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Artificial Intelligence: Challenges of AI in Accounting

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ABSTRACT

Objective: The aim of the article is to present the AI solutions used by accounting departments and the challenges they bring to the accounting field.

Research Design & Methods: The article was developed based on the literature, reports of companies which are currently implementing AI solutions in their accounting departments, and author's own research findings. The empirical part of the article includes the results of qualitative research. In the research process, the method of a diagnostic survey using the questionnaire technique was used. The study was conducted from February to March 2024, and involved 108 participants. The selection of respondents was deliberate and included a group of companies from the Małopolskie province.

Findings: The conducted research confirms that AI solutions have not been widely used in finance and accounting departments yet. However, respondents recognise the benefits and potential that the introduction of AI solutions and tools brings in terms of improving processes and tasks carried out in various enterprises. The obtained responses confirm that respondents are open to the introduction of new technologies and intend to use them in their organisations in the future. They do, however, express certain concerns about software errors or potential changes in employment levels.

Implications/Recommendations: AI solutions will be increasingly used in accounting. The challenge for future accounting departments will be to create a harmonious environment in which artificial intelligence will collaborate with human intelligence. The profession of an accountant will not disappear as a result of the introduction of improvements and the transfer of routine tasks to machines. Modern accounting systems will still require human supervision. However, the role of the accountant will change, as they will become operators of intelligent accounting applications in the future.

Contribution: The article addresses the current yet relatively scientifically understudied area of the practical use of AI solutions in the accounting departments of enterprises. The article partially fills the research gap and is one of the first studies presenting the results of research on the use of artificial intelligence solutions in the financial and accounting departments of the Małopolskie province. The research was exploratory and related to a limited group of enterprises. However, the presented research results may serve as a starting point for conducting more comprehensive studies on the discussed issue.

Article type: original article.

Keywords: accounting, artificial intelligence, robotic process automation (RPA), generative artificial intelligence.

JEL Classification: M41, M42.

1. Introduction

The technological landscape is constantly changing and evolving, providing entrepreneurs with innovative tools and methods of work. According to Calvino and Criscuolo (2019) in *Business Dynamics and Digitalization* on the example of 15 countries, the progressive processes of digitisation have significantly revolutionised most areas of business activity and contributed to the emergence of new business models. New technologies are also entering the field of accounting, streamlining the daily work of accounting departments.

Changes in the digitisation of tax settlements have significantly contributed to the reorganisation of the functioning model of accounting departments in business entities (Łada & Mierzejewska, 2021; Remlein, Jastrzębowski & Obrzeżgiewicz 2022). However, despite the government's introduction of online fiscal cash registers, a national e-invoice system, and the necessity for cooperation of transmitted files with government databases (JPK files), we are only at the beginning of the road to full automation of reporting (Semrau, 2021; Remlein, Nowak & Romanchuk, 2024).

According to the *Digitalisation in Europe 2022–2023* report by the European Investment Bank (EIB, 2023), more than half of companies in the European Union decided to introduce new digital solutions in their units during the COVID-19

pandemic. However, the level of digitalisation depended on the location of companies and their size (Jaumotte *et al*., 2023). On the other hand, research on small and medium-sized enterprises in Poland showed that only 38% of enterprises use basic digitisation tools, and 60% of enterprises see the need for full digitisation of business processes (Remlein, Nowak & Romanchuk, 2024). In addition, the European Investment Bank report highlights the role of advanced digital technologies such as artificial intelligence, business process automation, machine learning, and robotics (see: Jaumotte *et al*., 2023).

Among the most widespread technologies in accounting is the automation of serial business processes through the use of computer programmes (Januszewski, Kujawski & Buchalska-Sugajska, 2021; Borowiec, 2022). An example of accounting processes automation may be the mechanical calculation of salaries based on completed time records or the generation of financial statements in accordance with the documents, which are entered in the accounts. These programmes, through the simulation of human work, can automatically perform repetitive tasks. The characteristic feature of robots performing process automation is that they always perform their tasks according to the same scheme. They always act in the same way, not learning from mistakes, not seeking new solutions, always proceeding in accordance with the specified scheme.

What robots performing process automation cannot do, can be done by artificial intelligence (AI). This is because AI is the technology of intelligent computer programmes that learn by acquiring information. Artificial intelligence can reason and improve its actions by learning from mistakes.

