DIGITAL COMPETENCES OF ACCOUNTANTS WITHIN THE CONTEXT OF THE FOURTH INDUSTRIAL REVOLUTION

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Abstract: *The aim of this research is to identify the major digital competences that are required for accounting professionals. The focus of the research is on three positions in the National Classification of Professions and Positions (NCPP – 2011) – those of a chief accountant, an operational accountant and a bookkeeper. The objective of the research is to make a comparative analysis of the different classes in the NCPP-2011 and the major digital competences required for them according to the main duties of the people appointed to those positions. Our research approach is based on the methods of logical reasoning, deduction and comparison, as well as analysis and synthesis of the legal requirements which have been adopted at a national and an international level in terms of the competences and professional duties for each position. In addition, an analysis has been made of proposed classifications and identified competences in related economic literature. The propositions and conclusions we give will contribute to raising the awareness of employees, employers and educational institutions about the digital competences and knowledge required from persons practising the profession. The research has been funded by the MES Program 'Young Scientists and Postdoctoral Students' through a grant made to the Faculty of Economics and Business Administration at Sofia University. The author would like to acknowledge the support which has been provided through the program.*

Key words: *accounting, digital competences, tasks, chief accountant, operational accountant, bookkeeper.*

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Introduction

Technological progress, the adoption of innovations in virtually every human activity, the digitalisation of the economy and the use of virtual currencies require that both the personal and professional behavior of people be 'evolutionised'. Government bodies and institutions are increasingly aware of the need to have various digital solutions designed in order to optimise business. There was a positive trend in the use of Internet by enterprises for communication with public institutions in the period from 2010 to 2015. Nearly 80% of enterprises use the Internet to download and submit various forms, profit tax declaration forms, statistical reports, etc. (NSI, 2018). All those activities are part of accountants' responsibilities.

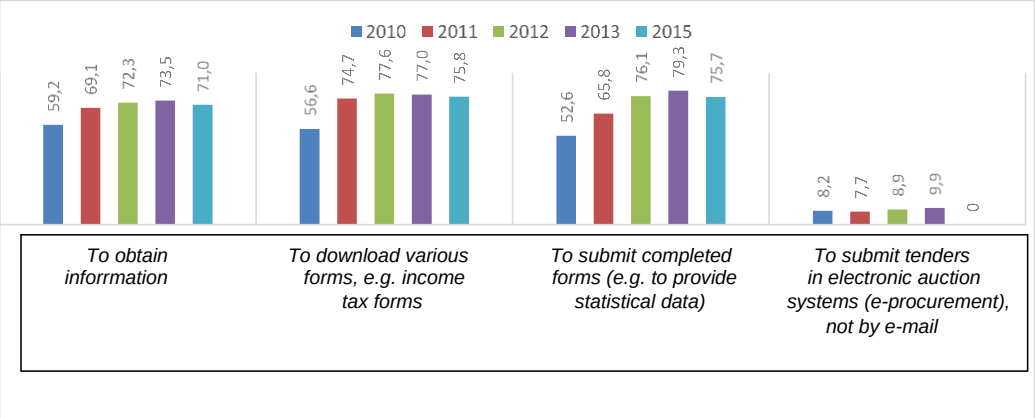

Figure 1. Enterprises in Bulgaria that use the Internet to interact with public authorities, 2010 – 2015 [1], as a %
Source: NSI, 2018, accessible in English at: *https://www.nsi.bg/en/content/6149/enterprises-using-internet-interacting-public-authorities, last access on 22.04.2019*

Accounting professionals have a number of functions and duties. Since accountants need to fulfil a variety of multiple tasks, they need to possess and develop various skills and competences that are related to their profession. We agree with specialists in the field who identify a major difference between the concepts of 'knowledge', 'skills' and 'competences'(Stone, D. N, V. Arunachalam, J. & S. Chandler, 1996; Deppe, L., A. Sonderegger, E. O. Stice, J. D. Klark, D. C. & G. F.Streuling, 1991; Ahmed, A. , 2003). The definitions of those concepts in related literature have been subject to numerous debates and there seem to be no universally accepted ones. Without claiming to be exhaustive in our analysis, we use the following working definitions in this research:

[1] There is no official data available from the NSI about the year 2014.

