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Sustainable Professional Training – Challenges and Solutions in Emerging European Countries

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Abstract

One of the important factors that determined the dynamic of the accounting profession is represented by information technology. The article puts a spotlight on some facilities offered by technologies such as blockchain, big data and artificial intelligence, highlighting the way they can be used in accounting and auditing processes. We face a new paradigm in accounting and auditing, as a result of this consistent set of technologies integration in the work of professional accountants. Some of the information technologies are still emerging and others have already started to be used and therefore the issue of training professional accountants to acquire the knowledge and skills required by these technologies is becoming a major priority. The research carried out on the teaching of these information technologies in European faculties highlights a slow development in this regard. Although the awareness of the need is constantly declared, the actual teaching of those technologies is done in an extremely small number of universities. The authors appreciate that a more consistent and effective collaboration between the accounting faculties and the professional bodies is necessary for the alignment of the university curricula to the new requirements of the profession aiming at ensuring the fast integration of the graduates in the labor market.

Keywords: *information technology, accounting profession, universities, sustainability in accounting, blockchain, big data, artificial intelligence*

JEL Classification: *M4, M15, I22*

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Introduction

Sustainable development is a global goal and its importance is growing significantly due to the increasing changes in the international economic environment. A critical step in achieving this goal is to provide sustainable education, which will ensure the increase in the employability of universities' graduates. Sustainable university education requires the permanent revision of the curricula and of the educational environment. A sustainable university needs to develop a holistic perspective to analyze the medium and long-term changes that may affect future practitioners and react in a timely manner to adapt to them.

Following the evolution of information technology (IT), the accounting profession has begun to undergo a series of major changes, due to the significant digitalization of processes and the adoption of more and more IT solutions that support practitioners, so that they can continue to offer useful information to the management of the companies and investors, as well as to all other stakeholders. The main challenge in the development of the accounting profession is the ability of professionals to use current IT solutions efficiently, now being quite difficult to analyze the vast volume of financial and non-financial data. To train practitioners for medium and long term, the faculties must continuously assess the main challenges and requirements of the business environment and align their strategy to the dynamic requirements of the profession as well as to the requirements of the labor market, which is, in fact, a reflection of social need.

Although during recent years there has been a clear concern in research on the sustainability of the academic environment, most studies focused on defining key elements and less attention has been paid to the ways in which universities support the sustainable development of key professions in the economic environment, in the context of technological progress. Thus, the aim of this paper is to analyze the extent to which the accounting faculties, in emerging countries of the European Union (EU), succeeds to develop sustainable skills to the students during their academic training responding effectively to the challenges issued by the business environment

There is a key link between the current and future role of accounting practitioners in their efforts to facilitate the achievement of sustainable development goals. In 2010, the International Integrated Reporting Council (IIRC) was founded with the purpose of creating an international accounting framework in which practitioners from various fields of activity were involved (financial accounting, administrative, regulatory, etc.) to present "financial, environmental, social and governance information in a clear, concise, consistent and comparable format" to support a global sustainable economic model (IIRC, 2010).

According to the study conducted in 2018 by the World Economic Forum (WEF), a significant number of jobs in the financial accounting field will disappear by 2022, as a result of digitization and processes' automation. Therefore, other new roles will emerge, which are located at the intersection of accounting and IT, focusing mainly on data analysis, financial forecasting and process automation. In this context, aiming at assessing the extent to which the academia manages to provide the necessary training to their students, the authors analyzed the curricula of universities offering academic programs in the financial accounting field, trying to reveal whether they include classes addressing big data processes and data analysis, blockchain registries and artificial intelligence, these being some of the most important technologies that will lead to the transformation of the profession and its sustainable development.

The proposed study is organized in three sections, as follows: in the first section will be presented an analysis of the literature in the field of changes in the accounting profession and technologies that can ensure its sustainability, while in the second part will be presented the methodology research on the academic environment in emerging European economies and in the last section will be detailed and discussed the results and conclusions of the research, the limitations and future research directions envisaged.