In the era of dynamic technological development, entrepreneurs are forced to constantly improve processes and activities in their financial and accounting units. The aim of the article is to present artificial intelligence solutions used in accounting departments and the challenges they bring in the area of accounting. For the purpose of achieving the assumed goal, the following research questions were formulated:

1. Which of the artificial intelligence and automation solutions is most often used in the finance and accounting departments of the analysed units?

2. What opportunities and threats do respondents see in connection with the use of artificial intelligence solutions in their accounting departments?

3. What impact will artificial intelligence have on work in the future for accounting departments?

For the purpose of searching for answers to such research questions, the author has divided the considerations into two parts. In the first part, she introduces the reader to issues related to the use of artificial intelligence in accounting, focusing on discussing examples of practical solutions that have so far dominated in accounting departments. The presentation of specific solutions will give the opportunity to specify the benefits of their implementation in financial and accounting units in the

following part of the article. The second, most important part of the article focuses on the presentation and discussion of the results of own research on the use of artificial intelligence and automation solutions in accounting processes.

2. Examples of AI Solutions Used in Accounting

The availability of various modern technologies referred to as artificial intelligence significantly translates into the automation of financial and accounting processes in organisations. The possibility to automate learning processes, communicate in a way that mimics human behaviour has propelled accounting into a phase of the development of intelligent automation (Łada & Martinek-Jaguszewska, 2023b). Artificial intelligence in accounting mostly operates in conjunction with other automation technologies. AI technology typically performs selected tasks, which, combined with other activities carried out by employees or technology (e.g., automation tools), are integrated into entire processes.

Among the examples of intelligent technology applications in accounting, we should mention (Bornet, Barkin & Wirtz, 2020; Łada & Martinek-Jaguszewska, 2023a, 2023b; Martinek-Jaguszewska & Rogowski, 2023):

– optical character recognition (OCR),
– robotic process automation (RPA),
– machine learning models (ML),
– natural language processing (NLP),
– and generative artificial intelligence (GenAI – LLM).

Optical character recognition technology is software or a set of tools to scan an image of text, then identify individual characters, and finally convert those characters into digital text. OCR systems can analyse each element of a given document to subsequently process it into another computer programme. In the accounting domain, optical character recognition is mainly used to support the process of recording purchase invoices. Scanned invoices and receipts have certain mandatory elements that the system can identify and then record appropriately in the accounting books using other software in the field of automated processes. The application of OCR methods by finance and accounting departments increases efficiency in terms of the quantity of recorded financial documents when compared to manual recording. Computerised character recognition also reduces the risk of misinterpreting the data in documents, which in turn results in higher quality and reliability of the accounting records. It also enables workers to reduce tedious routine tasks such as checking the correctness of data in purchase invoices as well as time required for their registration in the financial and accounting programme in the appropriate position. It is worth noting that the planned implementation of mandatory invoicing by the government, within the National e-Invoice System (KSeF)

and the possibility of downloading them directly into accounting programmes will reduce the need for OCR, but it may still be used for foreign invoices or contracts concluded with non-business entities.

Business process automation has already been widely used by accounting departments to perform repetitive tasks (Remlein, Nowak & Romanchuk, 2024). It is most commonly utilised in the areas of accounting where electronic data is structured (Borowiec, 2022). The examples of activities, which involve business process automation include (Nowak, 2023):

– automatic order registration and generation of sales documents for orders,

– document circulation in the company – automatic registration of invoices and forwarding them to the relevant department to which the purchase relates,

– payroll processing – automatic generation of payroll,

– preparation of financial statements and tax returns,

– verification of financial data such as contractor identification data, bank account from the whitelist, balance of the contractor's account.

Business process automation is applied during the transfer and transformation of data, which reflects actions performed manually in accordance with the adopted rules and which will be coordinated by algorithms developed by artificial intelligence (Łada, 2022; Remlein *et al*., 2022; Łada & Martinek-Jaguszewska, 2023a) – see Table 1.

Table 1. Differences between Business Process Automation and Artificial Intelligence Operations

Specification	Process Robotisation	Artificial Intelligence
Operation algorithm	Tasks are performed in accordance with accepted rules	Follow its own logic while performing tasks
Operation scheme	Each time tasks are performed according to the accepted scheme	Is able to improve its operations by learning from mistakes
Data used in information processing	Uses structured data compiled in specific form fields	Can use unstructured information such as images, natural speech, text

Source: the author, based on Nowak (2023).

