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CODING SKILLS IN THE AUTOMATION OF ACCOUNTING PROCESSES

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Abstract

Research background: The evolution of technologies nowadays gives a higher impact on all sectors, including accounting. With rapidly growing volumes of data available, coding can be a valuable skillset for accountants to derive insight and value for organizations from accounting data.
Purpose: The objective of this paper is to identify the benefits of coding skills among accounting professionals, especially in the area of the automation of processes. In addition, the paper discusses some barriers to developing coding abilities.
Research methodology: The research study analyzed a sample of 160 respondents from around the world. The study used a questionnaire. A principal axis factor analysis with the Promax rotation was conducted to assess the underlying structure for the points of the questionnaire.
Results: The results showed that accountants should possess at least some basic skills in coding. The top benefit of coding skills by accountants, as perceived by the respondents, was the possibility to automate repetitive tasks, data reporting, and visualization. The top barrier to coding skills by accountants, as perceived by the respondents, was a lack of time and knowledge of what software skills to acquire and how.
Novelty: This research contributes to the literature by exploring the benefits of and barriers to coding in the accounting field. The findings can be useful for financial professionals and adepts to understand the benefits of coding skills in accounting.

Keywords: coding skills, robotic process automation, accounting

JEL classification: M15, M30, O33

Introduction

Emerging technologies are transforming business and impacting all sectors of the economy. The fourth industrial revolution (Industry 4.0) accelerated digitalization in enterprises and disrupted the role of accountancy (Santonastaso, Macchioni, 2021). The aim of accounting is to measure and record financial transactions in organizations. The usage of emerging technologies, is in areas such as Robotic Process Automation, and eliminated manual input of data. The processing of accounting information is possible without human interaction and with real-time visibility (Karmańska, 2021). Therefore, it is indisputable that nowadays an accountant should demonstrate a high level of proficiency in information technology (IT). One such skill is coding, which can be defined as creating rule-based instructions that can be understood by a software program (ACCA, 2021).

The main objective of this paper is to identify the benefits of coding skills among accounting professionals. In addition, the paper discusses some ways to break the barriers to develop coding. The literature search, which was performed with the terms "coding skills" and "accounting" in bibliographic databases: Emerald Management and the ISI Web of Knowledge, clearly confirms the research gap.

1. Literature review

The transformation of the accounting industry due to rapid advancements in technology has already been a long-standing issue of debate (Korhonen *et al.*, 2021).

The increasing digitization and rapid development of information systems in the field of accounting require the presence of professionals, who possess interdisciplinary knowledge and understand new taxonomies, methods, and tools (Santonastaso, Macchioni, 2021). In the tax reporting area, an example of digitalization are the sales and purchase records that must be sent in Poland monthly to the revenue office by electronic means, in the form of a SAF-T Standard Audit File Tax with a tax return file**.** While, in financial reporting an example can be that EU-regulated listed companies must produce their annual reports in the eXtensible HyperText Markup Language (XHTML) for reporting periods beginning on or after 1 January 2020 and International Financial Reporting Standards (IFRS) reporters must use Inline XBRL (iXBRL) to make the consolidated data in the primary financial statements machine-readable (PWC, n.d.). Therefore, to grow and contribute in the marketplace of the future, accountants permanently need to acquire a new set of competencies, which comprises hard, technical skills: basics of coding, data visualization, data warehouse management, and understanding the capabilities

of the software (Karmańska, 2021). Moreover, to evaluate the reasonableness of accounting information, professionals need to understand how transactions move through the accounting process (Daff, 2021).

The McKinsey Global Institute claimed that numerous current middle-wage jobs in advanced economies, which are dominated by highly automatable activities, such as manufacturing or accounting, are likely to decline in the future (McKinsey&Company, 2018). As Shaffer et al. noticed, the accounting profession 10 years from now will look noticeably different than it does today (Shaffer *et al.*, 2020). According to McKinney's report, 60 percent of all occupations have at least 30 percent technically automatable tasks. The probability that computerization will lead to job losses in the accounting sector within the next two decades is high and equals 0.94, assuming 1 = certain (Frey, Osborneb, 2017).