The aim of the research is to analyze the sustainability of the training offered by the accounting faculties to their current and future graduates in terms of knowledge of new information technologies integrated into accounting and auditing processes. The paper will present and take into account the requirements of professional bodies and the business environment, but also the needs of future practitioners, from the perspective of the generation of which they are part (generation Z).

1. Literature review

The progress from various fields of activity creates significant challenges for academia because it has to create a curriculum that will sustainably train future practitioners. The dynamism in the field of IT, but also of the economic environment, creates the need for academic programs to focus on acquiring solid knowledge and practical skills adapted to the highly digitalized environment in which professional accountants work. This objective can be achieved only through direct collaboration with professional bodies and the business environment and by understanding the current needs and future trends of the professions, thus contributing to increasing the employability of the graduates.

In the current context in which young people in Generation Z represent the majority of students in academia, universities need to develop a sustainable approach by increasing their employability rate through technology. Thus, future practitioners will be able to accumulate the required knowledge and develop new skills needed in the business environment.

A study conducted by PWC published in 2018, which was attended by over 10,000 practitioners from different fields of activity, showed that 37% of respondents are concerned about technological progress from the perspective of maintaining their jobs. At the same time, the research results show that 74% of participants are willing to develop new skills to continue to add value to companies, given that the level of digitization continues to increase significantly.

The sustainability of the accounting profession, as defined by the Sustainability Accounting Standards Board (SASB) is represented by five key pillars: the environment, social capital, human capital, innovation and governance, which have the role of supporting the process of creating added value through the sustainable development of the economic and social environment.

According to the report published by the International Federation of Accountants (IFAC, 2015), practitioners are expected to provide a greater level of strategic and operational support in the decision-making process, by analyzing financial and non-financial information, reducing costs, developing forecasts that take social components into account, increasing the level of transparency and improving communication with stakeholders. The accounting profession is made up of practitioners working in various industries, which are essential to the sustainable economy, so the impact that they have in these areas of activity is significant, being suitable to disseminate and implement the principles of sustainable development. Thus, for this goal to be feasible, practitioners need to acquire new IT skills.

According to the model proposed by Wiek et al. (2016), supported by UNESCO (Rieckmann, 2018), there are six key competencies for sustainable development, which practitioners in different fields of activity must develop:

- systematic thinking – refers to the ability of practitioners to sustainably analyze problems in different fields of activity;
- anticipatory thinking – the ability to analyze over a longer period changes and their effects to create appropriate strategies and ways to manage risks;
- normative competences – the ability to analyze sustainable objectives from ethical, responsible and legal perspectives;
- strategic thinking – refers to the skills of developing strategic plans and effectively manage available resources;
- interpersonal skills – the ability to collaborate effectively with all stakeholders, in a sustainable manner;
- problem-solving skills – the ability to use different problem-solving methods in an integrated way to support sustainability goals.

In the context of the subject investigated by this paper – the impact of emerging technologies on the profession, the sustainable training of future accounting practitioners through university programs – the analysis focuses on three of the six competencies: the formation of systematic, anticipatory and strategic thinking. Thus, in this chapter, three currently emerging technologies will be presented, because they support the development of those above-mentioned skills and which are vital in the future of the profession, in the context of the massive digitalization of accounting processes.

