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THE DIGITALIZATION IN ACCOUNTING EDUCATION IN THE UNIVERSITIES – CHALLENGES AND PROBLEMS

A DIGITALIZAÇÃO NO ENSINO DE CONTABILIDADE NAS UNIVERSIDADES – DESAFIOS E PROBLEMAS

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Abstract
Digitalization of the global economic processes has had a great impact on the digitalization of higher education. However, globalization of business, stronger regulations and numerous technological solutions and innovations are not bypassing the accounting education either. Digitalization in the field of accounting has generated a series of changes both in the educational process and in terms of practical activity. An important point that creates competitive advantages for universities is the integration of science and education. Challenges for the accounting education are reflected in the need for rapid adaptation and transformation of training practice and education processes without abandoning away from basic accounting rules and principles. Accounting education should consider the competencies required in the digital era that must be included .in the curriculum. Significant opportunities and challenges emerge from digital disruption and rapid technological development. The aim of this paper is to analyse and systematize the key challenges that digitalization brings for the accounting education in higher education. Research is based on the review of relevant and available professional and academic literature. The methodology used is based on general scientific methods of scientific knowledge - analysis, synthesis, induction and deduction. According to the author, technological changes are having an increasingly a large impact on industry development in the digital era. The main findings of the study indicate that only 20% of teachers currently use innovative teaching methods by applying the digitalization process. In this regard, it is necessary to develop a strategic plan with concrete measures for the introduction of innovative and interactive techniques in the teaching of accounting. In accounting education, various simulation models and workshops should

Resumo
A digitalização dos processos econômicos globais teve um grande impacto na digitalização do ensino superior. No entanto, a globalização dos negócios, as regulamentações mais rigorosas e as inúmeras soluções e inovações tecnológicas também não estão deixando de lado a formação em contabilidade. A digitalização no campo da contabilidade gerou uma série de mudanças tanto no processo educacional quanto em termos de atividade prática. Um ponto importante que gera vantagens competitivas para as universidades é a integração entre ciência e educação. Os desafios para o ensino de contabilidade refletem-se na necessidade de rápida adaptação e transformação das práticas de formação e dos processos educacionais, sem se afastar das regras e princípios básicos da contabilidade. O ensino de contabilidade deve considerar as competências exigidas na era digital que devem ser incluídas no currículo. Oportunidades e desafios significativos surgem da disrupção digital e do rápido desenvolvimento tecnológico. O objetivo deste artigo é analisar e sistematizar os principais desafios que a digitalização traz para o ensino de contabilidade no ensino superior. A pesquisa baseia-se na revisão da literatura profissional e acadêmica relevante e disponível. A metodologia utilizada baseia-se nos métodos científicos gerais do conhecimento científico — análise, síntese, indução e dedução. De acordo com o autor, as mudanças tecnológicas estão tendo um impacto cada vez maior no desenvolvimento da indústria na era digital. As principais conclusões do estudo indicam que apenas 20% dos professores utilizam atualmente métodos de ensino inovadores, aplicando o processo de digitalização. Nesse sentido, é necessário desenvolver um plano estratégico com medidas concretas para a introdução de técnicas

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be included, and not only multimedia should be used.

Keywords: Digitalization. New Teaching Methods. Accounting Education. Higher Education. Universities.
JEL: A2, I2, M2.

inovadoras e interativas no ensino de contabilidade. No ensino de contabilidade, devem ser incluídos vários modelos de simulação e workshops, e não se deve utilizar apenas multimídia.

Palavras-chave: *Digitalização. Novos Métodos de Ensino. Ensino de Contabilidade. Ensino Superior. Universidades.*
JEL: A2, I2, M2.

1 INTRODUCTION

Digital education is known for utilizing technology in educational activities (e-learning). Concerning accounting education, incorporating technology in teaching activities has been considered significant, according to the Accounting Education Commission (AEC). This could help accounting education remain relevant and prepare more effective accountants. Until now, almost all universities worldwide have been investing in learning management systems (LMSs). It led to a massive surge in e-learning in general and accounting education. According to Mihret *et al*. (2017), applying technology in teaching activities facilitates guidance by lecturers and prompts feedback from learners about the studying materials and teaching methods' effectiveness. Helfaya (2019) stated that applying feedback methods and e-assessment in educational accounting fields has been highly appreciated by learners. Because of the flexibility of elearning (considering both time and place for both teachers and learners), this type of learning has been increasing exponentially (Al-Hadrami and Morris, 2014). Worldwide, accounting education is highly appreciated by young students because it is an important stage for themto master skills before becoming professional and talented accountants. Moreover, the accounting field is also concerned strictly with technical skills (Tran, 2022). Accounting education institutions must respond to the changes by providing education systems that comply with market expectations.

