

ACCOUNTING OPTIMISED SKILL SET AND THE FOURTH INDUSTRIAL REVOLUTION - THE VIEW OF PROFESSIONAL ACCOUNTING BODIES

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Abstract:

The digital transformation of the accounting field is triggering a reconfiguration of the optimized skill set that is required of practitioners worldwide. Emerging technologies have set foot into accounting daily processes, triggering the need that practitioners upskill their digital competences, while also emphasizing the relevance of soft and technical skills. The optimal accounting profile, adapted to the needs of the Fourth Industrial Revolution is being analyzed in the current paper through means of a thematic literature review of the reports of professional accounting bodies. Professional accounting bodies are key change-agents that enable the optimization of financial activities and help organizations improve activities and reach their goals. In this sense, they provide the most updated information in terms of skills and competencies required of accounting practitioners. The results of the literature review present three distinct skill categories. The three groups consist of technical skills, meaning traditional accounting skills, soft skills, meaning cognitive related and behavioral skills, and lastly the study addresses the topic of digital skills which are a direct result of technological innovations in the field. The digital skill group is being validated as an individual group through the recurrence and the interest that literature of accounting bodies has on these skills.

Keywords: Accounting, Skills, Industry 4.0, Professional Bodies, Digital Transformation, Literature Review

JEL classification: M41, M42, J24, O33

1. Introduction

Digital innovations have spread in most facets of human life, with the accounting profession being one of the most affected industries worldwide. The decade to come is expected to replace over 95% of current jobs, with accounting standing on the top of the list (Salam & Hasan, 2020) (Alsabahani et al., 2021). The business landscape is forced into a transformation in light of new technologies that are incorporated by organizations, thus triggering a restructuring of the processes and organizational models (Karcioglu & Binici, 2023).

In response to new demands in the requirements of an increasingly digitalized job market, the profile of accounting practitioners is also shifting into a more digitalized profile (Carvalho & Almeida, 2022), with requirements of IT software (Al-Hattami, 2021; Madakam et al., 2019), database software (Arquero et al., 2022) and new technologies such as AI, RPA or Cloud Computing (Leitner-Hanetseder et al., 2021; Moore & Felo, 2022; Yigitbasioglu et al., 2023). The literature of professional bodies (IFAC, 2019; ACCA, 2020a), as well as the peer reviewed accounting literature (Abbasi et al., 2018; Leitner-Hanetseder et al., 2021; Arquero et al., 2022) state the digital era is upon us and the changes in the accounting competence landscape can no longer be ignored.

These shifts within the industry cause the immersion of a new area in accounting that is yet to be fully understood and embedded by practitioners worldwide. Here, the role of academia is of growing importance, as novelty should be tackled through research and academic support, in any domain.

Consolidating the best competences that formulate the optimized skill set in accounting has been long within the interest of accounting literature (Daff, 2021; Aldamen et al., 2021). The fast transformation and the growing dynamic of the skill profile in accounting is a result of the digital transformation that companies started going through (Leitner-Hanetseder et al., 2021), nonetheless due

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to the fast-changing nature of the digital transformation in today's market, the skill profile needs to be constantly adapted and monitored. The profile of work-ready practitioners is changing and creating a gap between employers' requirements and capabilities of graduates or practitioners (Roy, 2022).

The study uses the reports of professional bodies and tries to map the relevant skills set that the accounting profession requires in the face of increased digitalization and the immersion of new technologies in the daily activities of organizations. The paper will perform an initial review of professional bodies and extract the relevant skills that are found to be of interest. In a second step, the paper will correlate the skills between various reports professional bodies reveal in order to obtain a relevant and complex picture of the optimized accountant profile. The originality of the paper stands in its cross analysis between various professional bodies' views on the competence landscape in accounting.

Professional bodies are key change-agents that enable optimization of financial activities and help organizations to improve activities and reach their goals (CFRR, 2021). They assist in the regulation of accounting work in many nations and function as representatives of accounting participants (Wikipedia). The reports they provide include a wide range of accounting issues, including trends, opportunities, new technologies, impacts and hazards, job futures, and so on. In this sense, the reports of professional bodies should offer deep and objective insights into the changes and challenges of the accounting profession, becoming a great source of knowledge for further improvements in the industry.

The structure of the papers starts with an introduction into the concept and work of accounting professional bodies. The literature review will address the main concerns of the literature surrounding the topic of skills and skill gap. The methodology will be outlaid in the next chapter, followed by the results section where a synthesization of the gathered information will be presented. The last chapter discussed implications, conclusions, and potential uses of the findings.

