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DIGITAL TRANSFORMATION IN FINANCIAL AND MANAGEMENT ACCOUNTING: THE IMPORTANCE OF HIGHER EDUCATION

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Abstract. The profession of accounting faces significant issues because of the rapid growth of information technologies, particularly regarding the digitalisation, artificial intelligence (AI), and how it impacts the duties and responsibilities of accountants. The purpose of this study is to assess how artificial intelligence has impacted the role of accountants and to explain how higher education can help equip them with new skills, particularly in the implementation of artificial intelligence tools. A survey in Lithuania was performed. In total, 32 people working in the accounting field were surveyed. Analysis of results includes a t-test, factorised boxplot analysis, and regression analysis. The results showed that there is evidence of a change in the accounting field. Most significantly, accountants require additional skills, particularly in areas such as cost allocation and transaction registration, where automated procedures and artificial intelligence are utilized to identify errors and automate repetitive tasks. Therefore, to preserve productivity and competitiveness in the labour market, more understanding of automation and artificial intelligence is needed. The respondents' strong desire to learn more about AI-based tools is another significant finding. The findings have important implications since the higher education system may offer additional resources to teach, enhance, or renew knowledge about data analysis, process automation, and the use of artificial tools to address the difficulties posed by the digitalisation of accounting tasks.

Keywords: accounting digitalisation, artificial intelligence, accountant role, digitalisation

Introduction

Today's business environment is heavily digitised, and this trend will only continue in the future. New IT products are continually being released into the market, creating new options to conduct business activities. In this perspective, the following aspects can be highlighted: Big Data, Internet Plus, AI, cloud computing, machine learning, blockchain technologies, and robotic process automation (Fang et al., 2023). The incorporation of technology into all business sectors, or digitalisation, as defined by various researchers (Ritter and Pedersen, 2020), affects changes in how commercial business operates and the information they need to process. However, the vast volume of created data, its collection, storage, integration, processing, and analysis is the key difficulty for commercial organisations, requiring a lot of labour; therefore, a lot of focus is attributed to automation problems of those related to AI (Bukht and Heeks, 2017).

The application of AI-based and other technologies covers various business areas—management, financial accounting, auditing, financial analytics, marketing, logistics, etc. A crucial role is played by the accounting field, where it is necessary to manage large data while ensuring data accuracy, timeliness, and reliability. Also, accounting systems provide the necessary data for other business areas. This includes such accounting tasks as financial reporting, tax compliance, cost calculation, budgeting, and others (Rieg, 2018).

When analysing AI applications in accounting, such aspects are highlighted: the ability to increase the accuracy and efficiency of financial reporting (Abdullah and Almaqtari, 2024), automating routine tasks and enabling predictive analytics for strategic decision-making, the need for personnel adept in AI, data privacy concerns, the high costs of AI, and accountants resistance to change (Odonkor et al., 2024). Therefore, accounting professionals should capitalise on vast opportunities in the rapidly evolving, disruptive, but ultimately advantageous environment by embracing big data, data analytics, and artificial intelligence (AI) to stay ahead of the competition (Bose et al., 2023).

Many researchers assume that due to digitalisation and the rise of AI technologies, the role of the accounting professional is changing or is about to change (Ciubotariu, 2020; Coman et al., 2022). This change must be supported by professional organisations and the university environment, developing knowledge of advanced information technologies, data analysis, and data security, to ensure the proper development of new skills. However, some researchers suggest that digital technologies can contribute to narrower and more specialised roles (Andreassen, 2020).

As a result, advances in IT shorten the time it takes to perform a routine operation and increase employee availability and productivity when performing a larger volume of work; it has become a topic of great interest (Al-Htaybat and von Alberti-Alhtaybat, 2017). This may lead to a significant demand for accountants to develop or refresh their knowledge, to include AI-based accounting systems in learning processes, and to raise

concerns about AI-related risks when performing accounting tasks. However, preparation is necessary on the part of regulators, educators, and professional bodies by addressing the paradigm shift and preparing the policies, students, and future professionals for the challenges of the world that is fraught with big data, blockchain technology, artificial intelligence, and other highlights of the fourth industrial revolution; academia has to reconceptualise the accounting curriculum (Hasan, 2021).