Digitalization in the field of accounting has generated a series of changes both in the educational process and in terms of practical activity. The use of intelligent applications in the field of accounting will generate greater efficiency of the accountant's activity, he will be able to serve a larger number of clients, to whom he can provide real-

time analysis, consulting, and current information in the activity they carry out. In this context, accounting education plays an important role because it must prepare graduates able to integrate into the labor market concerning the new demands. According to OECD (2020), worldwide can be found large differences between countries regarding the digital competencies and digitalization of education institutions. While developed countries find relatively easily the means to bring and integrate the new technologies in the teaching process, developing countries are struggling in this new digital era. However, the survey made by Central Independent and Public Employees' Trade Union showed that 93% of the interviewed professors felt stressed and overloaded by virtual teaching (Iordan *et al*., 2022).

The industry in addition to the technical knowledge of accounting also expects the accounting graduates to possess intellectual skills like analytical skills, problem solving skills, communication skills and interpersonal skills. All these skills are expected to make the students cope more efficiently in the ever changing dynamic corporate world. But the accounting research still has discussions on what necessary skills the accounting graduates should possess and how these skills can be delivered to them.

Recent technological advancements and the increasing speed of adopting new technologies in higher education are explored in order to predict the future nature of higher education in a world where artificial intelligence is part of the fabric of our universities. The paper pinpoints some challenges for institutions of higher education and student learning in the adoption of these technologies for teaching, learning, student support, and administration and explore further directions for research. This study analyzes the impact of artificial intelligence on higher education in finance. This study will also look at how higher education can contribute to Artificial Intelligence (AI) development.

We were very much aware of the need to rethink and reinvent accounting education to meet the needs of the digital era. A perfect 21st century education model is a combination of skills and knowledge with using platform technologies. According to the UNESCO report (The Digital Transformation of Education, 2020) UNESCO's e-schools Initiative is a global effort aimed at articulating connectivity with inclusive and quality teaching and learning, better learning outcomes and employability for learners.

2 MATERIALS AND METHODS

In accordance with the purpose of the study, the data were collected by the literature review and then it was analyzed by the descriptive analysis method. the digitalization in accounting education in the universities – challenges and problems are explained by tables and classifications. The data collection is based on the literature review.

The methodology used is based on general scientific methods of scientific knowledge - analysis, synthesis, induction and deduction, as well as on specific methods, specifically applying the systematic approach, the historical approach, the method of comparison and the abstract-logical method. The information base of this study is the results of large studies of international professional organizations and the review of relevant and available professional and academic literature on development on process of the digitalization in accounting education in the universities.

Bagban (2013) pointed out that In 21st century the scene the commerce education has several limitations like very high expectations from the commerce and management graduates. He pointed out and emphasized that the prospects of Commerce and Management Education in future will have main thrust on the following aspects:

- Skill development oriented teaching
- Information Technology.
- Industry- Institution Interaction
- Professional Courses and participatory teaching
- Research and research based teaching
- Skill Development oriented teaching (Pandit, 2021).

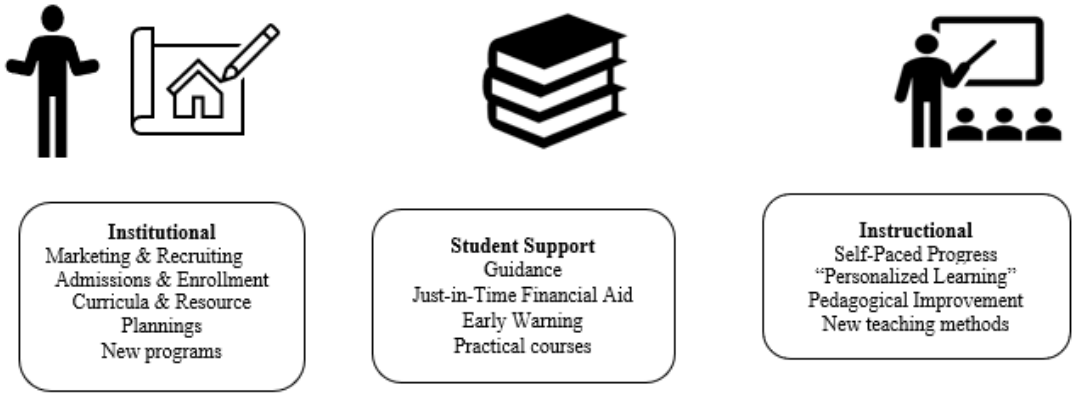
In higher education, there are two assessment methods: summative and formative. In summative assessment, examinations determine the achieved level of learning goals. However, lecturers continuously evaluate students during the formative assessment during teaching time to catch up with the learners' needs.