2. Literature review

The challenges posed by the digital revolution affect accounting students and practitioners worldwide. They are at the forefront in the battle of digital transformation, and they are affected by the immediate changes in the profession. The profession itself is transforming into a fully dynamic field (Melnik et al., 2020). Previously, the profession was thought to exist in a static format (Aldredge et al., 2021) which ensured stability throughout years, nonetheless the rapidity with which digital innovation expands, has forced the profession as well into a constant adaptation (IFAC, 2020).

Accounting literature makes the distinction between the different sets of skills that exist in the reality of the job requirements. In general, it identifies two main group categories. One of the widespread skill groupings validates the existence of the technical and non-technical group of skills. In this sense, it separates between technical skills, such as accounting acumen, business knowledge, industry related topics and even software usage (Hayes et al., 2018; Atanasovski & Trpeska, 2018), and non-technical skills, seen as communication, cognitive abilities, and decision-making competences (Beenen et al., 2018; Arquero et al., 2022; O'Shea et al., 2022). Similarly, the literature presents a different naming convention, thus separating between soft and hard skills (Dolce et al., 2020). The current paper will use these all the above terms interchangeably, to refer to the same two groups of skills.

Research in general placed high emphasis on the importance of soft skills. Studies vary from analysis of soft skill perception in accounting graduates (Arquero et al., 2022) to the lack of generic skills in the accounting curricula (Salam & Hasan, 2020). Literature states that employers are searching for employees with strong soft skills (O'Shea et al., 2022), nonetheless the changing role of the accountant states that it moves away from mundane work towards value adding activities (Andreassen, 2020; Melnik et al., 2020; Bakulina et al., 2020), thus a complex net of soft and digital skills becomes necessary.

In this sense, literature starts to focus its attention on new technologies such as Artificial Intelligence, Data Analytics and Robotic Process Automation (RPA). Accounting practitioners are now

required to possess knowledge of these technologies in their job pursuit (Yigitbasioglu et al., 2023). Some papers fall short of properly addressing the technological needs of organizations, while only treating topics of Excel, Outlook and accounting software (Daff, 2021). Other papers describe technical skills as accounting acumen with Information and Communication Technologies (ICT) knowledge on top (Ebaid, 2021). The scope of technical skills must be enhanced with basic digital skills (Arquero et al., 2022; Dow et al., 2021; Leitner-Hanetseder et al., 2021), as well as advanced IT skills and programming (Al-Hattami, 2021; Madakam et al., 2019; Yigitbasioglu et al., 2023).

There is also research that captures the changes brought by the Fourth Industrial Revolution to the accounting profession through studying the digital requirements of the future accountant. One of the technologies studied is Data Analytics and its infusion in academic curriculum (Dow et al., 2021). The importance of RPA technology in the reality of accounting workplaces is being discussed in literature (Madakam et al., 2019), while the general ability to use IT technologies has been proposed as the most important skills in accounting (Gavrilova, 2020). In conclusion, digital skills become an important tool in the accounting landscape (Hussein, 2017; Arquero et al., 2022).

Various approaches have been found to analyze the changes in accounting field, nonetheless irrespective of the angle, the literature agrees that the accounting profession was strongly shaped by the Fourth Industrial Revolution, thus forcing a gap between the current skills that accounting practitioners possess, and the skills required by the most digitalized organizations in accounting (Abbasi et al., 2018; Leitner-Hanetseder et al., 2021; Arquero et al., 2022). The existence of the skill gap is validated by professional accounting bodies (IFAC, 2019; ACCA, 2020), thus validating similar findings between literature and reports of professional organizations. In this sense, the current study responds to this necessity and brings forth an updated set of skills that the accountants of the digital world will require or should already possess.

3. Methodology

The methodology of the current paper follows the rigors of a thematic literature review. The investigated theme is the optimal skill set of the accounting profession, in the context of the Fourth Industrial Revolution. Firstly, the paper will extract the relevant accounting literature of professional bodies, surrounding the skill set in the accounting profession. For this purpose, the reports of professional bodies have been selected during a workshop between co-authors where the main organizations have been laid down, meaning ACCA, IFAC and CPA. The workshop was held on August 15th, 2023. In this round, four reports of professional bodies have been selected. As the initial four reports have been considered insufficient, a second workshop was organized. During the second workshop, three additional organizations have been added to the list, meaning GAA, ISCA and WEF, based on their ability to generate good input for the topic of skills in accounting. After selecting the six organizational bodies, the focus was set to find reports from these organizations that incorporate as many skills related topics as possible. In this sense, a total of eight reports have been selected for analysis, as seen in **Table 1**. The purpose of the analysis was skill extraction, therefore we selected only the relevant reports that provided lists of skills relevant for the profession. Reports that presented duplicated versions of the same topic have not been selected, moreover focus was placed on extracting the skills set from reports that address a variety of topics, such as repercussions of COVID-19 in the accounting industry, competency frameworks or even sustainability related accounting jobs.

