cost of finance and accounting and 30.8 % are planning to reduce the costs in the next two years. Still, a huge part of the participants (34.6%) did not start to take this into account.

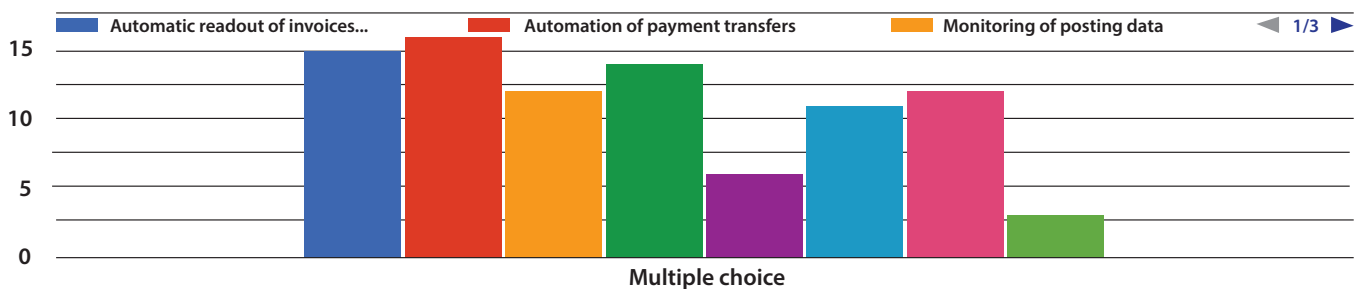
Figure 1. AI.



Source: Authors' data.

Figure 2. Digitalization Projects.

The areas of finance and accounting that are best supported by AI



Source: Authors' data.



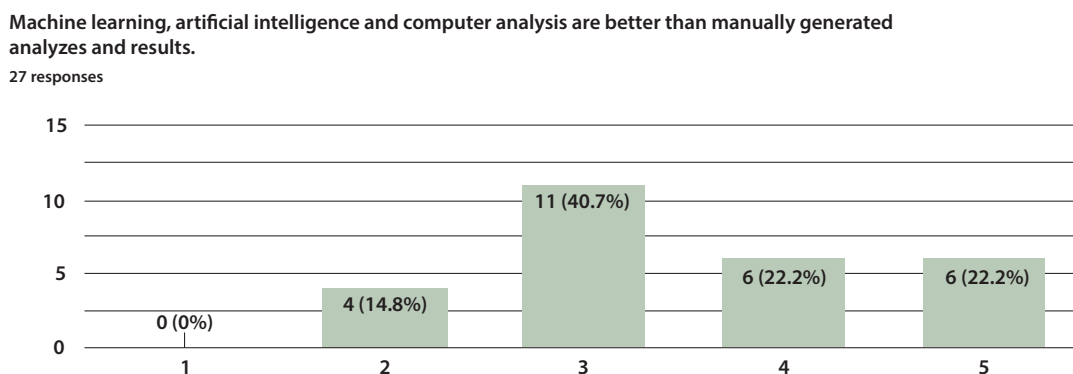
When asked about the strategy of cost saving, only 24% of the companies stated that they are using AI Technology, 24% stated that they are using In-house shared service center, 4% are using outsourcing as a strategy and almost 48% was neutral.

3.2. HOW DOES DIGITALIZATION AFFECT ACCOUNTING?

The effects on costs and time expenditure play a key role when it comes to the question of the aim of digitalization. The results in the next figures show that, for a considerable number of respondents, machine learning, AI and computer analytics are better than manually generated analysis and results.

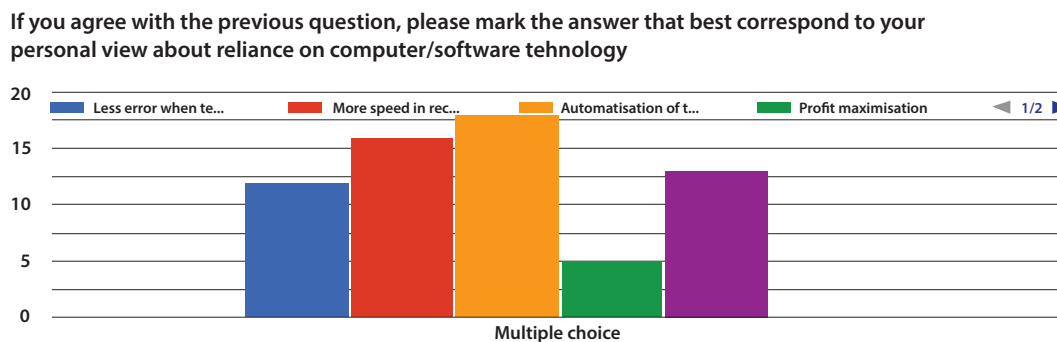
55.6 % of the respondents agreed with this statement, that the application of big data analytics improves the efficiency and effectiveness of finance and accounting processes.