1.1. Blockchain ledgers

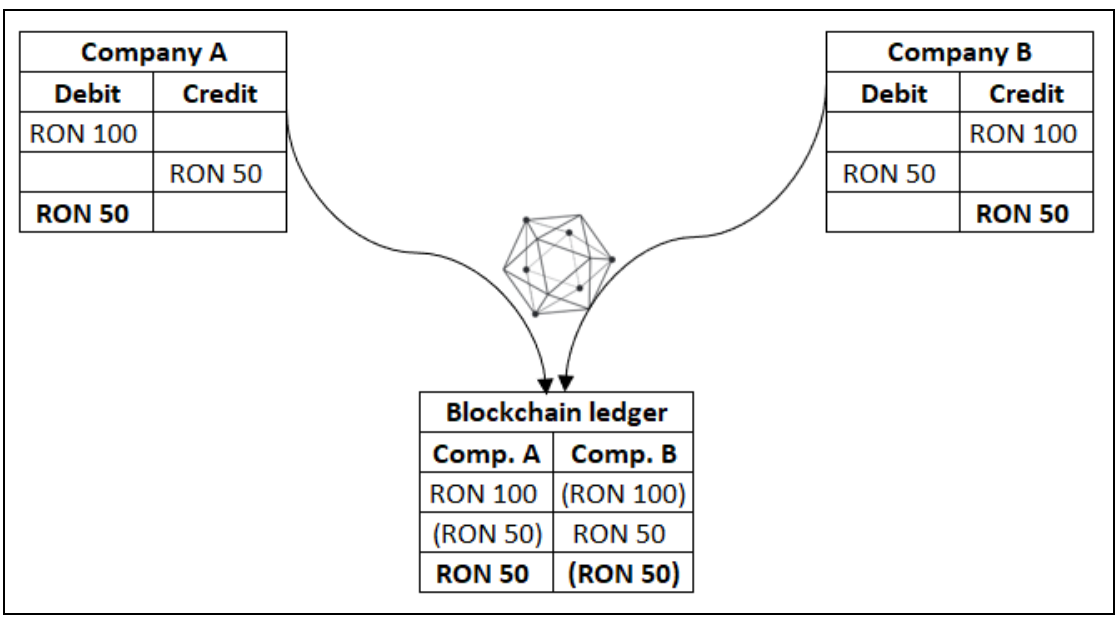
Blockchain ledgers are decentralized registers and in most cases public, which have the role of storing information of any kind (financial or non-financial), the data blocks being added to the register in chronological order and secured using cryptographic solutions, to

ensure the immutability of transactions and to increase security, without the need for a central authority to authenticate records. This new technological concept was defined in 2008 by Nakamoto to be used in trading virtual currency and now, due to its innovative nature that increases the transparency and security of transactions, its usefulness in various fields of activity (medical, financial accounting, supply, voting, etc.) began to be studied, currently, having an important number of public and private platforms based on this emerging technology. An important feature of registers is that they can facilitate global interactions between the world's population and economic development (Swan, 2015).

The applicability and adoption of blockchain registries in the accounting field bring significant benefits to companies, as they facilitate accounting and auditing processes, improve transparency and reduce the risk of fraud and tax evasion, which leads to the increase of the confidence of the investors (Fanning and Centers, 2016; Faccia and Mosteanu, 2019; Karajovic et al., 2019; Rîndaşu, 2019; Xu et al., 2019). The expectations of researchers in the field, who are studying the integration of these registries to improve accounting processes and reporting, are that in the future, double-entry accounting will be replaced by triple-entry accounting, with the help of smart contracts that can be integrated into decentralized registers (Dai and Vasarhelyi, 2017).

Reducing the risk of fraud or tax evasion can be achieved by comparing in real-time the transactions that participants agreed in the blocks of instructions. Thus, comparability is ensured in real-time, being significantly reduced the risk of fictitious operations. ***Figure no. 1*** shows a simple model for recognizing triple-entry transactions, in the case of the following scenario: Alfa sells to Beta goods worth 100 RON, the seller recognizes a receivable of 100 RON, and the buyer a debt of 100 RON. Subsequently, Beta pays 50% of the value of the goods, the final balance of the claim and the debt being 50 RON. Due to the registration of all transactions in a single register, the comparability of the information can be ensured, as highlighted in ***Figure no. 1***.