Table 1: List of accounting professional bodies

Name	Long Name	Report title
ACCA, 2020	Association of Chartered Certified Accountants	Competency Framework.
ACCA, 2022	Association of Chartered Certified Accountants	Developing the skills of sustainable business and finance professionals
CPA, 2022	Chartered Professional Accountants	Mindset and enabling skills of professional accountants – a competence paradigm shift. Chartered Professional Accountants Canada, 4
GAA, 2020	Global Accounting Alliance	Global Accounting Alliance Competency Framework
ISCA, 2022	Institute of Singapore Chartered Accountants	Sustainability—Jobs and Skills for the Accountancy Profession. Institute of Singapore Chartered Accounts
IFAC, 2020	International Federation of Accountants	Accountancy skills evolution: Impact of COVID-19 & The path forward. International Federation of Accountants
WEF, 2020	World Economic Forum	The Future Of Jobs Report. World Economic Forum
WEF, 2018	World Economic Forum	The Future Of Jobs Report. World Economic Forum

In conclusion, the review of professional bodies reports was done on the eight documents seen in **Table 1**. Further documents have not been included as they presented duplicate versions of the skills mentioned in the selected reports or they were focusing on different accounting topics.

In a second step, the reports have been extracted and thoroughly analyzed. As a result of the deep analysis, a total of 22 skills have been extracted. The 22 skills that resulted from the literature analysis will be further analyzed in comparison with the various reports of professional bodies in accounting.

In the last step, the cross analysis of the complete skill profile that was drawn from the examination of the selected professional bodies, will be further analyzed against two different similar frameworks. In this way, the study will validate the grouping of skills as they have been extracted from the eight reports. The results of this analysis will be further discussed in the results section.

4. Opinion of professional bodies on accounting skill set

The research firstly investigates the skills that appear within the literature of professional accounting bodies and places the skills into three distinct categories. The creation of the three skill categories follows the interest of the paper in obtaining a complete scheme of competences required in the digitalized accounting workplace. In general, the accounting literature of professional bodies groups the skills into two categories, namely technical and non-technical skills. Since the scope of the paper is to understand the impact of the Fourth Industrial Revolution on the accounting profession and respective skill set, we have created an additional category of skills, named digital skills. **Table 2** shows the 22 skills that have been selected for further analysis and the three groups they belong to.

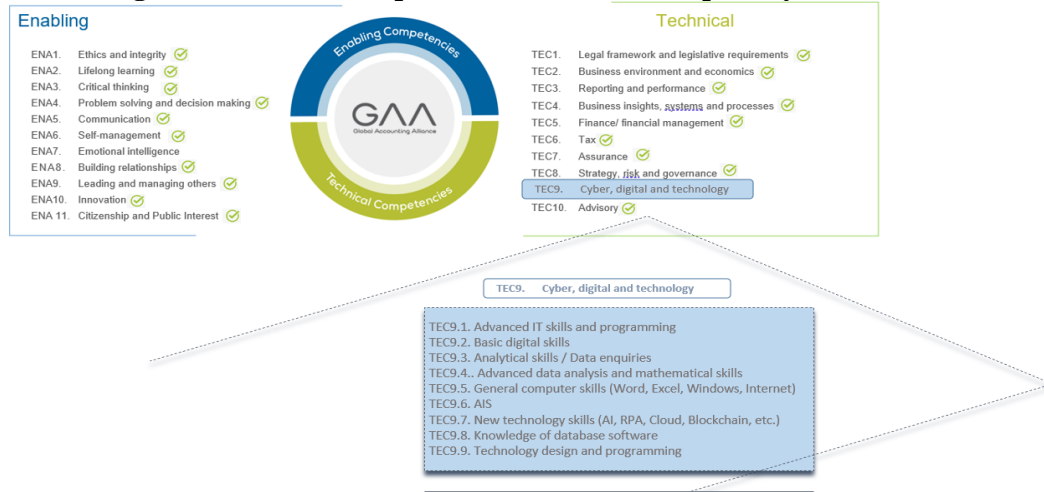
Table 2: Skills found in professional accounting bodies.

Technical skills	Digital skills	Soft skills
Financial Accounting	Advanced IT skills and programming	Complex information processing and interpretation
Management Accounting	Basic digital skills	Decision making and problem solving
Auditing	Analytical skills / Data enquiries	Communication skills
Taxation	Advanced data analysis and mathematical skills	Leadership skills
Corporate Governance, Risk Assessment, and Internal Control	General computer skills (Word, Excel, Windows, Internet)	Initiative, innovation and change mindset
Industry knowledge	AIS	Ethics and public interest
Process improvement & Performance management	New technology skills (AI, RPA, Cloud, Blockchain, etc.)	
	Knowledge of database software	
	Technology design and programming	

In order to validate the correctness of the skills extracted and the categories defined, the study links the obtained skills against a chosen accounting organization report. The scope is to obtain a uniform view of the skills obtained from the literature analysis therefore a standardized format needed to be integrated to obtain a robust and uniform group of skills. For this purpose, the layout of the GAA

Competency Framework was considered the most appropriate. The visual portrayal of the GAA Competence Framework is visible in *Figure 1*. The framework provides a good basis that helps with the segregation of the skills.