The global robotic process automation market size is expected to reach USD 13.74 billion by 2028, according to a new report by Grand View Research, Inc., registering a compound annual rate of growth (CAGR) of 32.8% from 2021 to 2028 (GrandViewResearch, 2021). The COVID-19 pandemic resulted in the need for cutting overhead expenses by automating the process and reducing the number of employees involved in performing redundant tasks (GrandViewResearch, 2021). Deloitte surveyed 441 executives from 29 countries and a wide range of industries. 78 percent of the survey respondents have already implemented robotics process automation and 16 percent plan to do so in the next three years (Watson *et al*., 2020). The above figures indicate the role and importance of Science, Technology, Engineering, and, Mathematics (STEM) skills in education, which are increasingly required by employers across a broad range of sectors all around the world.

Robotic process automation (RPA) can automate many repetitive and mundane tasks, with extreme accuracy, and increased compliance to reduce operating costs, and boost effectiveness. RPA enables the automation of rule-based business processes and tasks through the use of software bots (robots) which can be viewed as "digital workers" each using its computer station, username, and password similar to a human employee (Kokina, Blanchette, 2019). In this way, accounting professionals can move away from data gathering, entry, and book-keeping and instead take on more advisory roles for management. And naturally, the accountants must still perform the more complex, judgment-based, transactions that the robots are not able to process yet (UiPath, 2019).

According to EY, a classic process, which would be automated by RPA must meet the following key characteristics: the actions are consistent, with the same step being performed repeatedly (Diepeveen *et al.*, 2016). Second, the process is template driven, with data being

entered into specific fields in a repetitive manner. Finally, the process should be rules-based, to allow decision flows to alter dynamically (Diepeveen *et al.*, 2016). Typical financial transactions meet all the requirements, which results in increasing automation. Bots follow prescribed protocols and procedures with precision, and they are used to automate accounting and finance functions, for example, in areas: order to cash and accounts receivable, matching invoices against corresponding purchase orders and receipts, financial closing, and the reporting process (Deloitte, 2018).

As technology is advancing, coding is becoming a necessary process and a needed skill to solve complex scientific problems efficiently and thus impacts the careers of those who possess the skill (Scherer *et al.*, 2021).

Researchers have indicated many benefits of learning to code, for example, it can develop cognitive skills such as information processing, reasoning, and mathematical problem solving (Scherer *et al.*, 2021). Moreover, coding is claimed to foster creativity (Scherer *et al*., 2021). The academia also underlines the social aspects in coding activity, among other collaboration and teamwork, because they bring many benefits, including interacting with others, examining different perspectives, expressing understandings, and interpreting things differently (Papavlasopoulou *et al.*, 2019). Furthermore, the ability of programming improves employees' market value and career opportunities, because having advanced IT skills helps workers to earn higher wages and incrementally increases the probability that they are employed in higher-paid jobs (Atasoy *et al.*, 2021).

Global professional accounting bodies play a crucial role in the dissemination of new technologies (Santonastaso, Macchioni, 2021) and they also highlight that coding can benefit the finance departments of organizations. For example, an international organization that represents and supports accountants – the Association of Chartered Certified Accountants (ACCA) conducted research in November 2020 on a sample of 992 ACCA members, accountancy, and finance professionals. The findings revealed that 57% of respondents had no coding knowledge, but 40% expressed an interest in learning (ACCA, 2021). 88% of the respondents claimed that the ability of coding enables a better understanding of how data are organized, analyzed, and, flow through an organization. Moreover, according to 88% of respondents, coding helps in strategic conversations on technology use and adoption due to a better understanding of detail. Pursuant to 87% of informants, the next benefit is validating or interrogating information provided by software output. 86% of respondents indicated more partnering between accountants and professionals from other disciplines such as experts in data science through explaining requirements. 85% of respondents considered coding as a valuable skill set that improves market

value and career opportunities. The respondents also indicated the barriers; the main one being the lack of time (84%). 76% of respondents thought that tools and programming languages keep changing so skills learned can become quickly outdated. Other barriers are related to a view that learning to code is "out of scope" for an accountant (63%) or there is a reaction of fear that it is just too hard to learn (61%) (ACCA, 2021). The résumé of the research is that not every accountant may need to code, but a basic understanding can add value for customers and open up future career opportunities (ACCA, 2021).