Figure 1 shows a summary of the different kinds of applications that currently exist for artificial intelligence in higher education. The use of artificial intelligence in higher education also involves perils, of course. One is the peril of adverse outcomes. Despite the intention of the people who develop and use these systems, there will be

unintended consequences that are negative or that can even backfire. To avoid these adverse outcomes, you should take into account several different factors. One of the first to consider is the data that these tools draw upon. That data can vary in quality (Zeide, 2019).

Figure 1

AI Applications in Higher Accounting Education



(Source: Prepared by the author based on (Zeide, 2019))

There is a new impetus for the accounting profession to understand Big Data and business analytics, creating a growing opportunity for accounting educators to integrate these topics into the curriculum (Sledgianowski *et al*., 2017). A subject such as data analytics in managerial accounting can integrate analytical thinking and technology skills, introduces a critical thinking framework that provides a sound structure for data analytics inquiry (Janvrin and Weidenmier Watson, 2017). Accounting firms and professional associations recommend that Big Data, technology, and information systems be integrated into accounting coursework to provide students with the necessary skills and knowledge to adapt to the data-centric environment (Sledgianowski *et al*., 2017).

University accounting education change, especially incorporating information technology, against the threat of market obsolescence and more recently. Accountants and accounting students are increasingly needing improved awareness of and skills in using more advanced IT systems. Therefore, by delivering effective up-todate education accounting educators within the university systems may also need to develop e-business content in their accounting curriculum as a tool to help them capture or retain their

superiority as a source of well-educated recruits into the profession. With the increasing body of knowledge in accounting, developing the curriculum for any accounting course can be both exciting and challenging (Handoyo and Anas, 2019).

Digital transformation has changed society and the economy with an ever deepening impact on everyday life, and demonstrated the need for higher levels of digital capacity of education and training systems and institutions.The COVID-19 pandemic has further accelerated the existing trend towards online and hybrid learning. It uncovered new and innovative ways for students and educators to organise their teaching and learning activities and to interact in a more personal and flexible manner online. In parallel, the uptake of digital technologies for education revealed challenges and inequalities between those who have access to digital technologies and those who do not (including individuals from disadvantaged backgrounds); and challenges related to the digital capacities of education and training institutions, teacher training and overall levels of digital skills and competences. These changes called for a strong and coordinated effort at the EU level to support education and training systems to address the challenges identified and exacerbated by the COVID-19 pandemic, while putting forward a long-term vision for the way ahead for European digital education (European Commission, 2020). The Digital Education Action Plan (2021-2027) is a renewed European Union (EU) policy initiative that sets out a common vision of high-quality, inclusive and accessible digital education in Europe, and aims to support the adaptation of the education and training systems of Member States to the digital age.

More importantly, accounting education institutions has a responsibility to facilitate an education system that fulfills today's' job market demand. Beyond carrying out the fundamental tasks of their work many accountants are now required to possess a wide range of skills, including excellent basic technical ability and knowledge of the general business environment.

3 RESULTS

The most recent change in the educational paradigm in higher education took place in 1999, with the signing of the Bologna Declaration. The so-called Bologna process (BP) is associated with the phenomenon of globalization in education and was designed

in order for higher education to respond to the challenges and opportunities that emerged in a context of growing economic integration on a European scale, through a student-centered teaching and learning model, focusing on the assessment of learning objectives.