Figure 1: Author`s adaptation of the GAA Competency Framework



The study investigates the accounting competences in the midst of the Industrial Revolution. As such, the paper has extended the pre-defined format of the GAA framework with an emphasis on the cyber, digital and technology related skills. Those skills have been presented in detail and a new category of skills has been formed to reveal the new requirements of the accountant in the digital era. Within the newly created group of skills, named digital skills, we include skills ranging from basic digital skills to advanced IT and programming.

In a second step, the research tries to validate the creation of a new group of skills (digital skills) throughout the reports of accounting organizations in scope of the paper. The analysis of skill set in accounting bodies reports maps the accounting skills against the content of the eight reports of professional organizations. All skills that were initially selected, have been found within the content of the reports analyzed, as such it can be said that the selection of the skill set is validated throughout accounting professional organizations, as illustrated in *Table 3*.

Table 3: List of skills by accounting professional bodies.

		ACCA, 2020	ACCA, 2022	CPA, 2022	GAA, 2020	ISCA, 2022	IFAC, 2020	WEF, 2018	WEF, 2020
Technical skills	Financial Accounting	x	x	x	x	x			
	Management Accounting		x	x	x	x			
	Auditing		x	x	x	x			
	Taxation		x	x	x	x			
	Corporate Governance, Risk Assessment, and Internal Control		x	x	x	x			
	Industry knowledge		x	x	x	x			
	Process improvement & Performance management		x	x	x	x	x		
Digital skills	Advanced IT skills and programming	x	x	x	x				
	Basic digital skills	x	x	x					
	Analytical skills / Data enquiries	x	x	x	x	x		x	
	Advanced data analysis and mathematical skills	x	x	x	x			x	
	General computer skills (Word, Excel, Windows, Internet)	x	x	x					
	AIS	x			x	x			
	New technology skills (AI, RPA, Cloud, Blockchain, etc.)	x	x	x				x	x
	Knowledge of database software		x						
Technology design and programming			x	x			x		
Soft skills	Complex information processing and interpretation		x	x	x	x	x		
	Decision making and problem solving		x	x	x	x			
	Communication skills		x	x	x	x	x		
	Leadership skills		x	x	x	x			
	Initiative, innovation and change mindset	x	x	x	x	x			
	Ethics and public interest	x	x	x	x	x			

The analysis further tries to compare the selection of skills against an additional framework of skills. As such, the skill set extracted from the literature of professional bodies has been matched against two reputable professional bodies, namely the IES accounting standard (IAESB, 2014) and the GAA Competency Framework (GAA, 2020). **Table 4** presents the findings in line with the previous findings, with the mention that the group of digital skills have been expanded from IES2_8 in the case of IES standard and from TEC9 in the case of GAA Framework. The purpose of the double analysis against two of the existing frameworks is to ensure the accounting profile is fully optimized and validated in terms of skill grouping.

IES guidance exists to serve the interest of the public. This is ensured through summarizing and structuring requirements that help practitioners secure jobs in the accounting profession. Selection of educational sources, as well as educational trends are delivered to ensure the proper functioning of the profession (IAESB, 2014). Informing the IFAC members about report deliverables such as competences in accounting and educational programs are helping them into taking efficient and successful career decisions. The reports on relevant competences in accounting can serve as a strong basis for accountants worldwide, and thus the comparison of the selected skill set is being validated through the framework of the IES2 standard.