Coding skills also support innovation. For instance, Poon *et. al.* (2020) conducted research on the role of skills in Islamic financial innovation. Their findings revealed that cognitive-technical skills, which are the mean scores of computer or software programming, technical skill, and problem-solving positively influence financial innovation, while skill in the Sharia law does not (Poon *et al.*, 2020).

Learning to code provides many constraints and obstacles. One of the main barriers is the lack of logical, creative, and critical thinking - mathematical skills (Kadar *et al.*, 2021).

Moreover, the majority of programming languages, libraries, documentation, and instructional materials are in English, pursuant to Guo, non-native English speakers face barriers with reading instructional materials, technical communication, and reading and writing codes (Guo, 2018).

Excel spreadsheets are the most commonly used tool in public accounting for data extraction and analysis (Ragland, Ramachandran, 2014). Visual Basic for Applications (VBA) is an event-driven programming language that is built into Excel and other Microsoft Office applications (Sengupta, 2004). The language is used for the automation of manual operations (Chaudhry *et al.*, 2021) thanks to the elimination of the need to repeat activities and replace them with macros. Applications, which are being programmed in VBA, have numerous advantages, namely, no cost is needed to develop them and the complexity of operations can be conducted with substantial accuracy (Chaudhry *et al.*, 2021). For example, VBA can be used in building financial models, forecasting, and budgeting as well as consolidation. The main disadvantages of VBA are their restriction to Office applications and no support for iOS and Android.

Python, general-purpose programming language, is free from the above drawbacks. The PYPL PopularitY of Programming Language Index, which is created by analyzing how often language tutorials are searched on Google, ranks Python as the most popular language in the world with a share of 28.52% (PYPL, 2022). Python is a free and open-source software and can be used for many purposes, for example, building the backend of the website and mobile applications, automation workflows, pattern matching, and text analysis. Python's ecosystem of tools has

exploded over the past decade, both in the number of data analysis libraries and their adoption in different domains, including finance (Bota, Gosa, 2021). The library Panda is especially useful for manipulating tabular data and works with Excel spreadsheets. Another useful library NumPy offers among others comprehensive mathematical functions, random number generators, and linear algebra routines, while libraries Matplotlib and Seaborn are the backbone of data visualization in Python. Moreover, Python has a lot of accounting open-source libraries, for example, InvoiceNet, a deep neural network, that can extract intelligent information from PDF, JPG, and PNG invoices.

Structured Query Language (SQL) is a standard language that enables manipulating, analyzing, and summarizing data stored in relational databases. Thanks to clauses: SELECT, FROM, WHERE, GROUP BY, HAVING, and ORDER BY users can interact directly with databases to perform queries on data sets and retrieve answers for reporting and analysis.

An analysis of job offers for accountants on the website https://www.reed.co.uk was conducted on July 26, 2022, to explore the most popular programming languages among these professionals. Founded in 1995, Reed.co.uk was the first recruitment website in the UK (*Reed. Co.Uk About Us*, n.d.). The most frequent coding skills for qualified accountancy jobs (9967 offers in total) were: SQL, Visual Basic for Applications (VBA), and Python. Experience in extracting and transferring data from a database using SQL was necessary for 70 job vacancies, candidates were required to have advanced Excel skills with VBA in 31 job offers and 16 employers called for a lot of experience in Python. Employers require coding skills for different positions at various levels of the accountancy area, the examples of vacancies are the following: Data Analyst, Management Accountant, Finance and Business Analyst, Payroll Clerk, Treasury Manager, Financial Planning and Analysis Manager, Accounts Assistant, Financial Reporting Accountant, Junior Financial Modeler, Senior Data & Automation Analyst, Programming Accountant, Manufacturing Accountant, Project Accountant, Business Solutions Finance Manager, Credit Risk Analyst, Tax Administrator, Finance Manager. It can be concluded that coding skills are especially useful in the field of financial reporting and management as well as in data analysis.