Digital Transformation in accounting education involves improving the core business processes of a company to effectively fulfil customer expectations through data and technology leveraging. In the educational sector, students, faculty, staff and graduates can be the target consumer and both students and professors can benefit from digital transformation in universities. Digital transformation in higher education has its effect on 2 main business parts:

- ✓ First, Services transformation focuses on creating new education products and transforming existing products into digital ones. This usually means converting offline lectures into video ones, creating digital texts and quizzes;
- ✓ Second, Operations transformation would basically require a digitalization of all the common operations educational institutions have such as students' admission, registration for programs and courses, examination, program development, and their quality assurance.

According to an analysis of a study conducted on the need for digitalization in accounting education at the Faculty of Economics and Business Administration of Sofia University in Bulgaria, the following trends are observed:

- ✓ The Education 4.0 has a significant effect on accounting;
- ✓ The accounting process which usually consist of recording transactions, processing transactions, sorting transactions, and financial reporting is now all automated using accounting technology;
- ✓ These accounting transformation in industry 4.0 and Education 4.0 demands new competencies for accountants;
- ✓ The demand of new competencies for accountant will affect the learning pattern of accounting students.

The need for accounting education to change to reflect, inter alia, the implications of changing technological demands of business has been recognized, and lamented, for a long time. University accounting education curriculum should include subjects designed to provide students with a firm understanding of global issues affecting society and the business environment.

Accounting vocational education faces significant opportunities and challenges from digital disruption and rapidly evolving technology. According to Al-Htaybat *et al*. (2018) skills such as problem solving, critical thinking, analytical abilities, decision making, and evaluation as well as accounting principles such as double-entry bookkeeping and skills relevant to accounting standards are indispensable. In addition, the ability of data analysis and statistical knowledge is also needed to face the digital era. Educators can arrange a roadmap to bridge analysis gaps and integrate the competency. The focus on curriculum prepares students for long-term career demand. The concept of digital knowledge is changing from technical capabilities and applications to a wider perspective, including critical skills to solve problems. The uses of data analytics is currently growing rapidly and start taking over the basic work done by accountants (recording transactions, processing transactions, sorting transactions), as has been done by graduates of accounting vocations. Big data usage can improve cost efficiency and work effectiveness from the industry side. (Aulia, 2020).

The transversal skills connected with the digitalization process indicated in the literature, the development of which during academic training, specifically in accounting courses, is revealed to be of greater importance. The transversal skills to be developed in accounting students are communication, technological, teamwork, critical thinking, problem-solving, leadership, time management and ethics. Communication and the technological component are the transversal skills most mentioned in empirical studies. However, successful teamwork, problem-solving and critical thinking were other skills that were highlighted in the studies, as they are essential for current and future accountants to properly perform their duties. Therefore, we can conclude that increasingly, accounting training must combine hard with soft skills. Accountants will need to develop more analytical transversal skills, such as critical and strategic thinking, leadership, communication skills, successful teamwork, and problem-solving skills (Carvalho and Almeida, 2022).

The verified skills categories for digitalization in accounting education are: (1) ethical skills, (2) digital skills, (3) business skills and (4) soft skills. Within each of the core skill categoriesthere are subcategories of specific skills as summarised inTable 1.

Table 1

Categories and subcategories of skills identified as important for digitalization in accounting education

Category of skills	Subcategories of skills
Ethical skills	✓ Technical ethical skills ✓ Interpersonal ethical skills
Digital skills	✓ Basic digital skills ✓ Advanced digital skills ✓ Data skills
Business skills	✓ Consulting and business advisory skills ✓ Strategic thinking
Soft skills	✓ Adaptability ✓ Communication ✓ .Lifelong approach to Continuous Personal and Professional Development (CPD) ✓ Critical thinking ✓ Dynamic problem-solving ✓ Emotional intelligence