Table 4: Skill comparison across professional organizations in accounting

Technical skills	GAA skill correspondence	IES2 skill correspondence
Financial Accounting	TEC5. Finance/ financial management	IES2_1 Financial accounting and reporting IES2_3 Finance and financial management IES2_10 Economics
Management Accounting	TEC10. Advisory	IES2_2 Management accounting
Auditing	TEC7. Assurance	IES2_5 Audit and assurance
Taxation	TEC6. Tax TEC1. Legal framework and legislative requirements	IES2_4 Taxation
Corporate Governance, Risk Assessment, and Internal Control	TEC8. Strategy, risk and governance	IES2_6 Governance, risk management and internal control
Industry knowledge	TEC2. Business environment and economics	IES2_7 Business laws and regulations IES2_9 Business and organisational environment
Process improvement & Performance management	TEC4. Business insights, systems and processes TEC3. Reporting and performance	IES2_11 Business strategy and management
Digital skills	GAA skill correspondence	IES2 skill correspondence
Advanced IT skills and programming	TEC9. Cyber, digital and technology	IES2_8 Information technology
Basic digital skills	TEC9. Cyber, digital and technology	IES2_8 Information technology
Analytical skills / Data enquiries	TEC9. Cyber, digital and technology	IES2_8 Information technology
Advanced data analysis and mathematical skills	TEC9. Cyber, digital and technology	IES2_8 Information technology
General computer skills (Word, Excel, Windows, Internet)	TEC9. Cyber, digital and technology	IES2_8 Information technology
AI	TEC9. Cyber, digital and technology	IES2_8 Information technology
New technology skills (AI, RPA, Cloud, Blockchain, etc.)	TEC9. Cyber, digital and technology	IES2_8 Information technology
Knowledge of database software	TEC9. Cyber, digital and technology	IES2_8 Information technology
Technology design and programming	TEC9. Cyber, digital and technology	IES2_8 Information technology
Soft skills	GAA skill correspondence	IES2 skill correspondence
Complex information processing and interpretation	ENA3. Critical thinking ENA7. Emotional intelligence	IES3_1 Intellectual competence
Decision making and problem solving	ENA4. Problem solving and decision making ENA6. Self-management	IES3_3 Personal competence IES3_4 Organisational competence
Communication skills	ENA5. Communication	IES3_2 Interpersonal and communication competence
Leadership skills	ENA8. Building relationships ENA9. Leading and managing others	IES3_3 Personal competence
Initiative, innovation and change mindset	ENA2. Lifelong learning ENA10. Innovation	IES3_4 Organisational competence
Ethics and public interest	ENA1. Ethics and integrity ENA11. Citizenship and Public Interest	IES4_1 Professional scepticism and professional judgment IES4_2 Ethical principles IES4_3 Commitment to the public interest

The reports of professional bodies tackle various topics in the accounting area. Interests range from accounting education and changes towards a mindset of continuous learning (ACCA, 2022), to deep reviews on how COVID-19 affected the accounting community (IFAC, 2020), or even discussing sustainability trends in accounting (ISCA, 2022). In its pursuit of understanding the risks of job loss,

the literature reveals similar concerns during a previous industrial revolution. In the 19th century, when automation concerns started to appear within industries, major concerns were raised on the replacement of human work (ACCA, 2018). Employment has risen considerably as a result of intense automation (OECD, 2022) thus serving as an example that job transformation is a likely scenario. Job transformation tackles topics of human-machine collaboration (CPA, 2022), rather than human replacement.

On the other side, the literature of professional bodies can serve a mediating role in situations where the literature presents heterogenous views of various topics. One example is the border between skills in accounting. The treatment of one skill could be allocated either in the technical or non-technical group of skills, in different accounting professional articles. Arquero et al., 2022 sees that information technology (IT) skills are included in the non-technical skill group, while Dolce et al., 2020 includes it in the hard skills group. The professional bodies tend to agree that IT skills belong to the technical set of skills (IFAC, 2019; ACCA, 2022), thus serving as a base for further studies to cross check their allocations and data segregation.

In general, professional bodies identify the most relevant and impactful topics that influence the accounting profession. Amongst these, they tackled the impact of digital progress (ACCA, 2020a), learning trends (ACCA, 2022) or skill gap (IFAC, 2020, ACCA, 2022). The topic of skills is strongly addressed, with one report stating that the digital revolution generates new skills which are vital for basic accounting activities (ACCA, 2020a) and that leveling the skills is no longer a recommendation (IFAC, 2020).

The *digital skill set* is treated within the reports of professional bodies from various angles. One report analyzes the status quo on the skills required in accounting, and finds that digital fluency, digital technology and programming/coding are already embedded in requirements for assurance and finance management (ISCA, 2022). Other papers analyze the creation of new jobs that will support the interaction and interconnectivity between the digital and the human capabilities. As such, the future of jobs is being discussed and the formation of new jobs is being laid out. The future accountant will have the possibility to become a digital transformation specialist (CPA, 2022), a FinTech Engineer (WEF, 2020) or simply put, practitioners that can work in strong collaboration with technology, who can leverage data and risks (IFAC, 2020).

The fast-paced professional environment triggers required adaptation in terms of professional skill set and stakeholders seem to place high value on *soft skill set* like communication, critical thinking, and collaboration capabilities (CPA 2022). The focus on soft skills is seen also as a result of the increased digitalization as it forces practitioners to upskill their cognitive abilities in order to process and adapt to new technologies (ACCA, 2020). In times of digital progress, literature states that accountants should also place high value on competences that favor humans over machines, such as soft skills (CPA, 2022).