2. Research hypotheses, methodology, and results

This study contributes to the literature by exploring the benefits and barriers to coding development in the accounting profession. The research questions addressed in the study are:

Q1: In what area do coding skills bring benefits for accountants?

Q2: What are the barriers to developing coding skills in the accounting profession?

Based on the above research questions, the following hypotheses were posed:

H1: Coding skills bring benefits in the area of accounting in the automation of routine tasks.

H2: The main barrier to developing coding skills is the lack of time.

The primary research method was the survey method, namely an online survey with the use of a questionnaire. The data for this study were collected in November and December 2021.

Based on the literature review, a list of benefits and barriers used in the questionnaire is presented in Table 4.

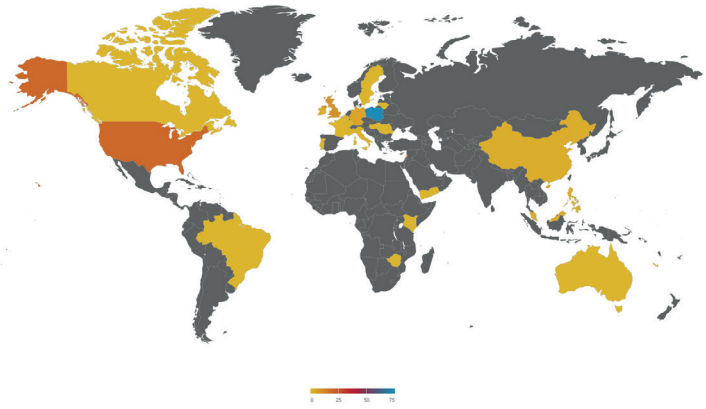

Figure 1. The geographic distribution of respondents

Source: own elaboration based on analyzed data using the Business Intelligence platform www.datapine.com.

Data for a questionnaire were collected through the use of a noninterventional, anonymized, self-administered, web-based survey, which was distributed using social media and groups devoted to surveying exchanges. The foreign study participants were recruited through the online research platform Survey Swap. The final sample consisted of 160 international respondents: accounting professionals and students, who were available on the platform during the collection of the sample. The respondents come from the following countries: Australia, Brazil, Canada, Croatia, the Czech Republic, Denmark, Egypt, France, Germany, Hungary, India, Italy, Kenya, Lithuania, Malaysia, Mauritius, the Netherlands, Pakistan, the Philippines, Poland, Portugal, Russia, Serbia, Singapore, Switzerland, Taiwan, the United Kingdom, the United States of America, and Zimbabwe. Figure 1 presents the geographic distribution of respondents.

The answers collected in a spreadsheet did not allow for the subsequent identification of respondents.

The detailed demographic characteristics are presented in Table 1.

Table 1. Respondents' demographic data

	Frequency	Percentage		Frequency	Percentage
Age of respondents			Country of residence		
Up to 20 years	21	13.1	Poland	74	46.3
21–30 years	111	69.4	Other	86	53.8
31–45 years	19	11.9	Place of employment		
46–60 years	7	4.4	Unemployed	62	38.8
Above 61	2	1.3	Micro enterprise (1–9 employees)	24	15.0
Gender of respondents			Small enterprise (10–49 employees)	24	15.0
Female	120	75.0	Medium–sized enterprise (50–249 employees)	12	7.5
Male	37	23.1	Large enterprise (250 employees and more)	38	23.8
Not specified	3	1.9	Work experience		
Education level			Unemployed student	46	28.8
High school	38	23.8	Specialists	111	69.4
Bachelor's degree	80	50.0	Other	1	0.6
Master's degree	34	21.3	Not specified	2	1.3
Other	7	4.4			
Not specified	1	0.6			

Source: own study.