Machine learning models are also popular artificial intelligence solutions, mainly used in internal and external audit processes. Machine learning models allow for proper sample selection during financial audits (statistical sampling method), ensuring randomness in the elements analysed while maintaining appropriate risk level proportions for the examined organisation (Karmańska, 2022). An example may be identifying non-obvious relationships between invoices and complex orders.

In machine learning models, the computer learns through trial and error to recognise patterns stored in the source data and identifies events that may cause their occurrence (Łada & Martinek-Jaguszewska, 2023b).

Another technology of intelligent automation is natural language processing. The main task of this technology is to transform a text saved in the continuous form, without a structured format, in such a way that the obtained data is understandable to machines. It is a special type of machine learning algorithm that interprets not only the written words but also learns to understand the language structure and contextual meaning to accurately represent the meaning of the analysed text. These algorithms learn to increase the correctness of interpreted documents. An example of NLP technology application is mailbox management by accounting divisions. Based on text analysis, the programme can recognise which messages are orders, which are received purchase invoices, or other financial information, and can sort and forward specific messages to the relevant departments.

An example of advanced AI solutions is generative artificial intelligence. It not only understands but also creates new content based on the analysis of multiple sources. In the accounting domain, this model can be used to create descriptive parts of financial statements. Based on the balance sheet or profit and loss statement, the model can assess the profitability of the entity, the level of indebtedness, or suggest interpretations of financial indicators. The described interpretation format can also be used in financial audits (Łada & Martinek-Jaguszewska, 2023b).

The above-presented artificial intelligence solutions are the tools that are most commonly used in financial accounting departments. Technological advancements mean that they are subject to continuous evaluation and adaptation to the specific, individual needs of the respective entities. At the same time, their scope of operation and tasks to be performed will expand in the future.

3. Benefits of Using AI Tools in Finance and Accounting Departments

Introducing AI technology and automated processes into finance and accounting departments offers a wide range of benefits.

One of the main benefits is the improved efficiency and effectiveness in uploading financial documents to accounting software (Gawrońska, 2021). Taking over the tedious task of recording each individual business operation from the employee significantly saves time. Additionally, automatically recorded invoices minimise the risk of human error. Uploading documents via software also contributes to more accurate recording of business operations in accordance with applicable provisions and accounting principles.

Transferring tedious routine tasks to be performed by machines further contributes to improved morale among employees. Relieved accountants can focus their efforts on more creative tasks that will bring greater benefits to the company (Prędkiewicz & Biegun, 2024). Implementing automation of accounting processes reduces the risk of delays due to factors such as employee illness, as machines operate 24 hours a day, 7 days a week. Accounting software allows for faster data analysis and reporting, and makes it possible to share the customer panel, where clients can check their company's results on an ongoing basis.

Accounting and finance are areas where experience and knowledge of current legal regulations will always be highly desirable. Modern accounting systems will still require human supervision to manage more complex cases efficiently and make appropriate decisions. Artificial intelligence, however, presents both a challenge and a significant opportunity for accountants (Olaru, 2021). The accounting profession will not disappear due to the development of artificial intelligence. The challenge for accounting departments will be to create a harmonious environment for the cooperation between human intelligence and experience and technological potential offered by accounting software. In the future, accountants will play an even greater role in operating advanced accounting software. Artificial intelligence will take over the execution of tedious routine work, leaving room for professionals to perform more advanced tasks (Herbert, 2023). Accountants will be able to dedicate more time to quality control, and deal with disputable and exceptional cases or tasks that require proper assessment of the given situation and decision-making (Gulin, Hladika & Valenta, 2019; Krawczyńska, 2020; Brabete & Goagara, 2022).

Accountants who can effectively handle new technologies and AI solutions enjoy a competitive advantage in the job market. They become more attractive to entrepreneurs and companies seeking modern financial and accounting services. Their value will increase year by year. At the same time, thanks to process automation, they will be able to serve a larger number of clients while focusing on a broader range of advisory services.

The tasks accountants will perform in the future will go beyond traditional bookkeeping and financial reporting, and involve business consulting and skills in managing automation processes. These changes will require accountants to enhance their soft skills as well as their IT and data analysis competencies (Li & Zheng, 2018; Jędrzejka, 2019; Zajączkowska & Żujewski, 2021).

4. Utilisation of Artificial Intelligence and Automation in Accounting Processes – Research Results

For the purposes of the present paper, research was conducted to assess whether companies in the Małopolskie province apply AI solutions in their accounting departments.