Figure no. 1. Triple entry accounting



Source: Own processing

In the relevant literature, several studies examine the level of sustainability that blockchain technology can bring to the social and economic environment (Nguyen, 2016; Pieroni et al., 2018; Saberi et al., 2019), the main

challenge being the energy consumption currently required for large-scale use of registers, but researchers believe that as renewable energy use increases, this technology will become a key component in sustainable development processes (Mengelkamp et al., 2018; Wu and Tran, 2018; Rana et al., 2019). It should be noted that virtual decentralized registries are currently in a continuous process of evolution and improvement, so on the medium term, an increase in the number of applications of this technology in the field of bioeconomy is expected (Willrich et al., 2019) to actively contribute to global sustainable development.

The importance of integrating this technology in accounting processes, from the perspective of improving the sustainability of financial reporting processes is given by the ability of registries to provide a higher level of transparency on accounting transactions, thus, depending on the blockchain platform model for which the company opts (public, private or consortium), all interested parties can have access to view the transactions made to obtain goods or provide a service. With this degree of transparency, consumers and all other interested parties have continuous access to the necessary information, financial or non-financial, such as the costs of acquisition, production, country of origin and conditions of production of a good or of a service, so there is enough information to make the right decision. The current transformation of the economic environment, due to the digitalization of processes, changes the requirements of consumers and investors, and by using blockchain registers the level of sustainability in companies can be improved, an idea supported by ACCA (2017), one of the most important international professional accounting bodies.

1.2. Big data and data mining

Big data processes are used to process and analyze large volumes of homogeneous and not homogeneous data, for which traditional solutions (such as relational databases) cannot be used due to their complexity and diversity. The main objective for the use of these processes is to obtain a competitive advantage, by highlighting the correlations between different types of information, with the scope of making feasible predictions and easily identifying various types of anomalies.

According to relevant literature in the field (Zikopoulos et al., 2011; McAfee et al., 2012; Demchenko et al., 2014; Kepner et al., 2014; Saha and Srivastava, 2014; Gandomi and Haider, 2015; Ylijoki and Porras, 2016), big data processes are defined by the following characteristics: volume, variety, velocity, veracity and value. The last two elements have been taken into account recently, due to the increasing complexity of the types of information and their impact.

The use of big data processes and the analysis of large volumes of data to obtain relevant financial information has been an strongly researched topic in the literature during recent years (Bhimani and Willcocks, 2014; Vasarhelyi et al., 2015; Warren et al., 2015; Janvrin and Watson, 2017), the main benefits for their integration in accounting processes being the improved real-time reporting, reduced error rate, facilitating audit processes and increasing the quality of financial forecasts. Internationally the most important professional bodies have begun to discuss the importance of big data, the concepts related with these processes and how to use them in accounting activities and audit missions are included in the faculties' curricula (CIMA, 2015; ICAEW, 2016; ACCA, 2019).

The use of big data processes increases the quality of financial and integrated reporting, because, unlike most accounting information systems which are designed to analyze only structured financial data found in relational databases, by using big data processes a wide range of information can be analyzed, including non-financial (unstructured, in different formats: text, image, audio, etc.). In this approach the authors can effectively explore future directions of economic development, possible risks and ways in which the level of sustainability can be improved (Moffitt and Vasarhelyi, 2013; Al-Htaybat and Alberti-Alhtaybat, 2017; Şerban, 2017; Wanner and Janiesch, 2019). Currently, the main challenge is the limited ability of accounting practitioners to use these processes effectively, so the academic environment must prepare future practitioners in understanding and using these specific technologies.

Big data and data mining processes can also be used by audit firms or by independent practitioners in the decision-making process to accept a new client for an audit engagement, by creating supporting documentation based on data available online (media, social networks, etc.). In this way, new risks can be identified. In the case of a classic selection process, those risks would not be as easy to observe, because their identification is based on unstructured data. Such

analyzes can also help assess the risks that do not originate from the financial statements, such as customers' opinion on the quality of products and services provided, how the company communicates and solves various problems online, issues which can affect the company's reputation.