AI-based accounting systems, big data, machine learning, and blockchain technologies should be considered by academia when designing accounting curriculum to prepare graduates for the market and to ensure their employability and competitiveness (Qasim and Kharbat, 2020; Zhang et al., 2020). Authors highlight these objectives that need to be achieved when teaching accounting information systems: a renewed focus on the human dimension of accounting; broader social and critical perspectives; movement beyond the technical, managerial, and financial focus (Ballantine et al., 2024); and a balance between existing accounting knowledge and information technology skills relevant to the profession (Qasim and Kharbat, 2020). Another important aspect is that online learning has become increasingly popular, which makes the learning process more accessible and attractive (Musyaffi et al., 2024), thus highlighting opportunities to improve or refresh knowledge of accountants or to teach AI-based accounting systems through an online form.

Similar to the other authors, our research focuses on how artificial intelligence has changed the role of the accountant and how higher education can assist in providing new abilities, especially regarding the implementation of artificial intelligence tools. We state hypotheses for our research:

- H1: There is a change in the accountant’s profession due to AI.
- H2: Accountants are interested in learning the application of AI tools.

Research methods

In 2024, the survey was conducted in Lithuania. The survey was completed by 32 respondents in total. Requirements for survey respondents:

1) is a professional accountant;
2) uses accounting software; and
3) has held a position involving accounting for the previous three years.

The study covers questions about the accountant profession shifts due to artificial intelligence (A1-A3) and accountants' interest to learn the application of AI tools (B1-B3). Replies are classified using Likert's rating scale, with a range of five.

- A1: Do you think that being able to integrate artificial intelligence in your work's accounting procedures makes you more marketable to employers? [1 – strongly disagree; 5 – strongly agree].
- A2: Do you think that the use of artificial intelligence means that your accounting knowledge is used less than if you were to perform the same tasks manually? [1 – strongly disagree; 5 – strongly agree].
- A3: Is your productivity at risk if you don't have access to artificial intelligence tools? [1 – strongly disagree; 5 – strongly agree].
- B1: Would you be interested in learning more about how artificial intelligence is being used in accounting processes? [1 – strongly disagree; 5 – strongly agree].
- B2: Would you take advantage of the training provided by your employer on the application of AI to accounting procedures? [1 – strongly disagree; 5 – strongly agree].
- B3: Would you be willing to give up your free time and money to learn how to employ artificial intelligence in accounting processes? [1 – strongly disagree; 5 – strongly agree].

The study then composes these questions into indices A and B, where A is calculated by summing up responses to questions A1-A3, and B is calculated by summing up responses to questions B1-B3. To evaluate the integrity and reliability of these indices, we employ Cronbach's alpha and test for normality.

Six additional survey questions are then examined as explanatory factors. Dichotomous (binary) variables (yes or no, 1 or 0) are used to code these responses:

- X1: The degree of technology used in the market in which the organisation functions [0 – below average; 1 – above average].
- X2: The organization's sector [0 – private sector; 1 – public sector].
- X3: The organization's primary activity [0 – no manufacturing activities; 1 – engaged in manufacturing activities].
- X4: The total number of employees in the company [0 – below 50; 1 – above 50].
- X5: Making choices inside the company [0 – decentralised; 1 – centralised].
- X6: Organisation uses or is implementing artificial intelligence tools [0 – no; 1 – yes].

The study results are then processed using summary statistics, a correlation matrix, factorised boxplot analysis, and a t-test. Calculations were performed using Gretl and Microsoft Excel software.

Results and discussion

First, we provide summarised results of our survey (see Table 1). Note that the theoretical mean (neutral values) for questions A1-A3 and B1-B3 is 3; for aggregate indices A and B, this is 9. This shows that the estimated average for all questions is above the theoretical mean (above 3). Thus, respondents indicate a shift in the accountants' profession due to artificial intelligence and interest to learn the application of AI tools from all questions. Interest to learn the application of AI tools (B) is higher than the perceived change in the accountant's profession due to AI (A) (mean values are 10.75 and 9.38, respectively). Question B1 regarding interest to learn AI tools has the highest mean value (3.75). Question A3 regarding productivity at risk due to AI has the lowest mean value (3.03). However, the t-test (h0: mean equal to 9) for index A has a two-tailed p-value of 0.3572. For B, the two-tailed p-value is 0.0013, showing that only index B can be considered to be statistically significantly higher than the neutral value of 9. About 56 percent of respondents identify themselves as using an above-average degree of technology in their organisation's market (X1), 22 percent identify working in the public sector (X2), 38 percent describe engaging in manufacturing activities (X3), 63 percent have more than 50 employees (X4), 72 percent describe working in a centralised environment (X5), and 44 percent describe using or are implementing AI tools (X6).