- ‘Knowledge’ is the outcome of the assimilation of information through learning (European Qualifications Framework, 2009). The specifics of practising the profession of an accountant in the Republic of Bulgaria give us grounds to claim that it largely relates to the fulfilment of legislative and administrative procedures. Those procedures include filling and submitting various documents, reports and references whose forms and items are strictly defined and are subject to frequent amendments by competent bodies and institutions. We therefore tend to disagree with Tudor, Gheorghe, Oancea and Sova (2013) who claim that, in accounting, it is irrelevant to distinguish knowledge from experience. Rather, we share the idea put forward by Ahmed (2003) that it is possible to identify two major categories of knowledge, i.e. ‘know-how’ and ‘know-that’. The ‘know-how’ category refers to how experienced and skillful accountants are in using their knowledge so as to produce certain results, whereas the category of knowledge identified as ‘know-that’ refers to the knowledge acquired through learning, or in other words, conventional knowledge.
- ‘Skills’ should be interpreted as what a person knows, understands and can do (European Commission, 2016).
- ‘Competences’ refer to the complex of knowledge and skills which a person uses to efficiently manage their available resources in order to perform their professional tasks. In order to distinguish competences from competency, we need to specify that ‘competency’ means the proven ability to use knowledge, skills, and personal, social and/or methodological abilities, in wok or study situations and in professional and personal development (European Qualifications Framework, 2009).

Based on these definitions, in our opinion, the terms ‘competences’ and ‘competency’ refer to the entire set of knowledge and skills which accountants need in order to fulfill their professional obligations. Therefore, they are subject of further analysis in this research, although its scope is far from being exhaustive.

One of the effects of the economic growth based on development of information systems and technologies and the introduction of digital currencies (such as bitcoins) is that some new professions have appeared on the labour market, while others have become obsolete. The increasing automation of the process of entering, systematizing, processing, analysing and presenting accounting information is perceived as a prerequisite for major changes in the nature of the accounting profession, and even for its disappearance in future. Hence, accountants need to be equipped with specific digital competences that are required for practicing their profession today. The accounting profession is one of those where the impact of adopting and developing information and communication technologies (ICT) and systems is most powerful. Identifying precisely the digital competences which accountants need to possess is essential both for accountants and the enterprises they work for, and the colleges and universities which are engaged in training future accounting professionals. Those

digital competences must meet not only the requirements of the profession, but also those of the specific position occupied by an accounting professional. Failure to distinguish between them might result in imposing irrelevant requirements in terms of the skills and knowledge a person needs to possess in order to be appointed to a particular position.

The *objective* of this research is to identify the basic digital competences which accountants need to develop in order to practice the profession. The three positions we have selected from those listed in the National Classification of Professions and Positions (NCPP – 2011) are those of a chief accountant, an operational accountant, and a bookkeeper[2]. The aim is to make a comparative analysis of the different classes identified in the NCPP-2011 and the major digital competences required for the different activities performed by persons at those positions. In order to accomplish the objective of the research, we set the following research *tasks*:

- To identify the main duties of chief accountants, operational accountants and bookkeepers;
- To determine the basic digital competences which accounting professionals need to acquire based on their specific professional commitments;
- To research job advertisements for the positions of a chief accountant, an operational accountant and a bookkeeper and summarise the major requirements to the digital competences of applicants.

The main *object* of this research is the digital competences required for accounting professionals. The *subject* of our analysis is applicable national and international regulations in terms of required competences and the professional obligations of specialists appointed at these positions. The *research methods* we employ are based on logics, deduction and comparison, as well as analysis and synthesis of relevant legislative texts and documents. In addition, a comparative analysis has been made of different classifications and types of competences in existing specialised literature.