For the purpose of the present study, a diagnostic survey method was applied through the use of the CAWI method (online survey technique). The study was conducted from February to March 2024, and involved 108 participants. The results presented in the article are part of a broader study conducted with the courtesy of the Association of Accountants in Poland, branch in Nowy Sącz. As part of this research, a survey was developed containing questions formulated by various authors in their respective areas of study. The presented research results were based on the questions prepared by the author of this article. The questionnaire consisted of 10 questions, of which the first 3 were a metric characterising the group of respondents. Subsequent questions were single-choice or multiple-choice with the possibility of completing the answers. The questionnaire constructed in this way allowed for qualitative analyses.

The respondents were mostly financial directors, chief accountants, owners, and heads of departments. Over half of the respondents represented the financial and accounting services sector (52.8%). Nearly 40% of the respondents were representatives of micro-enterprises, which employ up to 5 employees. The surveyed individuals possessed extensive professional experience. Approximately 55% of respondents were specialists with more than 10 years of professional experience.

The detailed structure of respondents according to sector of economic activity, company size, and professional experience is presented in Figures 1–3.

AI solutions have not yet been widely used by enterprises. This is confirmed by the fact that when asked a question "Are AI solutions used in the accounting department of your company?", nearly 54% of the respondents indicated "No" or "I don't know" (Fig. 4).

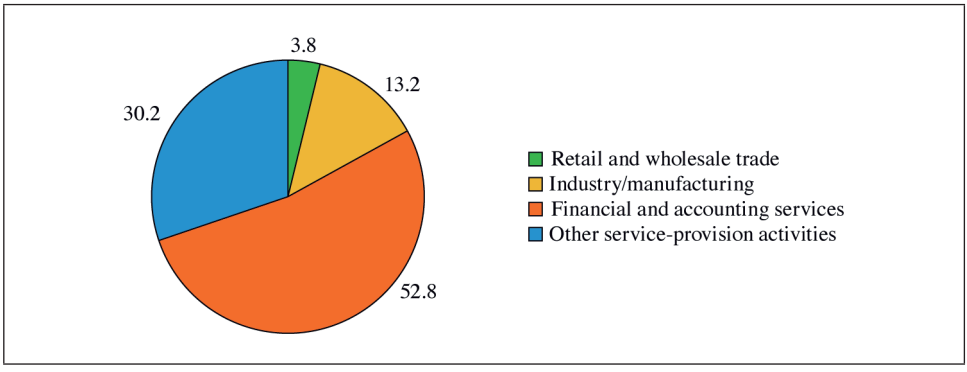

Fig. 1. Respondents' Sector of Economic Activity (in %)

Source: the author, based on empirical research.

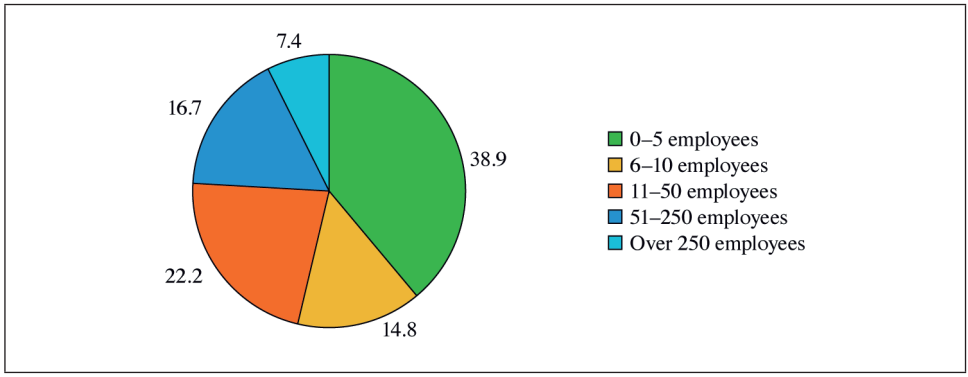

Fig. 2. Company Size – Number of Employees (in %)

Source: the author, based on empirical research.