The literature of accounting does not oversee the topic of *technical skill set*, yet it considers that having a technical background is the base upon which the true value of a practitioner can be built and that the search of the optimal accountant profile starts from this knowledge base (ACCA, 2020). The importance of competences in financial accounting, management accounting, audit and tax is discussed in many reports (IAESB, 2014; ACCA, 2020b; CA, 2020) and remains the foundation of any endeavor in accounting job profile definition.

The Fourth Industrial Revolution forced the accounting community to change the status quo and proceed into adaptive behavior. The implementation of new technologies in the field of accounting has changed the face of the industry, forcing all actors involved to reconfigure their positions within the landscape. The accountant profile and competencies required from a work ready employee has been altered. One report mentions that 40% of the competences in the accounting field will face a complete modification in a 5-year timeframe (ACCA, 2022). A second discussion revolves around the availability of jobs in accounting, stating that there will be an 85% modification in the total volume by 2030 (Dehaze, 2021). The Fourth Industrial Revolution is expected to decrease the volume of current accounting jobs by 85 mil. while estimating the generation of 97 mil. new jobs (WEF, 2020).

Predictions of job displacement estimate that the creation of new jobs will enable the accounting profession to thrive, nonetheless the immediate effect of the changes in jobs are widening the skill gap of current professionals, topic of concern and investigation within the professional bodies in accounting (ACCA, 2018; ACCA, 2020; IFAC, 2022). The current paper addresses the maintenance of the optimized accounting skill set during the digital transformation of accounting organizations and provides a structured summarization of the most relevant and required competences to be included.

5. Discussions

Following a period of torment and economic reconfiguration, the global landscape was faced with various challenges. On one side technological advancements and concerns of job displacements started to spread within markets, while the increased digitalization in the light of COVID-19 accelerated this trend and disrupted labor markets. Millions of people have lost their jobs or are at risk of losing their jobs in the face of further automations and the structural dynamism of the economic landscape (WEF, 2020).

Disruptive technologies have had a substantial impact on the job of accountants, auditors, as well as practitioners in finance related fields and consulting. The effects spread in several areas, but mostly they pose challenges in continuously monitoring and updating the competence landscape changes triggered by technology use. The accelerated pace of technology adoption is seen in the case of Cloud Computing, Robotic Process Automation (RPA), cyber security tools and remote working accessories, mostly appearing for the purpose of mitigating business issues related to the COVID-19 pandemic (IESBA, 2023).

The current study made a deep dive into the topic of accounting skills required by the profession in the midst of digitalization and the Fourth Industrial Revolution. Three distinct categories of skills have been reflected for the purpose of better understanding the requirements of the market. The three groups consisted of technical skills, meaning traditional accounting skills, soft skills, meaning cognitive related and behavioral skills, and lastly the study addressed the topic of digital skills which are a direct result of technological innovations in the field.

The objective of the current research was focused on delivering the most up to date set of skills relevant for the accounting profession during the digital transformation of the profession. The skills extracted from literature were validated against the framework of professional bodies (IAESB, 2014; GAA, 2020), while the creation of a distinct group of skills named digital, was validated through literature findings and reports of professional bodies, which largely discuss the existence of these new skills (ACCA, 2020, CPA, 2022). The creation of the new skill group has been validated through the analysis of literature, which discusses the existence of cyber and digital skills (Leitner-Hanetseder et al., 2021; Kwarteng & Mensah, 2022; Moore & Felo, 2022).

The abundance of technological innovations that characterizes the present times can be used to enable human potential. Accounting practitioners should use their ability to upskill themselves, to emerge in creating safety nets that protect them from possible destitutions, to generate a roadmap for accountants worldwide to thrive in the future of the industry (WEF, 2020).

6. Conclusions

The research of accounting competences has various implications in practice as a result of an increased digitalization of organizations, which in turn triggered a reconfiguration of the accountant profile. The optimal accounting profile has suffered great changes in the light of the Fourth Industrial Revolution, thus urging academic support in properly identifying and understanding the requirements of the industry.

The current paper assists the accounting community through an in-depth analysis of the skill set that accountants should have in order to secure employment in the field. The study focused on those competences that arose due to the increased digitalization of companies, thus separating three distinct groups of skills. The technical skill set consists of traditional accounting knowledge such as financial accounting, audit, or tax. Secondly, the paper treats the topic of soft skills which has long been studied

by accounting literature and is also seen to be a result of increased digitalization (ACCA, 2020). Lastly, the newly formed set of digital skills has been analyzed separately. The validation of the third group of skills comes from the fact that they have been deeply tackled in all of the reports of accounting skills.

The originality of the paper comes from the double angle from which the skill profile is being projected. The research firstly identifies the relevant skills through a literature search of articles in accounting. In a second step, these skills are cross checked against the literature of accounting bodies. In this way, double validation of the skill groups and their relevancy is ensured.