Figure 3. AI in practice.



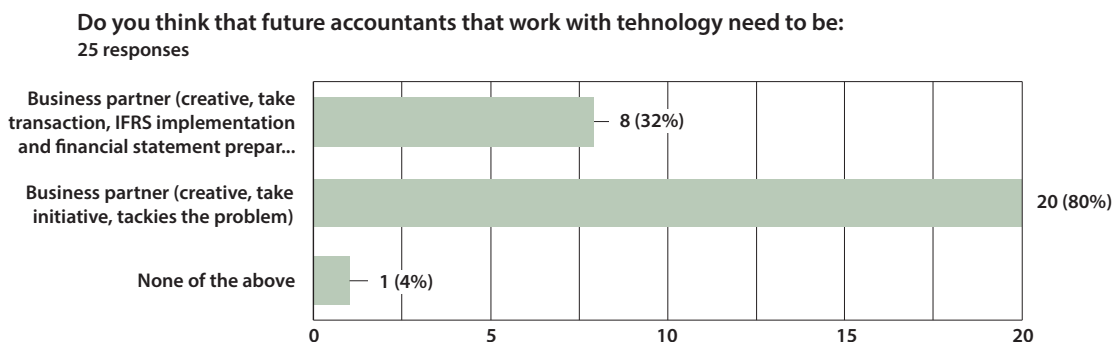
Source: Authors' data.

Figure 4. Digitalization Projects.



Source: Authors' data.

Figure 5. Future Accountants.



Source: Authors' data.



By applying data analytic tools, finance and accounting could receive up-to-date information in financial statements and assertion at any time - most of the respondents stated that they strongly agreed with this.

Digitalization contributes to speeding up the processes- minimizing errors, more speed in recognizing transactions, automatization, cost savings and profit maximation.

Most of the respondents strongly agree that digitalization can replace part of accounting team, while computer software/program is a better solution than engaging the people in recognizing the accounting transactions.

3.3. IMPORTANCE OF DIGITALIZATION IN ACCOUNTING

Digitalization is trending that companies and their departments must deal with now and in the coming years, to remain competitive. It will change the accounting profession. According to participants, future accountants need to see a bigger picture (56 %), need to be keen to take action and able to influence (48%), need to provide insight into the future (48%) and to take initiative proactively (41%). Almost 80% of the participants think that a future accountant needs to take the position of business partner and be creative and tackle the problems.

Not only will accountants need to change, but the CFO role in the future will take a completely different dimension. 80 % of the participants think that the CFO should focus more on adding value to the business and support other managers, than focusing on the transaction processing and reporting only.

4. CONCLUSION

The impact of digitalization on finance and accounting is undeniable, reshaping both industries and professional roles at an unprecedented pace. This study highlights the growing relevance of accounting engineering as a part of digital transformation and implementation of artificial intelligence, big data, and cloud computing into accounting processes. The research findings reveal that while many companies have begun to implement digital solutions, the full potential of AI and other innovations remains untapped in several areas. Digitalization promises enhanced efficiency, cost reduction, and process optimization, as seen in the widespread adoption of automated systems for tasks such as invoice processing and payment automation. However, challenges persist in the full integration of these technologies across all business sectors. The future of accounting will require professionals to evolve, embracing both technical and analytical skills, while companies must continue to adapt to remain competitive. As the digital era progresses, the accounting profession is evolving from its

traditional role to becoming strategic business partners, initiating more influence on decision-making and value creation.

This survey offers critical insights into the digitalization of finance and accounting by benchmarking current technology adoption, identifying gaps, and highlighting emerging skill needs. It serves as a valuable reference for organizations to assess their digital transformation progress, informs strategic decisions for finance leaders, and supports the ongoing industry-wide shift toward greater efficiency and competitiveness through digital tools.

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