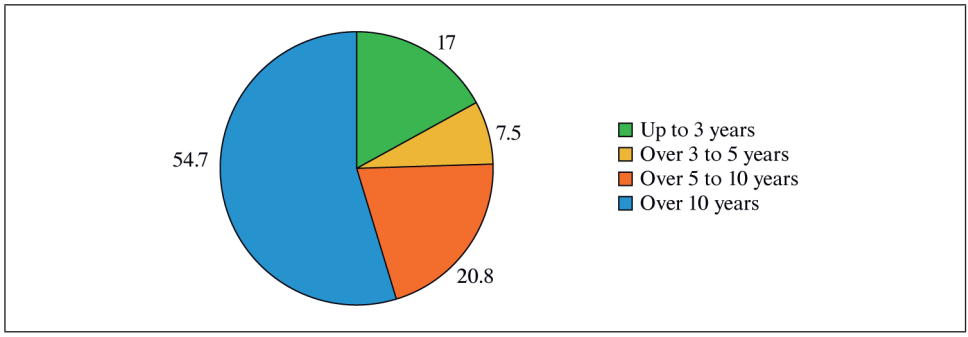

Fig. 3. Professional Experience of Respondents (in %)

Source: the author, based on empirical research.

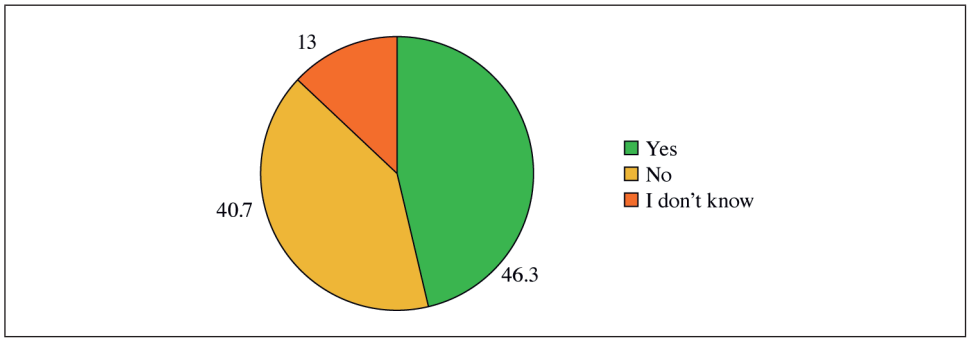

Fig. 4. Level of Utilisation of AI Tools in Accounting Departments of the Surveyed Enterprises (in %)

Source: the author, based on empirical research.

Among the AI and automation solutions used in financial and accounting activities of the surveyed companies, the most frequently utilised are machine translation software (translators – 30.8%), programmes enabling data extraction from scanned documents (23.1%), and programmes for robotic automation of specific processes such as posting of accounting documents, generation of financial statements, tax declarations, or payroll processing – 23% (see Fig. 5).

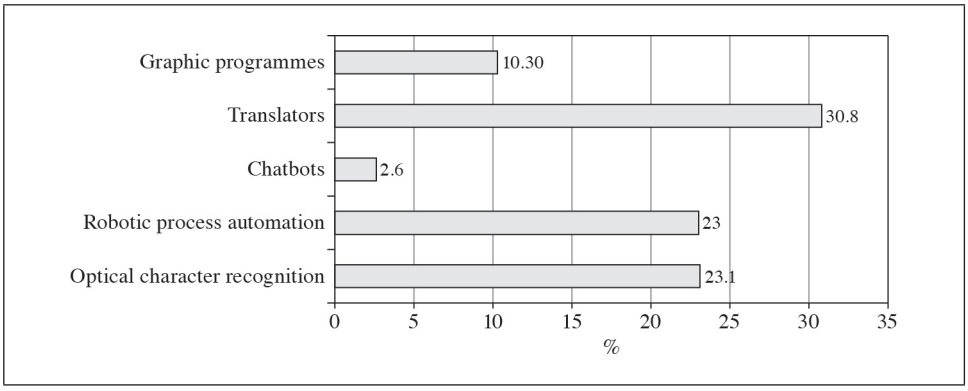

Fig. 5. AI and Automation Solutions Used by Surveyed Enterprises

Source: the author, based on empirical research.