Further research can perform a targeted cross analysis between the jobs of the future and the required competence mix that practitioners should have in order to successfully manage the requirements of the position. Moreover, accounting literature should focus its attention on upskilling techniques and sources for improving accountants' knowledge base. The continuous learning and adaptation of accounting professionals should be supported through research on learning sources, courses and possibilities for easy and effective access to information.

References

- Abbasi, F. K., Ali, A., & Bibi, N. (2018). *Analysis of skill gap for business graduates: Managerial perspective from banking industry*. Education+ Training, 60(4), p. 354–367
- ACCA. (2020a). *The digital accountant: Digital skills in a transformed world*. Association of Chartered Certified Accountants
- ACCA. (2020b). *Competency Framework*
https://www.accaglobal.com/content/dam/ACCA_Global/qual/competencyframework/ACCA-competency-framework-how-and-when-to-use-2020.pdf
- Association of Chartered Certified Accountants (ACCA). (2022). *Developing the skills of sustainable business and finance professionals*, available at:
<https://www.accaglobal.com/gb/en/professional-insights/pro-accountants-the-future/developing-skills-sustainable-business-finance-professional.html>
- Aldamen, H., Alkhateeb, H., Kercher, K., Duncan, K., & Hollindale, J. (2021). *Core competencies for the global workplace: A cross-cultural and skill-based simulation project in accounting*. Accounting Education, 30(4), p. 385–412
- Aldredge, M., Rogers, C., & Smith, J. (2021). *The strategic transformation of accounting into a learned profession*. Industry and Higher Education, 35(2), p. 83–88
- Al-Hattami, H. M. (2021). *University accounting curriculum, it, and job market demands: Evidence from Yemen*. Sage Open, 11(2), p. 21582440211007110
- Alsabahi, M. A., Bahador, K. M. K., & Saat, R. M. (2021). *Skills Development Factors of Information Technology Competency Among External Auditors*. International Journal of Information Systems in the Service Sector (IJISSS), 13(2), 13–28.
- Andreassen, R.I. (2020). *Digital technology and changing roles: a management accountant's dream or nightmare?* Journal of Management Control, 31(3), p. 209–238
- Arquero, J. L., Fernandez-Polvillo, C., & Hassall, T. (2022). *Non-technical skills and students' overconfidence in accounting*. Education+ Training, ahead-of-print.
- Atanasovski, A., & Trpeska, M. (2018). *Accounting students' and employers' perceptions on employability skills in the SEE country*. European Financial and Accounting Journal
- Bakulina, G., Kalinina, G., Luchkova, I., Pikushina, M. & Gracheva, A. (2020). *Transformation of the accountancy profession during digitalization of agriculture*. s.l., EDP Sciences
- Beenen, G., Pichler, S., & Davoudpour, S. (2018). *Interpersonal skills in MBA admissions: How are they conceptualized and assessed?* Journal of Management Education, 42(1), p. 34–54
- Chartered Accountants. (CA). (2020). *Capabilities for Accounting - A Model for the Future*.
<https://www.charteredaccountantsanz.com/learning-and-events/learning/capability-model>
- Carvalho, C., & Almeida, A. C. (2022). *The adequacy of accounting education in the development of transversal skills needed to meet market demands*. Sustainability, 14(10), 5755.