Table 1. Summary statistics

Name	Mean	Median	Min.	Max.	S.D.
A1	3.25	3	1	5	1.19
A2	3.09	3	2	5	0.82
A3	3.03	3	2	5	0.97
A	9.38	9	6	15	2.30
B1	3.75	4	1	5	1.11
B2	3.59	4	2	5	0.98
B3	3.41	3	1	5	1.29
B	10.75	11	4	15	2.80
X1	0.56	1	1	0	0.50
X2	0.22	0	0	0	0.42
X3	0.38	0	0	0	0.49
X4	0.63	1	1	0	0.49
X5	0.72	1	1	0	0.46
X6	0.44	9	0	0	0.50

Next, we provide the survey's results correlation matrix (see Fig. 1), depicted as a heat map where blue indicates negative correlation and red positive. The correlation coefficient's 5% critical value (two-tailed) is 0.3494 for n = 32. Note that responses to questions B1-B3 highly correlate with each other. There is lower correlation among responses to questions A1-A3. There is very low correlation between responses to questions A1 and A2, showing that there is a very weak connection between an accountant's marketability due to knowledge in AI tools and the use of accounting knowledge, regardless of AI. When analysing explanatory factors X1-X6, it is worth mentioning that most variables have low correlation, showing good distribution among response types. The highest correlation (0.4) is observed among X3 and X6, also among X4 and X6, showing that large companies and companies engaged in manufacturing activities have more plans or are already implementing AI-related tools.

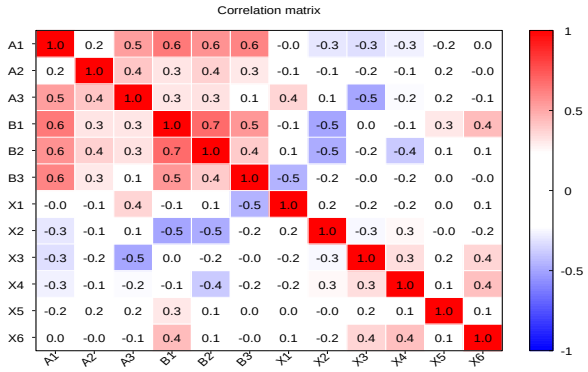

Fig. 1. Correlation matrix

Next, we provide frequency distribution graphs for indices A and B with test results against normal distribution (see Fig. 2). For A, the estimation is 9.1270, with a p-value of 0.0104 (reject the hypothesis of normal distribution). For B Jarque-Bera test estimation is 0.8284, with a p-value of 0.6609 (accept the hypothesis of normal distribution). The estimated Cronbach's alpha is 0.6405 for A and 0.7658 for B, showing questionable and acceptable integration levels among questions.

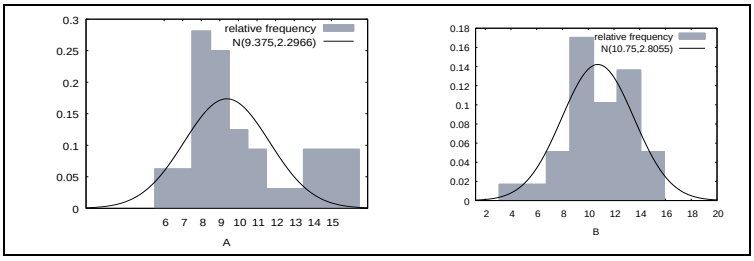

Fig. 2. Frequency distribution graphs

Respondents also specified that the most important areas to improve accounting efficiency and gain knowledge are transaction registration (28%); budgeting and forecasting (13%); cost allocation (13%); analysis of company performance (22%); and consolidation of financial data (10%).

Next, we provide graphs showing factorised boxplot analysis results using all six explanatory factors X1-X6 for index A (see Fig. 4). Here, we can observe that large companies (X4) and companies that are involved in manufacturing activities (X3) show a lower level of perceived accountant profession shift.