A five-level Likert scale was adopted in the questionnaire in questions related to the benefits and barriers of coding. Responses are coded as follows: "strongly disagree" = 1, "disagree" = 2, "neither agree nor disagree" = 3, "agree" = 4, "strongly agree" = 5.

The study employed the quantitative research methodology with the support of the SPSS software. First, the Cronbach's alpha coefficient for the entire scale, which included 27 items, was calculated. This coefficient, which provides an overall assessment of the reliability of the measure and internal consistency, was high (0.9).

The first question of the questionnaire was related to the level of the coding skills. Table 2 presents the results. Basic coding skills comprise key programming concepts and variables, and ready-made functions for basic input and output. While advanced programming skills are for example complex data structures, and object-oriented programming.

Table 2. Level of coding skills among respondents

	Respondents from Poland		Respondents from other countries		All respondents	
	frequency	percentage	frequency	percentage	frequency	percentage
No programming skills and no interest	12	16.2	15	17.4	27	16.9
No programming skills but interest in learning	45	60.8	15	17.4	60	37.5
Basic programming skills	13	17.6	50	58.1	63	39.4
Advanced programming skills	4	5.4	6	7.0	10	6.3
Total	74	100.0	86	100.0	160	100.0

Source: own study.

Based on the results of the Mann-Whitney U Test ($U = 4214.5$, $p = 0.000$) it can be concluded that foreign respondents rated advanced knowledge of programming as more statistically significant than the Polish ones.

The next question of the questionnaire concerned the attitude of respondents towards the use of coding in the accounting profession. Figure 2 presents the results broken down by frequency. 14.4% of respondents had no opinion. Only 8.8% of respondents claimed that coding is unnecessary in the accounting profession. According to 76.8% of informants, coding is useful for accountants, including 63.7% who indicated basic skills and 13.1% even advanced expertise.

Subsequently, the respondents were asked to indicate whether they agree or disagree with statements regarding the benefits and barriers of coding in the field of accounting. The frequencies and central tendency measures were calculated. For further studies, the factor analysis should be with the Extraction Method: Principal Axis Factoring and Rotation Method: Promax with Kaiser was performed to group similar variables into dimensions. The statistical method is used to determine the number of distinct constructs assessed by a relatively large set of variables. A high value (close to 1.0) of the Kaiser-Mayer-Olkin Measure of Sampling Adequacy indicates sufficient items for each factor, while a small value (less than 0.05) of Barlett's test of sphericity suggests that the factor analysis is useful. Tables 3 and 4 present the factor loadings, with loadings less than 0.6 omitted to improve clarity. The statistics for benefits are presented in Table 3.

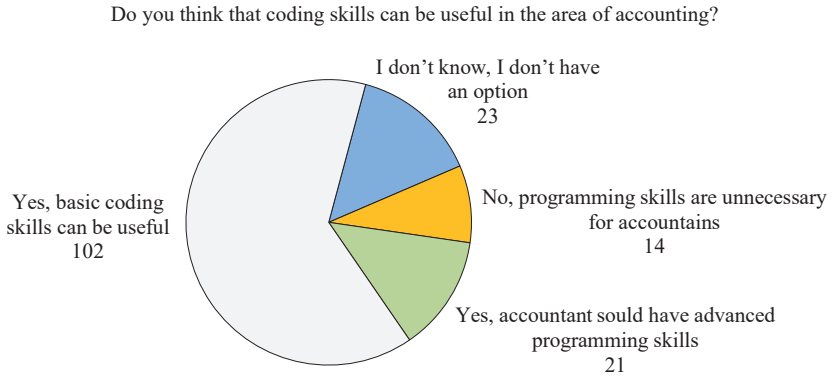

Figure 2. The usefulness of coding in the area of accounting according to respondents

Source: own study.