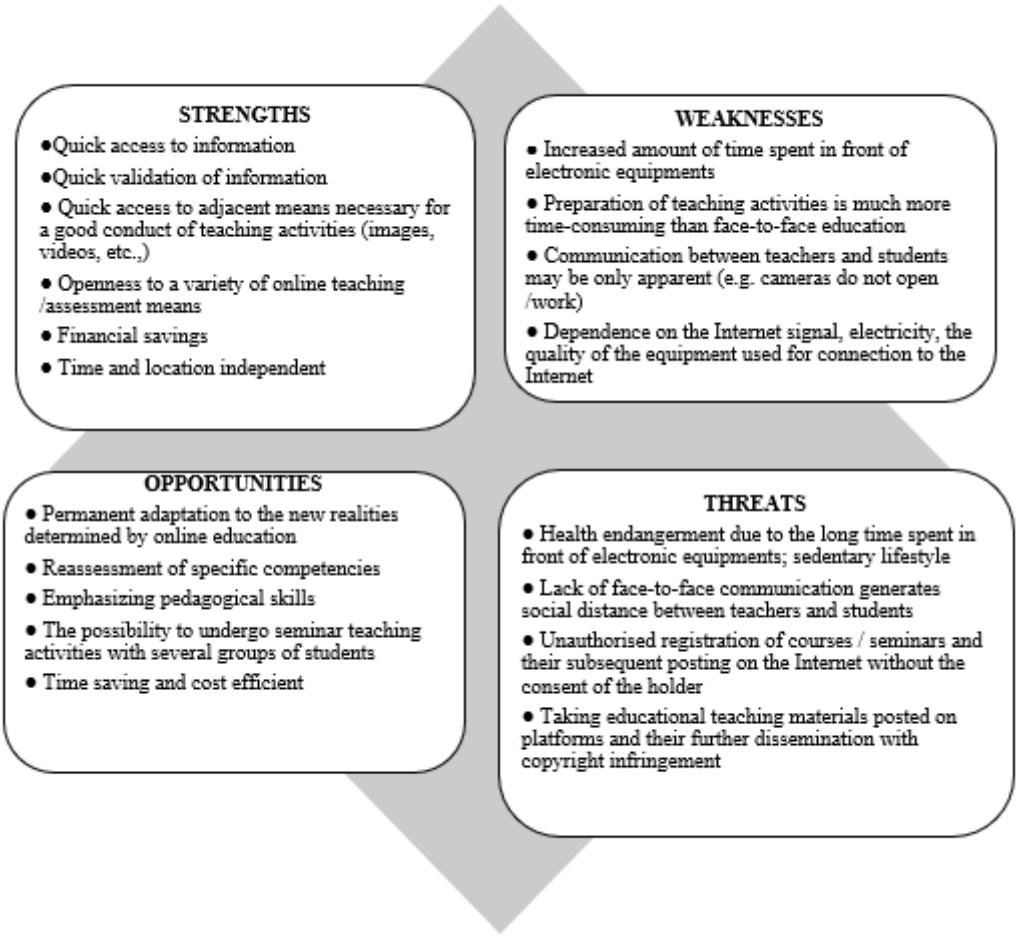
(Source: Prepared by Author on the base Tsiligiris and Bowyer, 2021)

Based on the literature review, we concluded the competencies needed to face the digital age are (1) technological competencies or information systems, (2) problem solving, (3) data analysis (including statistical knowledge), (4) critical thinking, (5) communication, (6) management competencies (leadership, teamwork, etc), and (7) professional value ethics and attitudes. Given all of the above we prepared a SWOT analysis of digital university education (Fig. 2).

The LMS is where lecturers and students interact, so the data volume and assessment method are essential during courses. Furthermore, one point that should be concerned about is the students' data privacy and security. The digitizing education in accounting will become more reasonable in the coming future. After nearly two years (COVID-19 pandemical), learners and instructors have become familiar with technical tools during class. Both could improve their skill in using high-tech access to search digital lectures and documents, interacting with others, building and presenting their lectures or assignments, etc. The instructors feel more confident in using such techniques as flipped classrooms, and students have become more proactive in preparing their lessons in advance. Other things that could indirectly impact online digitizing education in accounting are student and lecturer loans and financial assistance (Tran, 2022).

Figure 2

SWOT analysis on the continuation of online teaching activities and digital transformation in economy universities

