An Investigation of the Perceived Impact of IT on the Accounting Profession

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Abstract:

We are living in a hyper-digitalized world. From the way we travel to how we communicate with each other and the jobs we do, almost every aspect of the human life is slowly being changed by technological advancements which just 20 years ago would have been considered science fiction. In this context, the accounting profession will surely not be the same in the future. The purpose of this paper is to find out in what ways and to what extent the emerging technologies impact the stereotypical accountant "bean counter".

Keywords:

- Accounting profession
- Artificial Intelligence
- Data Analytics
- Robotic Process Automation
- Accountants' skills
- Digitalization

1. Introduction

In the last few decades, technology has progressed at an exponential rate. From the first computer to humanoid robots and self-driving cars, from the first Web to the hyperconnected world of today, it is no surprise that every single aspect of human life has been influenced by all the new possibilities yielded by technological means that at some point, were something out of science-fiction books.

The accounting profession is no exception in this case. The modern accountant uses IT resources in order to maximise efficiency and minimise effort. The paradigm of automating the relatively simple and repetitive tasks seems to be highly embraced by the professionals as the IT infrastructure allows them to handle other, more impactful tasks. According to a report by ACCA in collaboration with Deloitte Middle East, it is expected that in the future up to 20% of total work hours of accounting departments will be delivered by robots.[1] Under these premises, constant and drastic changes are to be expected, impacting the accountants' tasks and responsibilities, as well as the skills and knowledge they will need in the future.

The first objective of our study is to obtain an overview of the present state of the accounting profession in relation with the increasing degree of automation and technological

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[1] ACCA & Deloitte, *The rise of Automation in Accounting,* 2018

advances. Review of the recent literature will provide the relevant information in establishing a reference point for our second objective – prospecting the perception of accountants regarding the future of the profession in the context of ever-increasing use of technology. The study will focus on three areas: current impact of IT and automation, perception regarding the future, as well as digital skills and awareness of technology.

2. Literature review

Prior literature states that the most notable impact IT had on accounting system was revealed in the company's ability to develop and use advanced software to record financial transactions. Moreover, due to the evolution of IT and compared to the last decade, nowadays companies are able to prepare and present large reports of the company's financial performance with detailed information which facilitates the decision-making process at the management level.[2]

According to Ghasemi et al., the evolution of IT from year to year brought a lot of benefits at the entity's level: the software used in recording the transactions has increased its functionality becoming more efficient and complex, the accuracy of the financial information has been improved, faster processing of the transactions, and better external reporting. [2]

In other research paper, ACCA states that if the accountants will be open to exploit emerging technologies, they will be able to attract new talents and develop and manage the existing ones. Thus, if accountants will not learn and not adapt to the new technology trends they will follow "the dinosaur into extinction". In the same time, ACCA highlights that the future CFO of a company will need to know as much about technology as they now know about financial management. Moreover, the research study shows that by the end of 2025 everybody will have access to the digital data.[3]

Another research study made by ACCA reveals the digital skills needed for the accounting profession. The results of the research are based on a survey of 4,264 accountancy and finance professionals, including ACCA members, affiliates and students. The results are structured by **country** (UK, Russia, Malaysia, Pakistan, Brazil, Nigeria, Ukraine, Zimbabwe, Mauritius and other), by **activity** (people in practice such as external auditors, and people in business such as working in finance), and by **age** (between 20 and 71+ years). According to the study, 89% of the respondents consider digital skills to be important or very important to the accountancy and finance profession. The highest percent is coming from the countries like UK, Brazil, Russia, Nigeria and the predominant age of the respondents is comprised between 35-54 and 55+ years. Other result shows that 63% of respondents consider that they have enough digital skills to perform their job. The responses obtained show that people between 18-34 and 35-54 years old believes that they have enough digital skills compared to the people from the category 55+ years old which the new technologies trends put them into some difficulties. Moreover, 68% of the respondents revealed that they use all the time the digital skills at their work. Most of the responses were coming from the category of 35-54 years old showing that they adapted very well to the new technology changes.[4]

