IMPLEMENTING ARTIFICIAL INTELLIGENCE BY SMALL ACCOUNTING FIRMS IN THE CONTEXT OF INDUSTRY 4.0: NECESSITY OR AN EXPENSIVE TREND?

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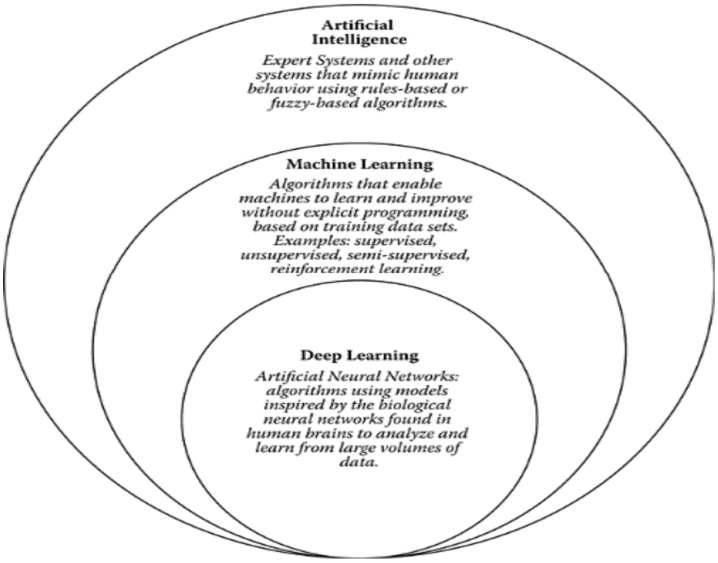
Abstract: Large accounting firms have invested huge sums in adopting artificial intelligence to increase internal efficiency and to improve customer engagement. Achieving the potential of artificial intelligence requires, in addition to short-term expenses, long-term expenses for the efficient use of AI systems. Also, developing customized artificial intelligence solutions comes with a high price, requiring specialists qualified in operating sophisticated software and significant research and development expenditures. This case study will analyze the barriers to the adoption of artificial intelligence and the impact that AI has on small accounting firms, in order to identify optimal solutions for transitioning to the new technology.

JEL classification: C61, M15, M41, P41

Key words: Artificial Intelligence (AI), Machine Learning (ML), Deep Learning (DL), Trends in Accounting, Audit, Accounting Firms

1. INTRODUCTION

Artificial intelligence is a software application or computer program that can think or act like humans or in a rational manner. There are 2 subtypes of AI: artificial narrow intelligence, which is focused on a specific task that it usually performs better than humans, such as chess-playing computers, autonomous cars or chatbots, and artificial general intelligence, which handles all cognitive tasks specific to the human brain. Artificial intelligence includes a variety of subfields, the most important being Machine Learning and Deep Learning. Machine learning (ML) uses algorithms to analyze data and learn from it to perform specific tasks, such as predictability. An example of the application of this technology in the accounting field is Deloitte, which uses Argus to review and extract key accounting data from any electronic document, being able to analyze sales or leasing contracts, invoices, financial statements or employment agreements, relieving auditors of these tasks so they can focus more on interpreting the results.



Relationship between AI, MI and DL (Ng, Alarcon, 2021)

Deep learning (DL) uses artificial neural networks to identify patterns from data, and is used in applications like facial and speech recognition, in text translation, or in self-driving vehicles, or to detect counterfeit banknotes inserted into ATMs. In accounting DL can be used to reconstruct poorly scanned documents using optical recognition software (Duffy, 2019) or in information identification to asist audit procedures.

This article resulted from analyzing the costs and effects generated by the adoption of artificial intelligence by small businesses. This is necessary both to increase the volume of data processed by the organization and to increase the speed of their processing, as well as to eliminate mistakes, errors, misconduct or biases that come from human weakness. Company development requires investments that will ultimately reduce expenses and generate profits. Doug Shrock, Vice President at KeyPoint Credit Union, compares customizing IT solutions to an Excel spreadsheet that must be configured to accomplish tasks, especially if there is nothing similar on the market. Once the AI system is implemented, its maintenance, integrations, and upgrades will generate an ongoing

expense. Also, running artificial intelligence requires a large amount of data which will accelerate cloud costs. Generative AI will cause IT spending to explode, generating a cloud boom, says Chris Ortbals, chief product officer for Tangoe.