- Centre for Financial Report Reform (CFRR). (2021). *The accounting profession and Professional Bodies*, <https://cfrr.worldbank.org/node/251>
- CPA. (2022). *Mindset and enabling skills of professional accountants – a competence paradigm shift*. Chartered Professional Accountants Canada, 4
- Daff, L. (2021). *Employers' perspectives of accounting graduates and their world of work: Software use and ICT competencies*. Accounting Education, 30(5), p. 495–524.
- Dehaze, A. (2021). *Most Jobs We Will Do in 2030 Have Not Been Invented Yet. Here's How Your Business and Workers Can Prepare for the Reskilling Revolution*. <https://www.adecogroup.com/future-of-work/latest-insights/most-jobs-we-will-do-in-2030-have-not-been-invented-yet>
- Dolce, V., Emanuel, F., Cisi, M., & Ghislieri, C. (2020). *The soft skills of accounting graduates: Perceptions versus expectations*. Accounting Education, 29(1), 57–76.
- Dow, K. E., Jacknis, N., & Watson, M. W. (2021). *A framework and resources to create a data analytics-infused accounting curriculum*. Issues in Accounting Education, 36(4), p. 183–205
- Ebaid, I. E.-S. (2021). *Employers' perception of generic employability skills of accounting graduates: Evidence from Saudi Arabia*. Journal of Management and Business Education, 4(2), p. 136–149
- Global Accounting Alliance (GAA). (2020). *Global Accounting Alliance Competency Framework*. GAA Education Directors. <https://globalaccountingalliance.com/working-groups/>
- Gavrilova, V. (2020). *Contemporary Innovation Challenges—Future of Adoption Artificial Intelligence: Case of Estonia*. European Integration Studies, 14, p. 217–225
- Hayes, S., Freudenberg, B., & Delaney, D. (2018). *Role of tax knowledge and skills: What are the graduate skills required by small to medium accounting firms*. Journal of the Australasian Tax Teachers Association, 13(1), p. 152–186
- Hussein, A. (2017). *Importance of generic skills in accounting education: Evidence from Egypt*. International Journal of Accounting and Financial Reporting, 7(2), p. 16–35
- Chartered Accountants (CA). (2020). *Capabilities for Accounting - A model for the future*
- IESBA, 2023 Technology Landscape: *Other Technologies and Technology-related Areas* <https://www.ethicsboard.org/consultations-projects/technology-0>
- International Federation of Accountants (IFAC). (2019). *An illustrative competency framework for accounting technicians*. International Federation of Accountants. <https://www.ifac.org/knowledge-gateway/developing-accountancy-profession/publications/illustrative-competency-framework-accounting-technicians>
- International Federation of Accountants (IFAC). (2020). *Accountancy skills evolution: Impact of COVID-19 & The path forward*. International Federation of Accountants. <https://www.ifac.org/knowledge-gateway/preparing-future-ready-professionals/discussion/accountancy-skills-evolution-impact-covid-19-path-forward>
- International Federation of Accountants (IFAC). (2022). *Mindset and enabling skills of professional accountants: Paper 4*. available at: <https://www.ifac.org/knowledge-gateway/building-trust-ethics/publications/mindset-and-enabling-skills-professional-accountants-paper-4>
- ISCA. (2022). *Sustainability—Jobs and Skills for the Accountancy Profession*. Institute of Singapore Chartered Accounts. <https://isca.org.sg/resource-library/sustainability/sustainability-jobs-and-skills>
- Karcioğlu, R., & Binici, F. (2023). *Developing a maturity model to identify digital skills and abilities of accounting professionals: Evidence from Turkey*. access-access to science business innovation in the digital economy, 4(2).
- Kwarteng, J. T., & Mensah, E. K. (2022). *Employability of accounting graduates: Analysis of skills sets*. Heliyon, 8(7), e09937.

- Leitner-Hanetseder, S., Lehner, O. M., Eisl, C., & Forstenlechner, C. (2021). *A profession in transition: Actors, tasks and roles in AI-based accounting*. Journal of Applied Accounting Research. ISSN: 0967-5426
- Madakam, S., Holmukhe, R. M., & Jaiswal, D. K. (2019). *The future digital work force: Robotic process automation (RPA)*. JISTEM-Journal of Information Systems and Technology Management, 16.
- Melnyk, N., Kolesnikova, O., Demchuk, O. & Golub, N. (2020). *Accounting trends in the modern world*. Independent Journal of Management and Production (IJM&P), 11(9).
- Moore, W. B., & Felo, A. (2022). *The evolution of accounting technology education: Analytics to STEM*. Journal of Education for Business, 97(2), p. 105–111.
- O’Shea, M. A., Bowyer, D., & Ghalayini, G. (2022). *Future Proofing Tomorrow’s Accounting Graduates: Skills, Knowledge and Employability*. Australasian Accounting, Business and Finance Journal, 16(3), p. 55–72.
- Organisation for economic co-operation and development (OECD). (2022). *ALFS Summary tables* (Organisation for economic co-operation and development) https://stats.oecd.org/viewhtml.aspx?datasetcode=ALFS_SUMTAB&lang=en#
- Roy, S. (2022). *Graduate readiness for a professional career in accounting—an investigation of employers’ perspectives in Fiji*. Pacific Accounting Review. ISSN: 0114-0582. ahead-of-print.
- Salam, M. A., & Hasan, K. (2020). *Generic Skills Gap in Curricula: Are Thai Accounting Graduates Ready for the Contemporary Workplace?* St. Theresa Journal of Humanities and Social Sciences, 6(2), 80–96.
- World Economic Forum (WEF). (2018). *The Future Of Jobs Report*. World Economic Forum. <https://www.weforum.org/reports/the-future-of-jobs-report-2018/>
- World Economic Forum (WEF). (2020). *The Future Of Jobs Report*. World Economic Forum. <https://www.weforum.org/reports/the-future-of-jobs-report-2020/>
- Wikipedia, https://en.wikipedia.org/wiki/Professional_accounting_body
- Yigitbasioglu, O., Green, P., & Cheung, M.-Y. D. (2023). *Digital transformation and accountants as advisors*. Accounting, Auditing & Accountability Journal, 36(1), 209–237.