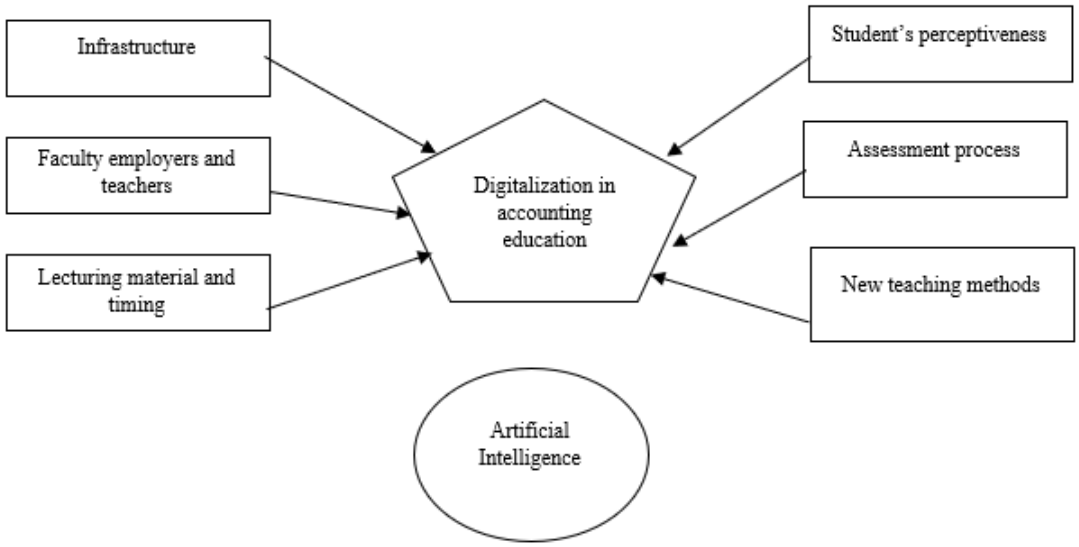


(Source: Prepared by Author on the base Toader *et al*., 2021)

This research is summarized in Figure 3, which is explorative and explores digitalization impact on accounting education in Sofia University.

Figure 3

Digitalization process in accounting education



(Source: Prepared by Author)

Technological changes require the university to change the curriculum, learning processes, and methods to generate the knowledge and skills required in carrying out future professional activities so that curriculum and teaching methods can be tailored to new situations. The digital era requires educators to incorporate new accounting tasks and positions within the company because tasks and positions are lost with the era of globalization. According to the results of research the challenge of accounting education in digital economy the challenge of accounting education in digital economy are:

- ✓ The challenge of market employment for accounting graduates;
- ✓ The challenge of new requirements in the application of accounting professional technology;
- ✓ The challenge of training compound talents in accounting education.

Accounting education in general universities is employment oriented, and its main goal is to cultivate students' accounting processing and financial analysis skills. With the coming of the trend of accounting automation, intelligent analysis, digital decision-making and collaborative work, it will have a subversive impact on the cultivation of accounting talents. In order to alleviate the structural contradiction between the supply and demand of accounting talents in the era of digital economy, universities should first

adjust the training objectives around the needs of the market; Secondly, accounting education should upgrade the existing teaching mode, focusing on the shaping of students' digital accounting professional skills; Thirdly, accounting education should use digital thinking to promote the innovation of accounting courses; Fourthly, accounting education should keep up with the development of technology and deepen the reform of accounting teaching methods (He, 2021).

In respect of the focus of this study on the challenges that teachers face, the following ranking refers to the five most relevant barriers to the teaching finance and accounting in the Faculty of Economics and Business Administration in Sofia University: (1) Increased time commitment; (2) Faculty compensation, incentives, etc; (3) Lack of shared vision for distance education in organization; (4) Lack of strategic planning for distance education and training the teachers (5) Difficulty keeping up with technological changes.

The barriers to the implementation of technology-supported education are: established teaching cultures; lack of digital incentives and legislation for teachers; unequal status of education and research; inflexible physical learning environment. Acknowledging these barriers, we suggest a list of steps that need to be taken:

- ✓ Support student-centred teaching cultures.
- ✓ Introduce personalised digital incentive structures.
- ✓ Equate the status of research and teaching.
- ✓ Redesign the physical infrastructure.