Ng et al. highlight the many benefits that emerging technologies bring to decision makers. Robotic Process Automation (RPA) can emulate routine, rule-based decision-making processes, whereas Artificial Intelligence (AI) is able to draw insights from unstructured data (images, sound, unstructured documents and emails), emulating human behaviour.[5] The subject of automation and virtual digital workforce in accounting have gotten a lot of attention, but little is known about the implementation of this revolutionary technology, as well as the organizational consequences of incorporating RPA for accounting and finance tasks. RPA has been shown to reduce data

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[2] Ghasemi, M., Shafeiepour, V., Aslani, M. & Barvayeh, E., *The impact of Information Technology (IT) on modern accounting systems*. Procedia - Social and Behavioural Science, Volume 28, 2011, pp. 112-116

[3] ACCA, *Technology trends: their impact on the global accountancy profession,* 2013

[4] ACCA, *The digital accountant: Digital skills in a transformed world,* 2019

[5] Ng, K. K. H. et al., *A systematic literature review on intelligent automation: Aligning concepts from theory, practice, and future perspectives*. Advanced Engineering Informatics*,* Volume 47, 2021

processing time and cost while also improving process accuracy, consistency, traceability, and decision quality. However, there are some drawbacks and risks associated with RPA implementation, as shown by a 30 to 50% initial RPA project failure rate, and expressed concerns about the fact that organizations often fail to assess potential risks and lack adequate RPA-specific governance processes and effective internal controls.[6]

Decision-makers should set simple and relevant key performance indicators (KPIs) that can be monitored and tracked using management reporting. An enterprise system can be seen as a form of organizational actor that has an impact on the culture and processes of the organization.[7]

It is emphasized by Taiwo that both operational and organizational performance are closely linked to the performance of the technological means involved in the process since most of the professional endeavours are conducted within the accounting information system (AIS).[8] The AIS in its entirety is considered to be a tool naturally incorporated in the professional environment along with the skyrocketing technological progress achieved in the recent years. Information is gathered and reported in a specific manner, under a specific workflow in every company. This aspect melds the way each AIS is designed for its respective user.[9]

The core functions of AIS denominated by Taiwo[8] are: the collection and storage of data, appropriate interpretation and processing of financial information, summarized and meaningful feedback for the decision-making and, last but not least, consistency - achieved by employing internal control measures.

Lim references three major types of AIS[9]:
1. Manual system - labour intensive due to the preliminary human processing and there is a high chance of human error.
2. Computer-based Transaction System – A collection of specialized modules with designated purposes, that aids in the accounting process.
3. Database Systems – ERP software consisting of relational databases, integrates both non-financial and financial data and offers an easy to access and complete view on the company's activity.

It is worth mentioning that the type a company would opt for is highly dependent on its costs-to benefit ratio.

Stancheva[10], Gulin et al.[11] and Zhang et al.[12] all highlight the fact that, rather than completely displacing accountants, modern technologies will work in synergy with professionals of the future, relieving them of repetitive, routine and structured tasks and freeing up time for more significant work such as financial planning, analysis and forecasting.

Zhang et al. consider that robots will replace humans in certain parts of the accounting work, especially in performing basic and repetitive tasks. They emphasise that big data analytics and Machine Learning have a positive impact on accountants' work, enabling fast and easy processing of very large volumes of data for control activities and financial planning. Based on historical data, machine learning algorithms can be developed and trained to predict the classification of transactions, the authors giving an example of promotional materials sent to clients automatically categorised as marketing expenses. Another factor that Zhang et al. consider

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[6] Kokina, J. & Blanchette, S., *Early evidence of digital labor in accounting: Innovation with Robotic Process Automation.* International Journal of Accounting Information, Volume 35, 2019

[7] ACCA, *What's the appeal of cloud-based accounting software?* 2017

[8] Taiwo, J. N., *Effect of ICT on Accounting Information System and Organizational Performance.* European Journal of Business and Social Sciences, Volume 5(2), 2016, pp. 1-15