The report "State of Cloud: The Critical Role of Third-Party FinOps in Cloud Spending Controll" by Tangoe, a provider of IT Asset Management & Expense Management Solutions State of Cloud, shows that 92% of companies are seeing an increase in cloud spending, half of which blame artificial intelligence, especially generative AI. Companies spend an average of $2,559 per employee annually on cloud software, requiring data usage monitoring to manage costs, the report shows. Spending money to enhance generative AI capabilities will need to generate substantial returns that make the investment economically viable.

On top of the cloud fees, subscriptions and licenses for AI solutions that the company wants to buy and not build will be paid. It is necessary to purchase specialized applications to serve particular needs, making expenses ongoing. The increasing complexity of these models will require the hiring of data specialists and software engineers, so that the expected decrease in labor costs due to the introduction of artificial intelligence does not materialize. Another source of expenses is the training of non-technical personnel to use new AI systems developed and maintained by specialists.

As for small companies, they do not have the resources to develop customized models and generally license commercially available models, making the use of artificial intelligence quite cheap. In addition, to be effective, artificial intelligence needs a large volume of data, which small companies simply do not have. Small businesses do not have to solve complex tasks to make large investments in solving them. Most of the time, a commercially available model is enough to ensure optimal functioning of the company, given that the current costs of these products have decreased over the years.

2. LITERATURE REVIEW

In order to write this article, the books and scientific articles that we considered relevant to the chosen topic were selected from the specialized literature. As technology advances, artificial intelligence and accounting increasingly intersect, fundamentally changing the field of accounting by offering solutions that increase efficiency and reduce errors. Automation and data-driven decision-making influence all aspects of accounting, from data recording operations to developing complex financial strategies, making this field more precise and future-oriented. These major changes have led numerous authors to study and publish papers on how companies and specialists can adapt to new trends in order to remain competitive. Several aspects are addressed by various authors: the relationship between artificial intelligence and accounting functions (Badiyani, 2022), how the work of accountants and auditors is affected by the new achievements of digitalization (Bhimani, 2021), the applicability and impact of artificial intelligence on accounting (Vasarhelyi, Kogan), developing an analytical mindset in order to effectively examine, analyze and interpret data in order to develop business decisions. (Richardson, Terrell, Teeter, 2024)

Al Naqvi presents a true guide to integrating artificial intelligence into auditing and accounting to create superior automated models, forensic accounting, and valuation. The continued development of this technology makes it the main competitive factor for accounting and auditing firms in the future. (Naqvi, 2020) By fully integrating artificial

intelligence into audit management, the current stage of its use only for narrow business problems will be overcome, making the organization remain competitive in this era of automation. The specialized literature also presents the challenges regarding the implementation of artificial intelligence, as well as the opportunities it offers, (Badiyani, 2022) or the impact on accounting processes and responsibilities. (Vasarhelyi, Kogan, 1997)

3. PERSPECTIVES FOR INTEGRATING ARTIFICIAL INTELLIGENCE INTO ACCOUNTING

The accounting profession has undergone radical changes, with many manual processes now automated. Banking services offered via smartphones, ATMs and POS services have made going to bank branches for face-to-face interaction unnecessary. It is very likely that the rapid advances made in current technologies will soon become obsolete due to the evolution of artificial intelligence, machine learning, and deep learning. However, this transformation also had negative effects, such as the loss of jobs for many bank workers and traditional accountants, whose tasks were taken over by computers and communication systems.

Artificial intelligence will be implemented primarily to eliminate inefficiencies, such as repetitive and mundane tasks. Artificial intelligence will enter data from invoices and receipts without human intervention, transactions will be immediatelly classified according to pre-established rules (e.g. QuickBooks), personalized financial reports will be generated automatically (e.g. Microsoft Power BI), and discrepancies between bank accounts and accounting ledgers will be eliminated. The emergence of Big Data technology combined with a strong infrastructure has favored the development of innovative applications for a wide range of business models.

Major accounting firms, Deloitte, KPMG, PwC and EY, have invested huge sums in embracing artificial intelligence to provide superior services and innovative solutions. They now offer solutions for tasks as diverse as tax analysis, auditing or inventory tracking. Machine learning techniques can identify anomalies, fraud or suspicious activities and a lot of documents, such as invoices and contracts, can be cross-checked. Deloitte, KPMG and PwC use AI to make audits more efficient and reduce audit time by analyzing a large volume of documents in a short time, reducing the intensive manual work performed by auditors, resulting in lower fees charged (e.g. KPMG Klara).