1. Theoretical Review

Identifying the basic digital competences and skills of accountants has been the subject of analysis for many international organisations and experts in the field. It is primarily based on determining the major roles of an accountant within an information system. Specialists agree on the four major roles of accountants in terms of information technologies as defined by the International Federation of Accountants (Damasiotis, V., P. Trivellas, I. Santouridis, S. Nikolopoulos & E. Tsifora, 2015; Tudor, C. et al., 2013; Ahmed, A., 2003). These are the roles of an accountant as a user, controller and evaluator, IT system

[2] Their codes in the NCPP – 2011 are: 24116002 for Chief Accountant, 33133001 for Operational Accountant and 43112004 for Bookkeeper.

manager and IT system designer. A similar view is shared by H. Saeidi, G. V. Bhavani Prasad and H. Saremi (2015), according to whom, an accountant acts as a user, controller and data designer in an information system. Advances in technologies are likely to change the role of accountants and shift the focus on the fulfilment of numerous integrated, strategic and entrepreneurial functions which are primarily related to the effective financial management of enterprises. V. Damasiotis et al. (2015) believe that digital competences therefore develop and evolve into different types of competences that do not relate directly to information systems, but are still required for executing a particular task. Hence, the digital competences of accountants relate directly to accountants' duties, which, in turn, are determined by their position. The approach adopted by the International Federation of Accountants is similar, since the updated version of IES 2 'Initial professional development – technical competences' distinguishes between different technical competences based on the level of the professional qualifications acquired by persons (Handbook of International Education Pronouncements, 2017). The approach of the Committee on Global Management Accounting (CGMA) is similar. The Competency Framework designed by the Committee identifies four knowledge areas: technical skills; business skills; leadership skills and people skills. The Framework distinguishes between four professional levels of competences for each of these categories – foundational, intermediate, advanced and expert. In terms of technical skills, CGMA identifies competences for financial accounting; management accounting; business planning; management analysis; corporate finance; risk management and internal control; accounting information system; tax strategy and planning. The Institute of Management Accountants distinguishes between different technological competences in the sphere of management accounting: information systems; data management; data analysis and data visualisation. Based on the level of knowledge, those competences are divided into five groups: limited knowledge; basic knowledge; applied knowledge; skilled and expert knowledge (IMA Management Accounting Competency Framework, 2018).

The digital competences required for accountants on the basis of their experience in using information systems and technologies have been identified by C. Tudor et al. (2013) as well. In their research paper, 'An Analysis Framework for Defining the Required IT&C Competences for the Accounting Profession', they suggest that IT&C competences be approached within a framework which captures those competences at the intersection of three axes: 'user role', 'user experience' and 'IT&C technologies'. Each axis within the framework is presented at the following levels (see Figure 1):

- The 'User role' axis – information technologies and communications user; manager; designer and evaluator;
- The 'User experience' axis – general knowledge; user skills and competences;
- The 'IT&C technologies' axis - IT&C for business; IT&C for office; IT&C for audit and control; Information systems development and acquisition.

The interrelation between individual axes and levels is presented in three dimensions (see Figures 2, 3 and 4).

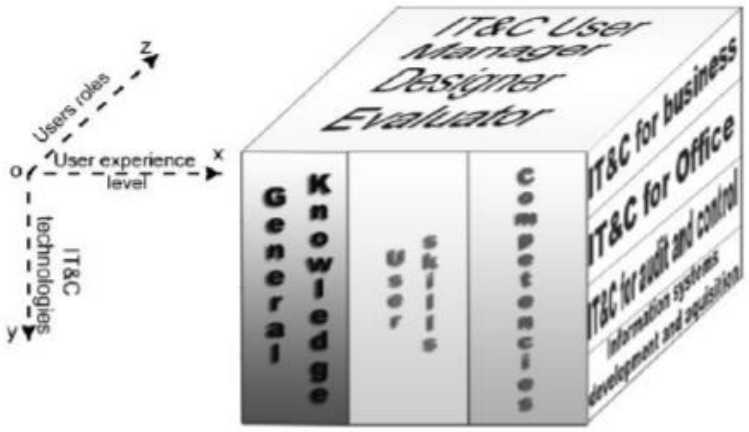

Figure2. General analysis framework of the ICT competences in the accounting profession
Source: Tudor, C., M. Gheorghe, M. Oancea, R. Sova (2013) An analysis framework for defining the required IT&C competences for the accounting profession, Accounting and management information system, vol.12, N.4, p.681