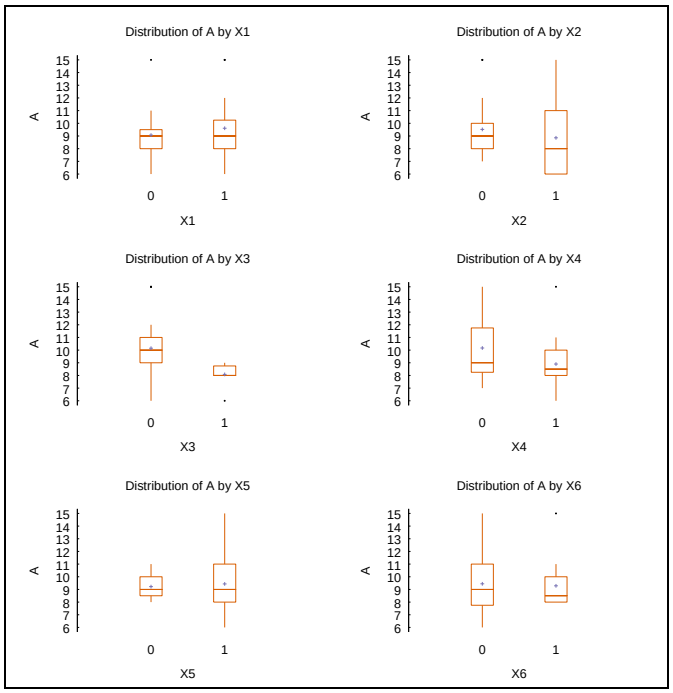

Fig. 3. Factorised boxplot for A

Next, we provide graphs showing factorised boxplot analysis results using all six explanatory factors X1-X6 for index B (see Fig. 4). Here, we can observe that respondents working in the public sector (X2) show less interest in learning the application of AI tools.

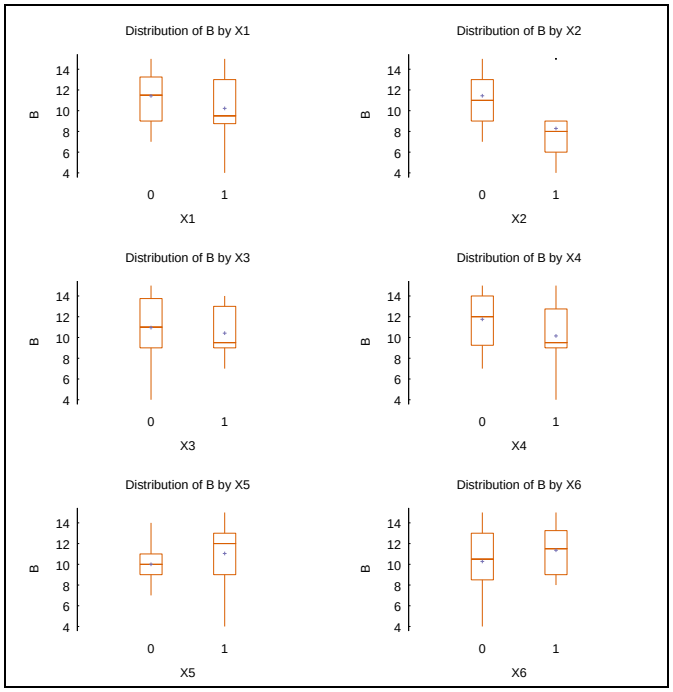

Fig. 4. Factorised boxplot for B

Next, we summarise t-test results (see Table 2). Here we can see that when analysing perceived change in the accountants' profession due to AI (A), there are no significant differences between groups (p-value above 0.05 in all cases). The lowest p-value is estimated for X4 (0.1321), thus showing that smaller companies tend to indicate more changes due to AI. When analysing interest to learn AI tools (B), private sector companies (X2) are estimated to show a statistically significantly higher level of interest (p-value is estimated to be 0.0064). Another factor with a relatively low p-value of 0.1199 is estimated to be smaller companies (X4)—thus showing that smaller companies show more interest in gaining knowledge regarding AI tools.