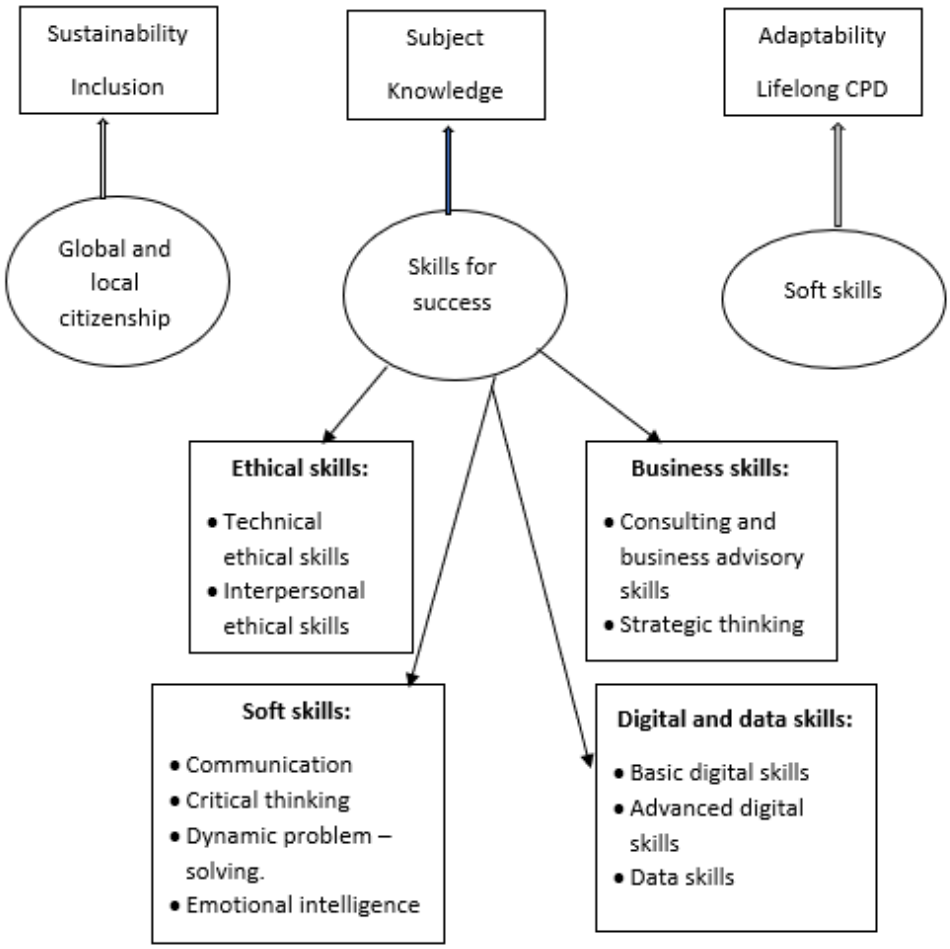
Most educational systems surveyed in Great Britain, Germany, Austria, Holland and France are modern and provide high-quality education. Despite that in certain areas, they have proved to be inefficient. Poland is by far the most active Member State in Eastern Europe in terms of financial education activities. Bulgaria, Latvia, Luxemburg, Slovenia, Slovakia and Romania seem to be active but only in the areas related to the EU multinational programs. An example of financial education in the Czech Republic is its integration into the school curriculum. The main target groups for financial education are now children and young adults. One of the most critical tools of financial education is both the Internet and private providers of financial services who operate every sixth system of financial education. According to them, there was realized training of financial education in individual countries. It categorizes Financial Literacy as both the internal

financial literacy and external financial literacy. Internal financial literacy assists top managers to optimize the use of scarce resources by a competent and efficient management system (Mihalcova *et al*., 2020).

Economic universities are responsible for educating global citizens who are aware of, andable to contribute in the effort to meet, the global societal challenges. As such, the discussion on how the research findings relate to university accounting education considers three different areas that form a proposed framework for university accounting education in the context of the Four Industrial Revolution. More specifically, the framework summarised in Figure 4, includes (1) skills for success; (2) personal qualities; and (3) global and local citizenship.

Figure 4

A conceptual framework for university accounting education in digitalization



(Source: Prepared by Author on the base Tsiligiris and Bowyer, 2021)

Building on the subject knowledge, university accounting education programmes ıshould aim to achieve an optimum combination of skills across the four key categories that emerged from the analysis–(1) ethical skills; (2) digital and data skills; (3) business skills; and (4) soft skills.

The another proposal for the implementation of digitization in accounting education is Smart Classroom. Smart Classroom's intelligibility requires the efficient implementation of integrated instruction and interactive learning tools, the insightful interplay of classroom education, context understanding and training, school architecture and electric management. It can be summed up in five dimensions: Speculative, manageable, Accessible, and real-time Two-Ways Theorem and Testing ("SMART"). A smart classroom is a digitally equipped classroom with a wide variety of technology teaching and learning methods (Zhang and Zhao, 2022).