IT&C General knowledge	• IT Strategy • IT architecture • The IT impact on the business process • Information systems development process or IT&C acquisition process • IT&C management • Business communication by the means of IT&C use	• IT control standards • IT control objectives • IT control environment • Roles and responsibilities • IT risks assessment • IT&C risk treatment • It control activities • Monitoring IT&C control compliances	**Knowledge associated with IT&C control**
IT&C control competencies	• The methods selection for assessing IT&C control • Assessing the IT&C control environment • Assessing the IT&C control in the Information Systems developing / acquisition process • The IT&C risks analysis and assessment • IT&C control evaluation • The evaluation of IT&C control monitoring.	• IT&C business and accounting systems • IT&C integrated systems for business management (ERP, SAP, CRM) • Ensuring security organization assets.	**IT&C use competencies**

Figure 3. Dimension of the general competences needed for information and communication technology usage
Source: Tudor, C., M. Gheorghe, M. Oancea, R. Sova (2013) An analysis framework for defining the required IT&C competences for the accounting profession, Accounting and management information system, vol.12, N.4, p.683

IT manager Role	• The business entity IT&C strategy administration • The management of IT&C organizational structures; • Efficient and effective management of IT&C operational environment; • Achieving financial control over IT&C resources; • Conducting the IT&C controls; • Managing the Information Systems acquisition, development, and implementation process; • Efficient change management; • Managing efficiently IT&C critical issues	• Analysis and evaluation of information from organizational environment • Use project management methods • Use techniques for initiating an IT&C project and to evaluate the existing information system • Use methods for determining user requirements and system design • Understand the process of system maintenance and change management	**IT designer Role**
IT user Role	• Using business specific programs packages • Understanding Business Process Management Systems • Applying control measures to protect organization assets	• Define an information system evaluation plan; • System assessment by applying CAATs techniques; • Communicate the results of assessment and monitoring the implementation of recommendations.	**IT evaluator Role**

Figure 4. The dimension of IT&C competences and functions specific to the accounting profession

Source: Tudor, C., M. Gheorghe, M. Oancea, R. Sova (2013) An analysis framework for defining the required IT&C competences for the accounting profession, Accounting and management information system, vol.12, N.4, p.684

Business activities	• Small Business Accounting Software • Tax Return Preparation Software • Time Management & Billing Systems • Firewall Software/Hardware • External Network Configurations • User Authentication Systems • Internal Network Configurations • Intrusion Detection & Monitoring • Wireless Communications • Digital Communications • Encryption Software • EDI-Traditional • EDI-Web Based	• Cooperative Client/Server Environment • Test Data • Database Search & Retrieval • Flowcharting/Data Modeling • Enterprise Resource Planning • Simulation Software • Workflow Technology • Database Design & Installation • Application Service Providers • Computer-Aided Systems Engineering (CASE) Tools	**IT evaluation, design and management activities**
Office activities	• Word Processing • Electronic Spreadsheets • E-Mail • Internet Search & Retrieval • Image Processing • Electronic Presentations • Groupware	• Electronic Working Papers • Generalized Audit Software • Embedded Audit Modules/Real-time Audit Modules • Expert Systems	**Control and audit activities**

Figure 5. Major technologies that can meet the IT competences required for the accounting profession

Source: After Tudor, C., M. Gheorghe, M. Oancea, R. Sova (2013) An analysis framework for defining the required IT&C competences for the accounting profession, Accounting and management information system, vol.12, N.4, p.685

In our opinion, the framework proposed by C. Tudor et al. (2013) covers the basic knowledge, skills and functions that should be taken into consideration when specifying the requirements to the digital competences of accounting professionals. Based on the proposed approach for diversifying the digital competences of accountants according to their professional level, further analysis is made of the tasks to be performed by chief accountants, operational accountants and bookkeepers. The aim of this analysis is to establish the major responsibilities of each position both in terms of existing statutory requirements and based on the review of requirements set to applicants for the positions, so as to identify the major digital competences required for them.

2. Work Tasks to be Fulfilled by Persons Appointed as Chief Accountants, Operational Accountants and Bookkeepers

According to the international classification of occupations, accountants are business professionals (International Standard Classification of Occupations (ISCO-88)). They provide accountancy and audit services. Their tasks include:

- Advising on, planning and installing changes in the budgets of entities; controlling accounts and other accounting systems and policies;
- Preparing and certifying financial statements to be presented to management, shareholders and statutory or other bodies;
- Preparing tax returns, advising on taxation problems and contesting disputed claims before tax officials;
- Preparing or reporting on profit forecasts and budgets;
- Conducting financial investigations in such matters as suspected fraud, insolvency and bankruptcy;
- Auditing accounts;
- Making book-keeping records and performing related tasks;
- Supervising other workers.