For accounting firms the global trend is to increase their investment in AI, as a determining element of their success, which means that accounting professionals have to adapt to the new way of working based on artificial intelligence. In addition to performing repetitive tasks, artificial intelligence will allow processing larger and more complex amounts of data with increased speed and efficiency. At the same time, having and being able to process a much more comprehensive volume of data will increase the accuracy and scope of financial analyses. Increasing the speed of data processing will provide managers with real-time information regarding financial performance.

AI algorithms can create predictive models that manage cash flow to avoid short-term borrowing costs, or to manage stocks to optimize them, thus reducing operational costs. Human errors caused by fatigue, stress or bias will be avoided with the adoption of artificial intelligence, thus preventing tax penalties or financial losses. As a chain reaction, management decisions and financial planning based on this complete and accurate data will be considerably improved. And last but not least, customers will benefit from better

and more promptly provided services. AI-based virtual assistants, such as chatbots, help accounting firms provide accurate and prompt answers to clients.

Another effect is that by laying off a significant part of the workforce, the company's expenses will decrease. In addition to eliminating personnel who performed repetitive work, accounting firms can outsource certain processes to clients using AI, further reducing internal expenses. However, despite the fact that AI embedded in accounting software is designed for intuitive use, the remaining staff will need to be trained to be able to effectively use the new technologies, which will generate additional costs. Another way to improve efficiency is to use cloud-based solutions, which will reduce the need for investments in IT infrastructure.

4. THE ISSUE OF AI ADOPTION BY SMALL ACCOUNTING FIRMS

The first and most important obstacle is the high implementation costs. Significant investments are required in the acquisition and implementation of AI-based software, as well as employee training. Added to these are the ongoing expenses for software updates, maintenance and cloud subscriptions. The lack of technical skills of the company's personnel will require time and money for training, in order to avoid underutilization of the purchased technology or faulty implementation, generating decreased benefits or even losses. Employees may also be reluctant to adopt artificial intelligence, for fear of losing their jobs or the need to acquire new skills.

A conservative attitude of employees and company managementas, as well as the fear of the unknown, can prevent major changes in the way of working brought about by new technologies. AI may be perceived as too advanced for the needs of a small business. As long as current processes work satisfactorily, the tendency is to stick with traditional methods. The lack of strategic vision makes it difficult to identify how AI can help the company, and limited resources for research make it difficult to identify appropriate technological solutions.

In addition to the problems raised by financing and the company's personnel, there are also technical problems. Most systems that use AI are based on complex solutions that meet the requirements of large companies, having a multitude of functions that are not relevant for small companies, making it difficult to adapt them to the specific needs of small businesses. An impediment may also arise due to the lack of dedicated technical support from AI solution providers, focused mainly on large clients. It is necessary to customize AI solutions to meet the company's needs, which can be a serious obstacle to the adoption of AI.

There may also be a lack of compatibility between the company's old accounting systems and the new AI-based solutions. It is also possible that the transition from one system to another will require the interruption of the company's operational flow.

Then comes the lack of confidence in the benefits brought by AI, which could be considered far too small to satisfactorily recover the initial investment.

5. CONCLUSIONS

Adoption of AI by small accounting firms may seem difficult, overcoming obstacles to reap the benefits of this transformative technology requires both a strategic approach and the right resources.

It is important for small companies to start from their current way of working and look for technology to complement it, rather than purchasing technology and then looking

for a use for it, as it is to their detriment. Artificial intelligence must be a solution to an existing problem or improve a certain activity and not generate complications. As the market is constantly changing, small businesses will need to increase their IT capabilities to remain competitive.

It will start with automating routine tasks, such as data entry or issuing invoices and gradually expand the use of AI to other operations..To streamline expenses, it is recommended to adopt only those technologies that are truly necessary. It is important to identify those applications that best suit the specifics and needs of the company. For this it is necessary to collaborate with technological consultants to help select and implement appropriate solutions. The service provider must comply with applicable regulations and data protection standards (e.g. GDPR).

To avoid major investments in infrastructure and operational disruptions, solutions must be chosen that can connect with the software owned and used by the company. As the company develops and becomes familiar with these new technologies, other packages can be purchased to increase efficiency and, implicitly, benefits.

You can start by accessing scalable solutions, such as QuickBooks, Xero, Wave or FreshBooks, which offers automated accounting functions and are oriented towards medium and small businesses, The services offered by these providers are relatively cheap and easy to use. Using cloud applications will eliminate the need for investments in IT infrastructure as well as constant updates.

Once you have started on the path of using artificial intelligence, it is necessary to constantly monitor performance by analyzing the results and evaluating the impact that AI has on the company. In the event of the company's development or changes in its needs, solutions will be sought to adapt to the new conditions to remain competitive in the market.

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