1.3. Artificial intelligence

Automating processes using techniques based on artificial intelligence is not a new activity, they have been used since the creation of the first computer, what is now attracting the attention is the complexity of developing these techniques, which are becoming increasingly important. Automation can replace, for example, most repetitive manual processes that do not require a high degree of professional judgment. From a technological point of view, artificial intelligence is represented by computer programs that perform specific activities, for which they were designed, representing the ability to think and learn.

The European Commission published a report in 2018 explaining the benefits of using technology solutions based on artificial intelligence to improve sustainability, by adapting strategies aiming to integrate optimal IT solutions that can promote sustainable development and cope with socio-economic changes. European Commission stated that "AI is transforming our world, society and industry." There are also projects at EU level that invest in artificial intelligence research and in the development of practitioners' working skills with these cognitive technologies.

Current research analyzing the benefits that artificial intelligence brings to accounting and financial reporting processes (Pannu, 2015; Issa et al., 2016; Sutton et al., 2016; Greenman, 2017; Kokina and Davenport, 2017; Li and Zheng, 2018) highlighted that cognitive technologies significantly reduce the time required to perform certain accounting activities, decrease the number of errors, improve the real-time reporting process, help real-time monitoring of assets and stocks, facilitate audit and contribute to obtain financial predictions with a higher degree of accuracy. As in the case of the big data processes presented above, the main international professional bodies (ACCA, ICAEW and CIMA) have included in the curricula elements related to artificial intelligence and how this technology can support the development of the profession.

By using cognitive technologies in the accounting processes is facilitated the sustainable development of companies by properly managing the resources used. Thus, artificial intelligence is one of the critical elements that contribute to the development and changes in the accounting profession, being necessary for present and future practitioners to develop the skills required to the effectively use of these technologies, the contribution of the university training in this process being a vital element.

As can be noticed from the roles and advantages presented for each of these technologies, through understanding how they work and their practical applications in the current context of the accounting profession, the three competencies covered in this study are ensured. Through the processes of big data and data analysis, future professionals manage to develop a systematic thinking, by analyzing and modeling different types of data (homogeneous and not homogeneous), but also anticipatory thinking, through making predictions, using artificial intelligence techniques. Through blockchain platforms, practitioners have more information at their disposal, with a high degree of accuracy and transparency, to choose the appropriate strategic solutions.

Various solutions based on artificial intelligence techniques are currently being created, mainly related to machine learning, to help the financial and audit departments detect transactions that may pose risks to the companies. For example, machine learning applications can be used to verify financial transactions to avoid duplication. In this case it starts from a database in which the historical transactions of the company in terms of expenses with various services are recorded and a set of new transactions where the following are compared: the date of the document, the value, the name of the company that provided the service and the number of the invoice or other supporting document. If at least two or three criteria coincide, the program will proceed to a detailed analysis of the transaction. In this case, the following 6 scenarios are possible, using combinatorics, in the case of 4 choose 2: vendor name – value, vendor name – date, document number – vendor name, document number – date, document number – value, date – vendor name. In the scenario of 4 choose 3, there are four possible situations, so the program analyzes a total of 10 types of cases that can highlight a possible inconsistency.

The first step is to determine if there are transactions that fall into one of the 10 situations presented above, and if so will proceed to make an additional analysis, and if not, the transaction in question will not be considered for other analysis. The additional analysis involves the following steps:

- Determining a pattern of transactions from the supplier in question;
- Determining the budget available for that category of expenses;
- Analyzing the user's decision in previous situations regarding similar scenarios;
- Comparison of documents using programs such as OCR (Optical Character Recognition).

After completing these steps, possible duplicate transactions that are not automatically removed by the program are sent to the user for manual analysis and decision. Depending on the end user's choices, new algorithms are generated in the program to filter future results.

Given the facilities offered by the three emerging technologies for the accounting profession, the authors considered necessary to analyze the extent to which future practitioners, currently students, are prepared to use them.