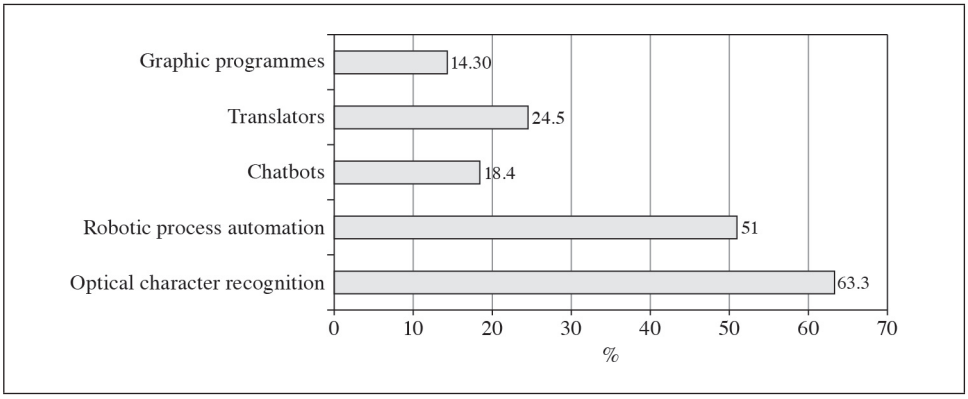

Fig. 6. AI and Automation Solutions Which Respondents Would Like to Use in Their Companies in the Future

Source: the author, based on empirical research.

Being aware that AI and automation solutions are not popular and still pose challenges for accounting departments, the author asked the question „Which AI tools would you like to use in your daily work in the future?". The responses obtained clearly indicate that accountants are interested in introducing technological improvements (see Fig. 6). When answering this question, respondents had the opportunity to select more than one option and provide their own suggestions. 64% of the respondents see potential in OCR programmes, while 51% of the surveyed individuals want to improve accounting processes using robotic process automation. Accountants also point to chatbots as a tool that they would like to use in the future. Among the suggestions added by respondents are simple interfaces of accounting programmes that provide owners with remote access to their company's results in real-time and document management system (DMS).

Respondents recognise the benefits of using AI tools by the finance and accounting departments (Fig. 7). Primarily, it is the possibility of eliminating daily tedious routine tasks (66.7%). According to over half of the respondents, technological solutions allow for the elimination of error risk while increasing work efficiency and resources. The introduction of AI solutions will also, according to respondents, increase employee satisfaction by relieving them of excess duties while providing the opportunity to perform more creative tasks that generate greater value in business.

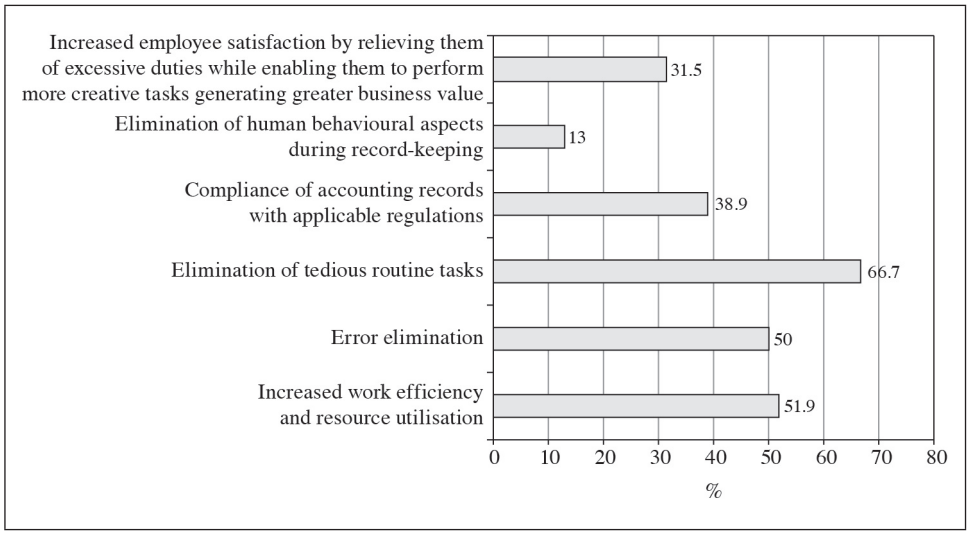

Fig. 7. Benefits of Using AI Solutions in Accounting Departments According to Respondents
Source: the author, based on empirical research.

Introducing technological innovations often entails concerns in the processes of their implementation. The finance and accounting departments of every enterprise are specific areas where the risk of software errors can bring about serious financial consequences. Employees in accounting departments are experienced individuals who understand how the outcomes of their work translate into the overall results of the company. They cannot afford software errors to result in inaccurate data subsequently presented in financial statements and reports. Therefore, their greatest concern is software errors, the occurrence of which could distort the presented results (Fig. 8). Another significant concern indicated by the respondents is the omission of specific details in accounting operations by programmes (63%) or the difficulty in interpreting complex regulations (55.6%). By recognising potential threats associated with the use of artificial intelligence in accounting departments, respondents see the need to control what has been done by artificial intelligence.