Table 2. T-test results

Name	**p-value**	**value**	**p-value**	**value**
Index	**A**		**B**	
X1	0.5185	1	0.2332	0
X2	0.5086	0	0.0064	0
X3	0.5215	0	0.6130	0
X4	0.1321	0	0.1199	0
X5	0.8179	1	0.3541	1
X6	0.8506	0	0.2873	1

Even though the study results indicate a change in the accountant profession due to AI tools, similarly to other authors (Ciubotariu, 2020; Coman et al., 2022), this estimation should be based on more observations and higher statistical significance. On the other hand, there is a statistically significant difference between interest in learning the application of AI tools, thus showing demand for this type of knowledge and skills. This supports other authors' research that the implementation of AI tools in accounting gains momentum, and accountants are becoming more aware of the benefits that these tools could provide (Al-Htaybat and von Alberti-Alhtaybat, 2017), thus emphasising the role of external institutions providing educational services. According to our results, in most cases, there are no significant differences between groups and respondents working in different types of organisations, as they provide similar responses to all survey questions. However, the only statistically significant difference is between public and private companies, showing that private sector organisations show more interest in learning the application of AI tools.

Conclusion

The research investigates how artificial intelligence has changed the role of the accountant and explains how higher education can assist in providing new abilities, especially regarding the implementation of artificial intelligence tools. The study has several important findings:

First, the shift in the accounting profession due to AI, according to survey results, is noticeable but relatively small. However, there is a significant interest in learning the application of AI tools in accounting, as measured through questions regarding interest, perceived advantage, and willingness to spend effort learning AI tools. Second, even though different groups of respondents show similar results, respondents from private sector companies show more interest in learning the application of AI tools in accounting, especially in areas like transaction registration and analysis of company performance.

The findings highlight the role of external institutions in providing educational services. Higher education schools can take several steps to adjust to the shifts in the accounting profession:

- adjust to changes and use the newest AI-based technologies;
- provide opportunities for graduates to enhance or refresh their skills;
- research to create new instruments and procedures on how to implement AI-based accounting information systems for teaching;
- provide more practice opportunities in companies already applying AI-based accounting systems;
- incorporate courses with the most recent lectures on information technology and employ an interdisciplinary approach;
- interact and build relationships with leading providers of accounting software and AI-based solutions.

The future research may be expanded into different countries, analyze in more depth areas of financial and management accounting in which AI-based solutions can be applied, risks imposed by AI-based tools, and include students in the survey to specify methods that would be the most suitable to teach AI-based accounting information systems.

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SKAITMENINĖ TRANSFORMACIJA FINANSŲ IR VALDYMO APSKAITOS SRITYJE: AUKŠTOJO MOKSLO SVARBA

Santrauka

Dėl sparčios informacinių technologijų plėtros, ypač susijusios su skaitmeninimu, dirbtiniu intelektu (DI) ir jo poveikiu buhalterių pareigoms bei atsakomybei, buhalterijos profesija susiduria su dideliais iššūkiais. Šio tyrimo tikslas – įvertinti, kaip dirbtinis intelektas pakeitė buhalterio vaidmenį, ir paaiškinti, kaip aukštasis mokslas gali padėti įgyti naujų gebėjimų, ypač susijusių su dirbtinio intelekto priemonių diegimu. Lietuvoje buvo atlikta apklausa. Iš viso buvo apklausti 32 apskaitos srityje dirbantys asmenys. Rezultatų analizė apima t-testą, faktorinę analizę ir regresinę analizę. Rezultatai parodė, kad apskaitos srityje yra pokyčių. Svarbiausia, kad apskaitininkams reikia daugiau įgūdžių, ypač tokiose srityse kaip sąnaudų paskirstymas ir sandorių registravimas, kur automatizuotos procedūros ir dirbtinis intelektas naudojami klaidoms nustatyti ir pasikartojančioms užduotims išvengti. Todėl, siekiant išsaugoti produktyvumą ir konkurencingumą darbo rinkoje, reikia geriau suprasti automatizavimą ir dirbtinį intelektą. Kitas svarbus atradimas – respondentų didelis noras daugiau sužinoti apie DI pagrįstus įrankius. Šie atradimai turi svarbių pasekmių, nes aukštojo mokslo sistema gali pasiūlyti papildomų išteklių mokyti, gilinti ar atnaujinti žinias apie duomenų analizę, procesų automatizavimą ir dirbtinių įrankių naudojimą siekiant spręsti sunkumus, kylančius dėl apskaitos užduočių skaitmeninimo.

Raktiniai žodžiai: apskaitos skaitmeninimas, dirbtinis intelektas, buhalterio vaidmuo, skaitmeninimas

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