2. Research methodology

Aiming at analyzing the extent to which the accounting faculties contribute to the sustainable development of the future practitioners' skills, the authors chose to study the faculties from emerging European economies, because in these countries there are the lowest rates of underqualified staff (European Commission, 2019), which demonstrates that the educational staff manages to train practitioners from different fields of activity in an effective manner.

The general approach of the proposed research consists in conducting a collective case study, because the objective is to capture several perspectives on the issue of academia sustainability, in the context of long-term training of accounting practitioners. From the methodological point of view of research in the educational field, by using the collective case study the effects are observed in the real context (Cohen et al., 2018) and new research directions can be provided (Saunders et al., 2009).

In this exploratory research the authors analyzed the current curricula of universities offering bachelor or master programs in financial accounting. The sample included faculties from 12 emerging countries: Bulgaria, Croatia, Estonia, Latvia, Lithuania, Greece, Poland, Czech Republic, Romania, Slovenia, Slovakia and Hungary (**Table no. 1**). The aim was to identify whether universities offer to the future accountants, courses regarding these three technologies presented above, which have significant potential for the profession. The main limitation of the study is caused by the fact that not all universities are publishing online their curricula. This is the reason why the number of universities differs from one country to another in the sample.

The research questions were the following:

1. What is the degree of insertion of emerging technologies in the curricula of the European university environment from emerging countries?
2. Is there an adequate level of employability ensured based on the current curricula?
3. Which are the courses universities should consider on medium and long term for their accounting programs?

A total of 52 study programs in the field of accounting were analyzed, of which 22 were undergraduate and 30 master programs, from 27 universities in the 12 emerging countries listed above. It was not possible to analyze the same number of programs in each country because in some cases only one university was identified. Therefore, to maintain a correct proportionality, in the situation where several faculties were identified in a country, a maximum of four of them were chosen (in the case of Bulgaria and Romania).

Most of these programs are accredited by international professional bodies such as ACCA, ICAEW and CIMA. In this context, because these bodies have intensely promoted over time the importance of the technologies targeted by this research, it is expected that they will be included in the curricula.

Table no. 1. Centralization of universities that offer studies in the field of accounting included in the research

Country	University	No. of undergraduate programs	No. of master programs
Bulgaria	New Bulgarian University	1	2
	Sofiiski Universitet Kliment Ohridsky	1	1
	South-West University "Neofit Rilski"	1	2
	University of National and World Economy	2	0
Croatia	University of Split	0	1
Estonia	Estonian Business School	1	0
Greece	Athens University of Economics and Business	1	1
	Dayalbagh Educational Institute	1	0
	International Hellenic University	0	1
	The American College of Greece	1	0
Latvia	University of Latvia	1	1
	Riga Technical University	0	1
Lithuania	Vilnius University	0	1
	Kaunas University of Technology	0	1
Poland	Kozminski University	1	1
	University of Applied Sciences in Wałcz	1	0
	Warsaw School of Economics	0	1
Czech Republic	Mendel University in Brno	0	1
	Prague College	1	3
	University of Economics Prague	1	1
Romania	Bucharest University of Economic Studies	1	2
	Alexandru Ioan Cuza University of Iasi	1	3
	West University of Timisoara	1	2
	Babes-Bolyai University Cluj-Napoca	1	1
Slovakia	University of Economics in Bratislava	1	2
Slovenia	University of Ljubljana Faculty of Economics	2	1
Hungary	Budapest Metropolitan University	1	0

Source: Own processing based on the data collected

The analysis was performed between November and December 2019, based on the latest study plans, by examining the mandatory and optional courses. If the title of a particular course did not provide sufficient details about the elements that are taught to students, the syllabus was analyzed if it was made available by universities on their website, thus another limitation of this study is given by the fact that only data that could be collected directly from the website of each institution was taken into account in this analysis. As the curricula were found for each study program analyzed, the authors consider that the results generated by this study are relevant for the present research.