A large number of accounting work may be replaced by the new generation of digital technology products, forcing colleges and universities to change to the goal of cultivating the ability of business innovation thinking, data analysis and technology application. Accounting education should do a good job in training comprehensive talents, so as to avoid weakening the impact of process robots with more creative and valuable accounting work. Therefore, the application education of digital accounting must consider the requirements of industrial technology, and create a digital accounting skill training path matching supply and demand through the integration of production and education. In the course arrangement of accounting education, universities need to supplement digital related courses, integrate digital accounting into the classroom, seek a balance between modern knowledge and traditional knowledge, digital skills and professional skills, and enable students to creatively carry out accounting work with digital theory and application skills. Under the new technology environment, universities should combine the new digital technology to establish a new multi scene teaching method, so as to improve the quality and efficiency of accounting teaching. Build an intelligent teaching platform, dynamically record and track the training effect of accounting students, strengthen students' skills, and ensure the completion of the training goal of compound accounting talents.

Accounting is considered as a profession that has existed since the birth of civilization and still survives to this day. Accounting as a business and management is

always able to recruit themselves in the company in the face of various transformations, both transforming in the company and transforming the industry. Digitalization of the challenges of 'information literacy' as well as new assistance for accounting information providers. Big Data identification provides an opportunity for accounting and finance to take a more strategic role and help shape the future. Based on these needs, the curriculum for each major field of study in accounting education must be approved by these needs by creating an Accounting 4.0 education that will produce Accountants 4.0 (Surianti, 2020).

Universities should be able to work closely with industry to ensure that graduates will have the expertise needed in the era of the industrial revolution 4.0, such as the use of AI-based and big data technology. The expertise that will be needed immediately in this era include:

1. The ability to analyze data for understanding of the factors that trigger business
2. Understanding of what is most needed by customers and how to track it
3. The ability to utilize new forms of data and use them for business decisions
4. The ability to interpret data to produce information that is more meaningful for decision makers.

The digitalization in accounting education relates to Block Chain, Big Data, Artificial Intelligence and Cloud Computing. In blockchain technology, data created by one server can be replicated and verified by another server. Big Data is a general term for any collection of data sets that is so large and complex that it makes it difficult to handle or process if only using ordinary database management or traditional data processing applications. Artificial Intelligence is a science for designing, building, and constructing a machine (computer) or computer program to have intelligence like humans. Intelligence in this case is the ability to take action or solve problems like humans use their intelligence. Cloud computing is a combination of the use of computer technology (computing) in a network with internet-based development (cloud) which has the function to run programs or applications through computers connected at the same time, but not all that are connected via the internet using the cloud computing.

4 CONCLUSIONS

Education institution, especially accounting education, has to respond to the phenomena and adjusting the education system in line with the need of the current era. Technology advanced must be incorporated with the education process to get the benefits of sophisticated technology in terms of teaching method and media. Furthermore, accounting education should also take care curriculum to be adjusted with the need of the industry and current business practice. Adjustment of the curriculum must consider the development of Information and communication technology. Therefore, accounting education institution must do innovation the way process transfer of knowledge conducted (Handoyo and Anas, 2019). In the era of digital economy, how to adapt to the trend of accounting personnel training in the new era is a hot issue for educators.

This frame-work can generally be adapted to inform university accounting education in three respects. First, the design of university accounting education programs needs to reflect a balance of skills and personal qualities as these are summarised in the conceptual frame-work. Second, the conceptual framework can be a practical guide for university accounting education teachers to update, enrich, and refocus their teaching and learning approach to the requirements of the digitalization. Third, the conceptual framework can be a reference for the coordination and rationalisation of the skills and personal qualities currently pursued at university, course, and module levels.

Machine learning, artificial intelligence and blockchain technology have gone on to trigger a revolution that currently has a major impact on accounting education. Digitalization management in the educational environment is carried out using digital marketing aimed at organizing interaction with educational support personnel, scientific and pedagogical workers, alumni, students, applicants using a range of digital communication channels. A modern teacher is forced to live in the conditions of an emerging and transforming digital environment, regardless of their own interests, desires and needs.

The main findings of the study indicate that only 20% of teachers currently use innovative teaching methods by applying the digitalization process. In this regard, it is necessary to develop a strategic plan with concrete measures for the introduction of innovative and interactive techniques in the teaching of accounting.

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