[9] Lim, F. P., *Impact of Information Technology on Accounting Systems.* Asia-pacific Journal of Multimedia Services Convergent with Art, Humanities, and Sociology, 3(2), 2013, pp. 93-106

[10] Stancheva-Todorova, E. P., *How Artificial Intelligence is Challenging the Accounting Profession.* Journal of Scientific Publications, Volume 12, 2018, pp. 126-141

[11] Gulin, D., Hladika, M. & Valenta, I., *Digitalization and the Challenges for the Accounting Profession.* Proceedings of the ENTRENOVA – ENTerprise REsearch InNOVAtion Conference, 5(1), 2019, pp. 428-437

[12] Zhang, Y. et al., *The Impact of Artificial Intelligence and Blockchain on the Accounting Profession.* IEEE Access, Volume 8, 2020, pp. 110461-110477

important is the constant development in the Robotic Process Automation (RPA) field, which now allow RPA solutions to do common accountants' tasks such as filling spreadsheets, submitting tax declarations etc. OCR technology is a final important factor illustrated by the authors, a type of tool which is able to "read" documents on paper and for example record the data from invoices into the accounting software.[12]

Stancheva-Todorova is also of the opinion that AI will have a positive influence on the future of the accounting profession. She considers that the bookkeeping aspect of accounting is the most prone to automation due to its routine and repetitive nature, and that the implementation of AI technologies to replace humans in this area will improve the accuracy and timing of the data entry. Secondly, automation can help in fraud detection and prevention, as *"machines cannot be tempted with money or power"*[13]. Moreover, machine learning has the potential to improve the accuracy of revenue forecasting in times of uncertainty by using complex models, but these models are vulnerable to low-quality data sets. In terms of challenges, the author considers there are several risks associated with the use of AI, meaning that appropriate internal controls need to be put in place.

Another impact of technology advancements is a change in the skills required from accountants. As robots take over the more routine tasks, she considers that technical expertise, big data analytical skills, communication, leadership and critical thinking skills will become increasingly important in the future. Finally, the emergence of AI technology creates opportunities for new roles and responsibilities, such that *"accounting roles are getting closer to company's management functions"*[14]

In addition to all of the above, Gulin et al. conclude in their article that, as a result of digitalization in the accounting field, accountants will likely shift their work towards advisory or consultancy in the future. They also highlight the need for developing new skills for the future accountants, mainly technical knowledge, analytical skills and tax knowledge, and the need for an overhaul of the accounting curriculum to integrate modern technologies such as Artificial Intelligence, Machine Learning, Big Data Analytics etc.[15]

3. Research methodology

We conducted a quantitative research based on a structured questionnaire consisting in 12 questions with the aim to analyze how accounting professionals perceive the impact of IT on the profession. For this purpose we used several types of questions: multiple choice, free choice, ranking, as well as rating.

Due to the COVID-19 situation and for ease of gathering and processing the responses, the questionnaire was distributed in electronic format (Google Forms). Out of the total number of 70 questionnaires distributed (40 to Master's students and 30 to businesspeople activating in the accounting and financial audit fields) we have received 44 valid responses, which corresponds to a response rate of 63%.

We used Excel to centralize and process the data. For the multiple choice questions we classified the responses based on the most frequent answer given. In the case of the free choice questions we used a binary scoring system (1 if answer selected, 0 if not selected), then summed up and computed the frequency of each variant. For the ranking questions we computed the total per each type of answer and established the overall ranks following the initial logic. Finally, for the rating questions, we calculated the relevant descriptive statistics measures in order to have a clear understanding of the given responses.