Table 3. The benefits of coding in the accounting field

Variable	Frequency					Mode	Median	Factors	
	strongly disagree (1)	disagree (2)	neither agree nor disagree (3)	agree (4)	strongly agree (5)			1	2
1	2	3	4	5	6	7	8	9	10
Possibility to automate repetitive accounting processes	2	9	19	52	78	5	4		0.856
Coding can be used in reporting and data visualization	2	8	22	62	66	5	4		0.873
Possibility of advanced data analysis	3	8	20	62	67	5	4		0.886
Possibility of changing industries and profession	4	6	28	59	63	5	4	0.649	
Programming teaches logical, analytical thinking and problem solving	3	8	24	68	57	4	4	0.730	
Better understanding of digital reality, more conscious use of modern technologies	1	10	28	68	53	4	4		
Programming teaches order, requires precision in thinking and behavior	3	11	27	67	52	4	4	0.784	
In-demand skill set, improves the market value	4	9	29	66	52	4	4	0.641	
Programming shapes the habits of searching for new, optimal solutions	1	10	35	65	49	4	4	0.771	

1	2	3	4	5	6	7	8	9	10
Programming supports innovation, interdisciplinarity, the ability to work with the project method and work in teams	2	11	35	64	48	4	4	0.710	
Thanks to the knowledge of programming, an accountant can more consciously participate in strategic discussions and decision-making regarding the implementation and use of IT systems in the organization	2	14	33	59	52	4	4		0.743
Programming language is universal, understandable to other programmers around the world	1	14	32	66	47	4	4	0.841	
The ability to check and confirm output information from the IT system	3	14	28	66	49	4	4		0.619
Greater ease of learning and operating the software	3	11	36	60	50	4	4		
Explaining requirements to IT and Data Scientists in a way that they understand them	6	9	31	65	49	4	4		
Programming skills can increase the salary	5	7	39	59	50	4	4	0.611	
Programming develops creativity, it is creative work	4	16	40	49	51	5	4	0.749	
A better understanding of the organization and information flow in the enterprise	3	15	30	77	35	4	4		0.743
Percent variance explained								58.011	58.011
Cumulative percent variance explained								4.677	62.688

Source: own study.

The top benefit of coding skills by accountants, as perceived by the respondents, was the possibility to automate repetitive tasks, reporting and data visualization, advanced data analysis, and development of creativity (mode = 5).

Only 2 factors with eigenvalues greater than 1 account for 62.688% of the variation for benefits. The first factor, which accounts for 58.011% of the variance, reflects benefits for employees (internal). The factor has strong loadings on ongoing education and professional development – on the items: versatility of programming, the ability of precision in thinking, searching for optimal solutions, developing creativity, innovation, and interdisciplinarity. The second factor accounts for 4.677% of the variance and reflects the benefits for organizations (external). The factor has strong loadings on the automation of accounting processes, reporting, and analysis.

The results confirmed H1, assuming that coding skills bring benefits in possibilities of the automation of repetitive processes.

The next question of the questionnaire concerns barriers to the development of coding skills among accountants. Table 4 presents the results.

Table 4. The barriers to coding in the accounting field

Variable	Frequency					Mode	Median	Factors	
	strongly disagree (1)	disagree (2)	neither agree nor disagree (3)	agree (4)	strongly agree(5)			1	2
No time	5	14	19	68	54	4	4	0.924	
Lack of knowledge of which software skills to acquire and how	6	15	30	73	36	4	4		
Fear and mental block that programming is too difficult	6	18	31	63	42	4	4		
Programming tools and languages keep changing, so skills learned can become outdated quickly	9	19	39	65	28	4	4	0.643	
Lack of sufficient knowledge of a foreign language to understand the documentation and interface of the programming language	14	22	37	53	34	4	4		0.739
Having not enough money, because learning to program is expensive	12	33	37	54	24	4	3		
Lack of mathematical skills	15	35	37	44	29	4	3		0.632
Not my area, coding skills are not necessary for accountants	16	33	51	36	24	3	3		
Fear for the state of health, due to the sedentary work of the programmer	34	36	42	31	17	3	3		0.739
Percent variance explained								43.964	14.685
Cumulative percent variance explained								43.964	58.649

Source: own study.