3. Results and discussions

To ensure an optimal level of training for future practitioners, it is necessary to reduce the gap between the skills that practitioners assimilate in university training and the expectations of the business environment and international professional bodies. An effective way of achieving this goal is the dialogue between the above-mentioned parties, aiming at creating, in the university training, the skills needed by practitioners for the medium and long term. Christ et al. (2018) propose as a measure to increase the

sustainability level of the accounting profession the integration in the literature and in the curricula of the issues used in current practice.

After analyzing the curricula of the 27 universities presented in the previous chapter, only ten courses in the field of big data, artificial intelligence and blockchain registers were identified. As can be seen from **Table no. 2**, in some countries no courses in this area were identified, the focus being mainly on topics in the financial and accounting fields.

Table no. 2. Centralization of the courses provided by the universities

University	Big data	Blockchain	Inteligență artificială
New Bulgarian University	-	-	-
Sofiiski Universitet Kliment Ohridsky	-	-	-
South-West University "Neofit Rilski"	1	1	-
University of National and World Economy	-	-	-
University of Split			
Estonian Business School	-	-	-
Athens University of Economics and Business	-	-	-
Dayalbagh Educational Institute	-	-	-
International Hellenic University	-	-	-
The American College of Greece	-	-	-
University of Latvia	-	-	-
Riga Technical University	-	-	-
Vilnius University	-	-	-
Kaunas University of Technology	1	-	-
Kozminski University	2	-	1
University of Applied Sciences in Wałcz	-	-	-
Warsaw School of Economics	-	-	-
Mendel University in Brno	-	-	-
Prague College	-	-	-
University of Economics Prague	-	-	-
Bucharest University of Economic Studies	-	-	-
Alexandru Ioan Cuza University of Iasi	-	-	-
West University of Timisoara	2	-	1
Babes-Bolyai University Cluj-Napoca	1	-	
University of Economics in Bratislava	-	-	-
University of Ljubljana Faculty of Economics	-	-	-
Budapest Metropolitan University	-	-	-

Source: Own processing based on the data collected

In the case of two universities: Sofiiski Universitet Kliment Ohridsky and Prague College, courses such as fin-tech and digital business were found in the curricula, but because the syllabus was not available, the topics addressed could not be identified for these courses. In the case of the Faculty of Accounting and Management Information Systems from the Bucharest University of Economic Studies, the existence of the Business Intelligence course was identified. Its syllabus includes the main technologies approached in this study. The shortage of the necessary software solutions restrains the presentation to theoretical developments with less practical insights. The curriculum also offers a number of other courses such as MS Office applications, databases, web design, accounting information systems (ERP). In the authors' opinion, the alignment of the university curricula with the current and future needs of the accounting profession in the field of information technology requires significant investments in IT resources, which is now an important constraint for academia.

In recent years, researchers in the field (Krahel and Vasarhelyi, 2014; Yoon, 2015; Gamage, 2016; McKinney et al., 2017; Sledgianowski et. al., 2017) begun to put pressure on academia to include in their curricula subjects focusing on big data processes, so that future practitioners to be better trained on the topic. One important step in the improvement of the academic accounting programs is the proper training of the professors in the field of IT. Accounting professors need to be familiar with these technologies that impact the accounting field and lead to changes in accounting and reporting processes. Therefore, it becomes obvious the need for a dual approach in accounting training: acquiring the necessary knowledge and practical skills in the field of accounting through the use of new technologies.

In the analyzed curricula, where the presence of data analysis and big data processes courses has been identified, are presented elements on data extraction, analysis, modeling and the use of computer programs for data processing and of cognitive technologies such as machine learning for developing economic models.

In the two situations in which courses related to artificial intelligence were identified, the syllabus was not available on the web pages of the universities. Therefore, it was not possible to analyze their scope and content. Although research in the field of accounting education has drawn attention to the need of integration of these topics into the curricula (Baldwin-Morgan, 1995; White, 1995; Al-Htaybat et al., 2018) the response from academia is rather slow as the results of this analysis show.