[13] Stancheva-Todorova, E. P., *How Artificial Intelligence is Challenging the Accounting Profession.* Journal of Scientific Publications, Volume 12, 2018, p.135

[14] Stancheva-Todorova, E. P., *How Artificial Intelligence is Challenging the Accounting Profession.* Journal of Scientific Publications, Volume 12, 2018, p.139

[15] Gulin, D., Hladika, M. & Valenta, I., *Digitalization and the Challenges for the Accounting Profession.* Proceedings of the ENTRENOVA – ENTerprise REsearch InNOVAtion Conference, 5(1), 2019, pp. 428-437

4. Research results

Table 1 shows the demographic distribution of the respondents. Out of the 44 answers received, 70% came from females and 30% from males. The majority of respondents are aged between 18 and 35. 48% of the respondents have less than 2 years of experience in the accounting field, 16% have between 2 and 5 years and 36% have more than 5 years.

<div align="right">Table 1</div>

Demographic information of the survey participants

Particular	Range	Frequency	Percent (%)	Cumulative percent (%)
Gender	Male	13	30%	30%
	Female	31	70%	100%
	Total	**44**	**100%**	**100%**
Age	18-25	23	52%	52%
	25-35	10	23%	75%
	35+	11	25%	100%
Years of experience	Less than 2	21	48%	48%
	2 to 5	7	16%	64%
	More than 5	16	36%	100%

Source: Authors' data analysis

Figure 1 shows our respondents' perception regarding the impact that automation would have on the accountant's work and accounting records. Based on the answers received, automation is expected to lead to both less errors in the accounting records and less work for the accounting professionals (33 out of 44 responses for each). 15 out of the 44 respondents consider that they would have more responsibilities, whereas 11 consider there would be less. Only 5 respondents think that automation would bring more work for accountants, and 4 expect more errors in accounting.
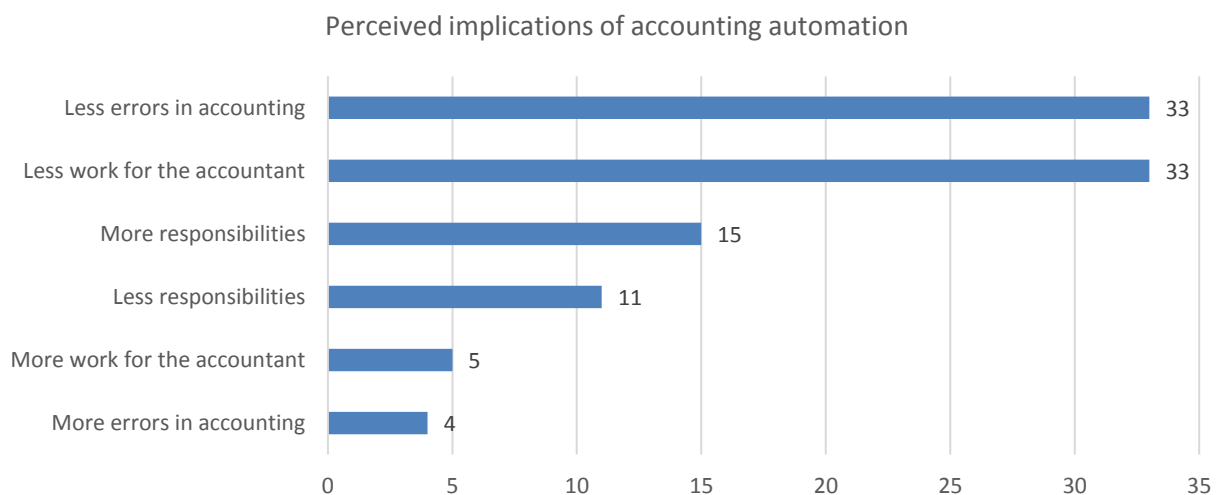
Perceived implications of accounting automation

Figure 1. Frequency analysis of the perceived implications of accounting automation
Source: Authors' data analysis

The results confirm the hypothesis derived from the articles of Zhang et al.[16] and Stancheva-Todorova[17] that automation will improve accuracy of accounting records and relieve the accounting professionals of the more monotonous, time-consuming tasks.