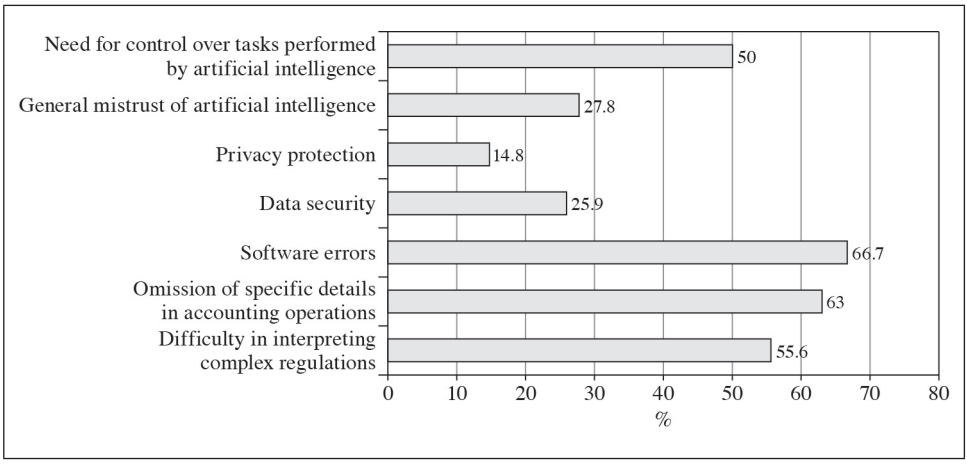

Fig. 8. Threats Associated with the Use of AI Solutions in Accounting Departments According to Respondents

Source: the author, based on empirical research.

Despite many concerns, respondents are aware that AI solutions will increasingly be used in finance and accounting departments of various enterprises. According to the respondents, tasks in which AI solutions will be most extensively used in the future include: posting and booking transactions (59.3%), document sorting and circulation (57.4%), and financial data analysis (48.1%) – Figure 9. However, respondents see limited potential for the use of artificial intelligence in creating non-financial information (only 16.7%).

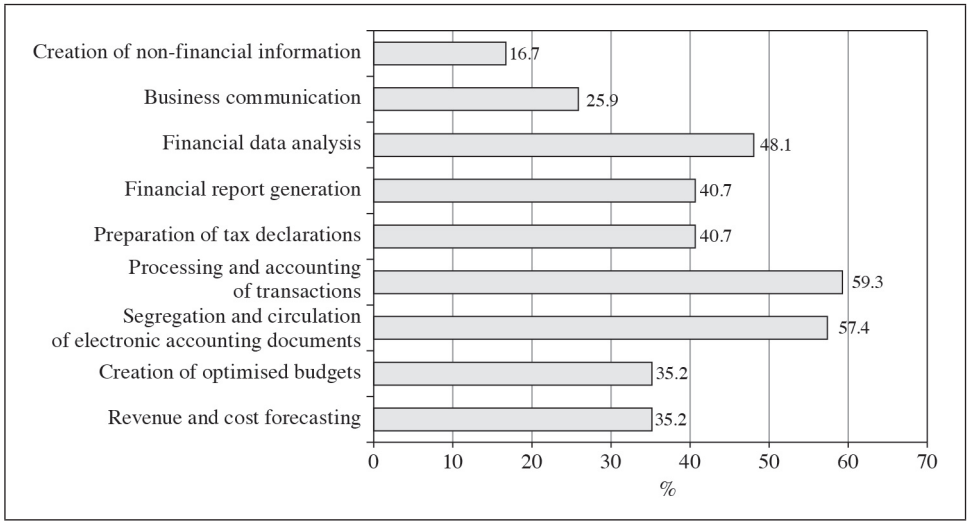

Fig. 9. Areas of Accounting Where AI Solutions Can Be Most Extensively Used According to Respondents

Source: the author, based on empirical research.