Only the Neofit Rilski University (from the sample of 27 universities), offers courses in the field of blockchain. The university offers a master program focused on digital finance at the Faculty of Economics, where students deepen their knowledge of blockchain registers, virtual currencies and digital contracts, in the field of public finance.

To answer the first research question, it can be concluded that only a relatively small number of courses in the field of big data, blockchain registries and artificial intelligence exists in universities' accounting curricula (universities from emerging economies). This result can be justified by the fact that these are still emerging technologies. Their existence in curricula shows that the professors in the field of accounting seek to manage the current gap between academic training and the present and future needs of the profession.

Lukman and Glavič (2007) consider that the main feature of a sustainable university is the continuous improvement of efforts to take into account future developments, in this case, the integration in the curricula of the courses related to information technologies that change the accounting profession. Therefore, to manage the gap identified in the academic curricula in emerging countries, it is necessary that universities update the curricula aiming to ensure the sustainability of the accounting profession and improve the graduates' employability, in the context of digitizing most accounting processes.

At the time of this study, the technologies presented are still emergent, but on the medium term they will be introduced in accounting activities, so the answer to the second research question is that at this time there is no significant negative impact on the employability level, however, in the medium term, this result may change if the curricula are not revised in accordance with the requirements of the business environment and international professional bodies.

To provide a sustainable education, the academic environment must promote an active dialogue with the labor market representatives and professional bodies, to improve the employability level of graduates, otherwise, the future accountants might not be prepared to deal with the professional challenges in the age of information technology, this being the answer to the last research question initially formulated.

Conclusions

This paper analyzed the sustainability of universities training from the perspective of professional insertion in the context of the digital accounting profession, researching how the academia in the European emerging economies is involved in developing the skills of future graduates in regards to the use of emerging information technologies. Our study focused on blockchain registries, artificial intelligence and big data processes as important information technologies impacting the accounting profession. To fulfill the research scope, a collective case study was used as a research method, using the data provided on the websites of the 27 universities. 52 undergraduate and master degree programs were analyzed.

The study's results show that the universities have already started to include emerging information

technology courses into their curricula and are struggling to enable students to acquire the necessary IT skills so that future graduates can meet the challenges of digitized processes that are transforming the accounting profession. A relatively small number of courses in this field has been identified. That can be explained by the emerging status of the information technologies analyzed and the medium horizon anticipated of their integration in the accounting processes.

The main limitation of this study was due to the lack, in some cases, of the universities' syllabus, that would help to better understand the purpose and area covered by certain courses. Although there have been only two cases in which the authors couldn't identify the IT skills that future graduates will acquire in their study programs. In the authors' opinion a sustainable university must demonstrate transparency and provide sufficient information to the potential candidates facing the decision about the study program to be followed.

The three technologies presented in this paper (blockchain registries, artificial intelligence and big data processes) have a significant potential to facilitate increased transparency in the business environment, proper management of resources and increased the trust of the social environment. The accounting profession plays an important role in the sustainable development of a global economy, so it is necessary for the professionals to be involved in an optimal education process, which will develop the necessary IT skills for the medium and long horizon of time.

Aiming at increasing the professional integration of the graduates, a sustainable university needs to manage the current gap between academia, business and professional bodies, by improving dialogue and creating working groups with constant activity. Continuous training for the professors is also essential, preparing to train the students on the field of emerging information technologies and their usage in accounting, auditing and analysis processes.

This research contributes to the literature on the sustainability of the universities' training in the context of digital accounting. The specialized literature is limited in this field of study, and in the Romanian scientific literature the topic is not approached. By our knowledge, this is the first study that approaches the analysis of the sustainability of accounting education from the perspective of emerging information technologies. As future directions of research, the analysis can be extended to all EU countries to determine if there are significant differences in the educational approaches of the universities. A longitudinal analysis can be also performed to capture the evolution of accounting education over time.

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