We further asked our respondents to rank four areas of the accountant work from most likely to least likely to be automated. Based on the obtained responses (Table 2), the most likely area to be automated is bookkeeping, followed by financial analysis, decision-making process and lastly budgeting. This fact has been highlighted in previous studies, for example Zhang et al. (2020) expect that the most repetitive and rule-based activities will be assigned to robots in the future.

Table 2

Ranking of accounting aspects from most to least likely to be automated in the future

	Bookkeeping	Financial analysis	Decision-making process	Budgeting
Rank	1	2	3	4

Source: Authors' data analysis

Our respondents were asked to assess the impact that IT would have on their salary level, free time and work responsibilities, from 1-very negative to 5-very positive. The results presented in Table 3 show that the perceived impact is slightly positive in the case of work responsibilities and free time, whereas the impact on salary level is expected to be almost neutral.

Table 3

Descriptive statistics regarding the effect that automation will have on salary, free time and responsibilities

	Salary level	Free time	Responsibilities
Mean	3.05	3.50	3.64
Stdev	1.26	1.17	1.20
Median	3	4	4
Min	1	1	1
Max	5	5	5

Source: Authors' data analysis

Regarding the future of the profession, our respondents consider that a shift in the accountant's daily work will happen in the future. As shown in Figure 2, 28 out of 44 believe that accountants will move towards other fields, for example consultancy or advisory, while 27 out of 44 think that repetitive tasks will not be part of their daily activities anymore. 24 respondents expect accountants' roles to get closer to management and 22 consider that communication within the company will be facilitated.

[16] Zhang, Y. et al., *The Impact of Artificial Intelligence and Blockchain on the Accounting Profession.* IEEE Access*, Volume 8, 2020, pp. 110461-110477
[17] Stancheva-Todorova, E. P., *How Artificial Intelligence is Challenging the Accounting Profession.* Journal of Scientific Publications, Volume 12, 2018, pp. 126-141
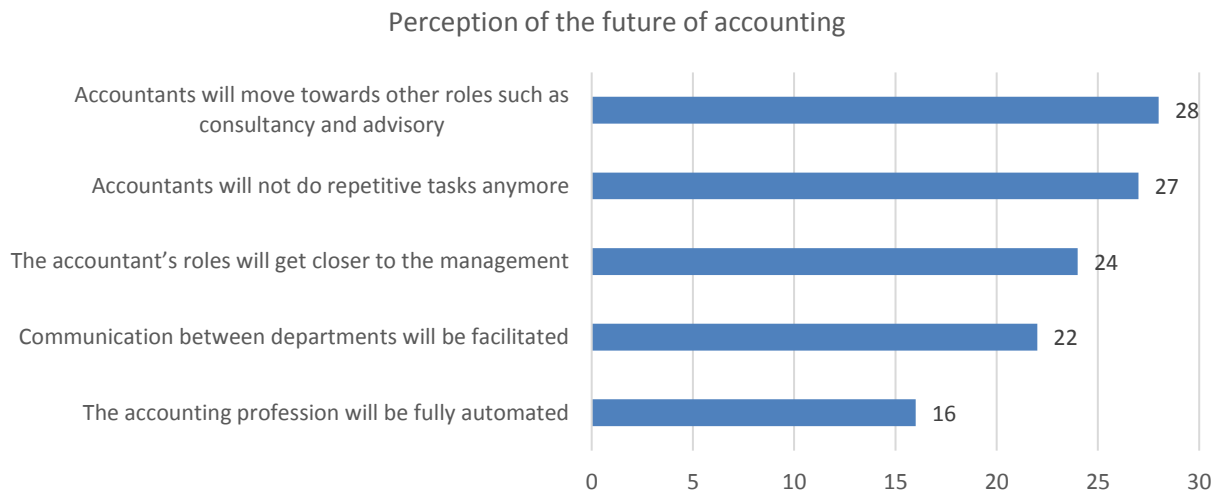
Perception of the future of accounting

Figure 2. Frequency analysis of the respondents' perception regarding the future
of the accounting profession

We were also interested in finding out the level of awareness of technology that our respondents have. For this purpose, they were asked to assess their knowledge of five relevant forms of existing and emerging technologies, from 1-no knowledge to 5-very familiar. The results in Table 4 show that the most familiar are data visualization tools, followed by Analytics applications, AI and Machine Learning, Robotics and lastly ERP systems.