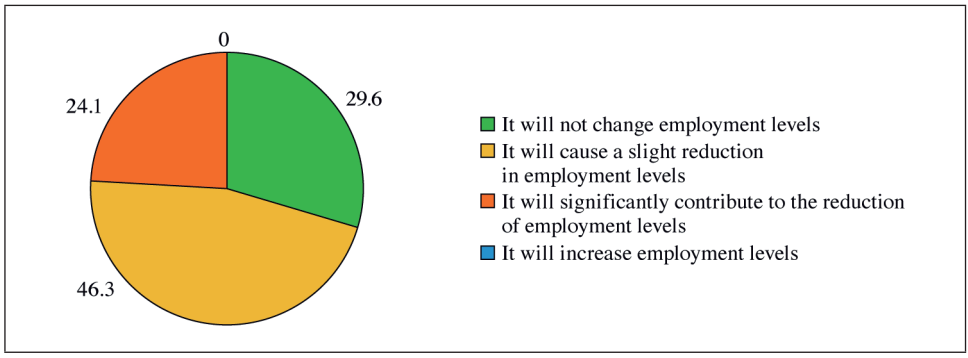

Fig. 10. Changes in the Level of Employment after the Introduction of AI Solutions (in %)

Source: the author, based on empirical research.

Introducing new technologies into accounting departments raises concerns not only about the accuracy of data entered by machines but also about how the introduction of AI solutions will affect the employment levels. According to nearly 30% of the respondents, the introduction of modern tools and methods into financing and accounting programmes will not lead to a reduction in employment, while according to 46.3%, it will lead to redundancies, but to a small extent only (Fig. 10). None of the respondents, however, indicated that the introduction of AI solutions would lead to an increase in employment levels.

5. Summary and Conclusions

Modern technologies and AI solutions are increasingly being used across all segments of business activities. Also, in the accounting and finance departments, such software is being introduced to increase efficiency and effectiveness as well as eliminate repetitive tasks.

Among the AI tools most commonly used by organisations, we can include robotic process automation and optical character recognition of scanned documents. The results of the conducted research have confirmed that entrepreneurs are open to introducing new technologies into their accounting departments. They recognise the benefits of implementing AI technology and mention some of them, namely error elimination, accounting business transactions in accordance with applicable legal provisions and improving employee satisfaction.

The latest scientific research confirms that the scope and manner of work performed in accounting departments are changing dramatically. In the future, to an even greater extent than before, accountants will serve as operators of advanced financial and accounting applications. Artificial intelligence will allow professionals to devote more time to solving exceptional cases or deal with quality control.

However, accounting will still remain a field that requires interpersonal contacts, and due to the necessity of providing businesses with customised accounting services and guidance, it will probably never be replaced by robots. The key is to create a harmonious environment for human-machine collaboration.

Introducing artificial intelligence into the accounting field is a challenge for accountants. They must be open to the opportunities offered by technological innovations and be aware that the ability to operate intelligent accounting applications is an opportunity that gives them a competitive advantage in the job market among other specialists.

The author is aware that the topic she has taken up is worth discussing in at least three areas. Firstly, the research method used, and in particular the research tool prepared. The forms of questions used (mainly single and multiple choice) can be analysed primarily qualitatively by analysing the respondents' beliefs about the issues formulated in the questions. A differently constructed research tool would probably allow for the use of a wider range of statistical methods. Secondly – the degree of return of the surveys. Every researcher wants a high return rate of survey questionnaires. In the research process, an attempt was made to collect a large number of questionnaires through the use of an electronic system for filling them in. High reflexivity was also taken care of by asking the Accountants Association in Poland, Nowy Sącz branch, to disseminate the survey among the members of the association. The attempts made it possible to collect 108 questionnaires. The third area of limitations is the selection of respondents. It was intentional and covered enterprises from the Małopolskie province. The respondents to the

survey were mainly representatives of micro-enterprises operating in the financial and accounting services sector. The author is aware that the results obtained from representatives of micro-enterprises may differ from the results of large enterprises. However, it should be remembered that micro, small, and medium-sized enterprises are the largest group of business units in Poland. The sector of business activity probably also translated into the results obtained.

The research results presented in the article are the starting point for further analyses on the process of using artificial intelligence in accounting. It also seems interesting to conduct a comparative analysis of the benefits and costs of implementing artificial intelligence solutions in finance and accounting departments. Such research would allow for the assessment of real measurable financial benefits for enterprises. It is equally interesting, or even necessary, to conduct this type of research periodically due to the dynamics of the development of artificial intelligence and its application in accounting.

Conflict of Interest

The author declares no conflict of interest.

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