The top barrier to the acquisition of coding skills by accountants, as perceived by the respondents, was the lack of time and knowledge of which software skills to acquire and how.

The results of the factor analysis for barriers revealed 2 factors with eigenvalues greater than 1, which accounted for 58.649% of the variation. The first factor, which accounts for a 43.964% variance, is lack of time and the need for constant learning of new programming languages tools, and methods. The second factor, which accounts for a 14.685% variance,

is related to restrictions perceived by respondents such as lack of mathematical skills, and knowledge of foreign languages.

The results confirmed H2, assuming that the main barrier to acquiring coding skills is lack of time.

3. Discussion

Digital competencies, including coding skills, are one of the essentials for the success of each economy. In the times of a pandemic, this is of particular importance, because the COVID-19 shock has accelerated technological development due to an increase in teleworking or making changes in production processes to reduce face-to-face interaction (Contreras, 2021).

Following the analysis conducted, it could be concluded that coding skills belong to desirable competencies among accountants. According to 76.8% of informants, programming is useful in the accountancy profession. 63.7% of respondents claimed that bookkeepers should possess at least basic skills in this field. Comparing Polish and foreign respondents, the international group demonstrated a significantly higher level of programming. This is because the vast majority of international respondents come from well-developed countries, in which coding is a compulsory subject in education. For example, the United Kingdom (UK) was one of the first countries to mandate in 2014 computer programming in its primary and secondary education in state-maintained schools (Balanskat, Engelhardt, 2015). This state also invested in learning programming, for example, the UK Treasury allocated in November 2017 £100 m to the launch of a National Centre for Computing Education (NCCE) to train 8,000 computer science teachers (Whittaker, 2017).

An accounting information system is essential to any business. However, small, and medium-sized enterprises (SME) often use ready-made accounting software. The cost of its installation and maintenance is low. But the software has only basic and standard features and often it is not integrated with other IT systems, such as payroll or e-commerce platforms. The limitations create additional and unnecessary workloads. With the relevant coding skills accountants can automate the processes and make the data work more effectively for their organizations.

As automation will displace many human beings, the school curriculum should focus on creating a workforce for the intelligence era. At the same time, university graduates ought to possess a level of qualification in digital competencies suitable for their entry into the world of work (Pérez-Navío *et al.*, 2021). The results revealed that programming brings benefits in many aspects of the professional life of accountants, comprising effectively leveraging

the automation of transactional and routine tasks. It also can help in sophisticated data analysis, enhanced reporting, and visualizations. But the results also indicate that coding is not only a strictly technical skill, but it also develops other essential qualities for employers and employees, such as abstract thinking, problem-solving ability, creativity, and teamwork. The factor, which reflects the professional development of accountants due to learning coding, explained a 58.011% variance.

Although the respondents showed a great interest in learning programming, they noticed a lot of barriers, among them the important role played by lack of time and knowledge of which software skills to acquire and how to do it. In this situation, universities should consider offering accounting students programming courses.

Conclusions

The results of the study can be summarized in the following two conclusions. First, the automation of routine accounting tasks such as data entry, processing transactions, and compliance work is inevitable. Second, coding skills can bring opportunities for the accountancy profession to reduce everyday tasks and allow to focus on more complex, judgment-based and value-added services.

These research findings contribute to the literature and practice in several ways. First, for academia, they expand the literature and indicate the need for the inclusion of coding in education programs for accountants. Second, they can be useful for financial professionals and adepts, as well as managers, to understand the benefits of coding skills in the automation of accounting processes.

The identification of benefits provides an important basis for further surveys aimed at digital competencies required by accountants in the changing environment.

The findings of the study have to be interpreted in light of certain limitations. The literature research method concerns only papers with particular search criteria, so there is a risk of omitting some research. Secondly, a small sample size – only 160 respondents from 30 countries were used. Finally, the questionnaire was based on a data collection method in which some variables could have been omitted due to closed-ended questions and their lower validity rate.

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