Table 4

Descriptive statistics regarding the respondents' level of awareness of the following technologies

	Enterprise Resource Planning	Analytics applications	Artificial Intelligence and Machine learning	Robotics	Data visualisation tools
Mean	2.91	3.25	3.23	3.16	3.57
Stdev	1.36	1.06	1.27	1.24	1.32
Median	3	3	3	3	4
Min	1	1	1	1	1
Max	5	5	5	5	5

Regarding the challenges that they face in developing their digital skills, we asked our respondents to choose which are the most significant for them. The results shown in Figure 3 reveal that the most noteworthy impediment is the lack of time, followed by the perceived lack of relevant information. This highlights a potential need for both employers and academic programs to offer more technology-related learning and training opportunities, which would enable current and future professionals to master the newest systems and technologies.
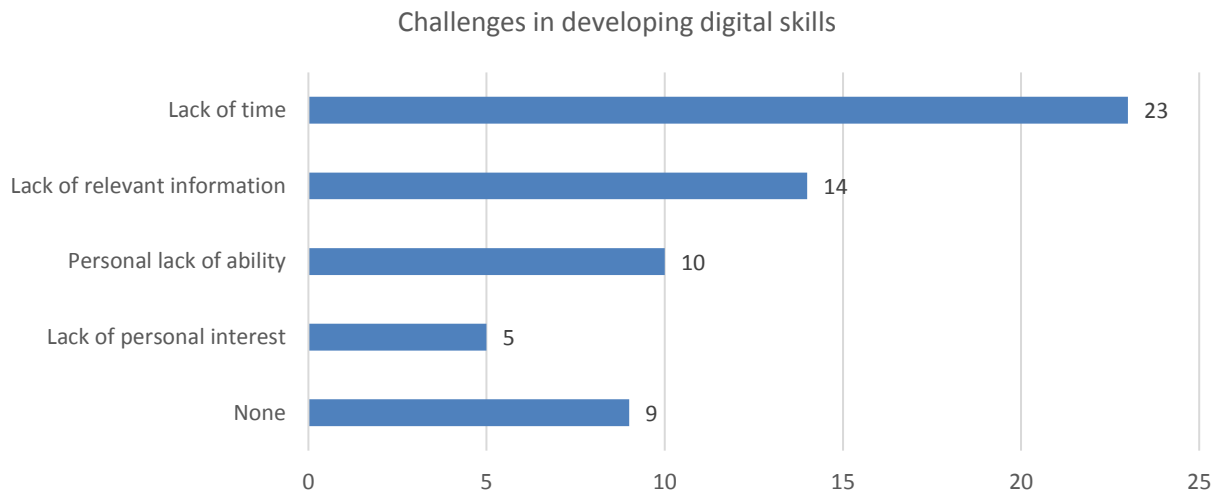
Challenges in developing digital skills

Challenge	Value
Lack of time	23
Lack of relevant information	14
Personal lack of ability	10
Lack of personal interest	5
None	9

Figure 3. Frequency analysis regarding the challenges experienced by respondents in improving their digital skills

Source: Authors' data analysis

In connection with the previous question, we were also interested in the degree to which accounting academic programs are in tune with the technological advancements. Our respondents were asked to assess how well the digital skills needed for accountants of the future are developed in an academic context, from 1-not at all to 5-very high extent.

Table 5

Descriptive statistics regarding the degree to which academic accounting education develops the digital skills needed for accountants in the future

	Level of digital skills development through academia
Mean	3.14
Stdev	1.34
Median	3
Min	1
Max	5

Source: Authors' data analysis

According to the results summarized in Table 5, our respondents consider that digital skills are developed to a medium extent as part of academic programs. The median value is 3, meaning that at least half of the respondents evaluated this aspect from "not at all" to "medium extent". As with the previous question, the results show a need for academic programs to be refreshed in order to help future accountants develop the skills they will need to succeed in an ever more digitalized field.

5. Conclusions

Based on the research results, we can conclude that the accounting field will look at least slightly different in a few years' time. Although a full automation is unlikely in the near future due to the inexistence of fully conscious artificial intelligence technologies, professionals will need to adapt, mastering the trends and learning to work with the emerging technologies that are being implemented in the field (Robotic Process Automation, Machine Learning, Blockchain, Big Data Analytics etc.)

Our study also highlighted the need for more up-to-date IT curriculum within academic programs, which would equip future accountants with the necessary knowledge to be able to keep

on top of the future developments. Among our respondents the biggest impediments to developing digital skills were lack of time and of relevant information, which could imply that a "window of opportunity" for learning about the newest accounting-related technologies during student years is being missed.

The main limitation of our study is represented by the relatively small sample size, which derives from the short time and low resources available for disseminating the questionnaire. A similar study on a larger, more diverse sample would be needed in order to confirm the findings herein.

Bibliography:

1. ACCA, *Technology trends: their impact on the global accountancy profession.* 2018. Available online at: https://www.accaglobal.com/in/en/technical-activities/technical-resources-search/2013/may/technology-trends.html
2. ACCA, *What's the appeal of cloud-based accounting software?.* 2017. Available online at: https://www.accaglobal.com/pk/en/member/member/accounting-business/2017/04/practice/cloud-based.html
3. ACCA, *The digital accountant: Digital skills in a transformed world.* 2019. Available online at: https://www.accaglobal.com/in/en/professional-insights/technology/The_Digital_Accountant.html
4. ACCA & Deloitte, *The rise of Automation in Accounting.* 2018. Available online at: https://www.accaglobal.com/middle-east/en/technical-activities/technical-resources-search/2018/april/the-rise-of-automation-in-accounting.html
5. Ghasemi, Maziyar, Shafeiepour, Vahid, Aslani, Mohammad & Barvayeh, Elham, 2011. *The impact of Information Technology (IT) on modern accounting systems.* Procedia - Social and Behavioral Science, Volume 28, pp. 112-116
6. Gulin, Danimir, Hladika, Mirjana & Valenta, Ivana, 2019. *Digitalization and the Challenges for the Accounting Profession.* Proceedings of the ENTRENOVA - ENTerprise REsearch InNOVAtion Conference, Volume 5(1), pp. 428-437
7. Kokina, Julia & Blanchette, Shay, 2019. *Early evidence of digital labor in accounting: Innovation with Robotic Process Automation.* International Journal of Accounting Information, Volume 35
8. Lim, Francis Pol, 2013. *Impact of Information Technology on Accounting Systems.* Asia-pacific Journal of Multimedia Services Convergent with Art, Humanities, and Sociology, Volume 3(2), pp. 93-106
9. Ng, Kam K.H., Chen, Chun-Hsien, Lee, C.K.M & Jiao, Jianxin (Roger), 2021. *A systematic literature review on intelligent automation: Aligning concepts from theory, practice, and future perspectives.* Advanced Engineering Informatics, Volume 47
10. Stancheva-Todorova, Eleonora P., 2018. *How Artificial Intelligence is Challenging the Accounting Profession.* Journal of Scientific Publications, Volume 12, pp. 126-141
11. Taiwo, J.N. & Agwu, M. Edwin, 2016. *Effect of ICT on Accounting Information System and Organizational Performance.* European Journal of Business and Social Sciences, Volume 5(2), pp. 1-15
12. Zhang, Yingying, Xiong, Feng, Xie, Yi, Fan, Xuan & Gu, Haifeng, 2020. *The Impact of Artificial Intelligence and Blockchain on the Accounting Profession.* IEEE Access, Volume 8, pp. 110461-110477