Those duties relate to a wide range of activities whose implementation requires multiple competences. According to the Independent Financial Audit Act, financial audit in the Republic of Bulgaria is conducted by registered auditors who are members of the Institute of Certified Public Accountants (Independent Financial Audit Act, Art. 3, available online at: http://dv.parliament.bg/DVWeb/showMaterialDV.jsp?idMat=109378).

Hence, the law provides that auditing of reports and statements is within the competence of independent auditors, and not of accountants. It is therefore necessary to provide a more detailed description of the duties of accountants.

According to the national regulatory framework and the National Classification of Professions and Positions 2011, in particular, there are 10 major classes of positions for the different professions. Accounting positions primarily belong to class 2 ‘Specialists’; class 3 ‘Technicians and Applied Specialists’ and class 4 ‘Auxiliary Administrative Staff’. For each of those classes and their sub-

classes and groups, the main duties of employees are described for each position (https://www.mlsp.government.bg/nkpd/index.php; http://balans.bg/web/files/docs/nkpd-notes.pdf).

Within that context, the position of a chief accountant belongs to class 2, 'Specialists', subclass 24, 'Economic and administrative specialists', group 241, 'Financial specialists'. Financial specialists are responsible for planning, designing, organizing, administering, investing, managing and analysing financial reporting systems and funds of persons, enterprises, public and private institutions. The duties of financial specialists include:

- Preparing and organizing the financial statements of enterprises;
- Inspecting the financial documents of enterprises;
- Providing financial consultancy to people and organisations;
- Preparing analytical reports on various economic sectors or the economy in general.

The position of an operational accountant belongs to class 3, 'Technicians and applied specialists', subclass 33, 'Economic and administrative applied specialists', group 331, 'Applied specialists in Finance and Mathematics'. Applied specialists in Finance and Mathematics prepare evaluations; keep records of financial transactions; analyse data from loan applications; make decisions about the purchase and sale of financial instruments; perform math calculations and similar computations. Major duties of applied specialists include:

- Recording and sending orders for the purchase and sale of securities, shares, bonds or other financial instruments and carrying out foreign exchange operations;
- Processing and submitting loan applications to the managers of financial institutions by giving recommendations about their approval or rejection;
- Approving or rejecting applications within permissible limits by applying relevant loan standards;
- Keeping exhaustive records of all financial transactions made by an enterprise in compliance with common accounting principles;
- Providing assistance in the planning and performing of mathematical, statistical, actuary, accounting and other related calculations.

The position of a bookkeeper belongs to class 4, 'Auxiliary administrative staff', subclass 43, 'Administrative staff keeping accounting and stock records'. Employees responsible for keeping accounts and reporting documents receive, gather and process accounting, statistical, financial and other data. They also make cash payments related to economic activity. Their duties include:

- Providing assistance in the accounting process and in performing calculations;
- Computing costs per unit of output;
- Computing remuneration, preparing payrolls and paying remuneration to staff;
- Receiving, gathering and processing statistical or actuary data;
- Performing various administrative duties related to the financial transactions of insurance companies, banks and similar organisations;

- Making cash payments related to a specific economic activity.

In contrast to the International Classification of Jobs, the National Classification of Professions and Positions in the Republic of Bulgaria makes a more detailed distinction between the duties of different positions since their definitions have been given at a national level. The duties listed for different classes, subclasses and groups, however, are common and do not reflect all the requirements for the positions of a chief accountant, an operational accountant and a bookkeeper (in accounting). This is due to the fact that a chief accountant is expected to perform activities and functions that are primarily related to producing, analysing and interpreting accounting information about the property and financial situation of reporting units and thus assist managers in making strategic decisions that are in line with the mission and vision of the enterprise. A chief accountant is therefore responsible for different activities of analytical, organizational, consultancy, communication, control, financial and management nature. Operational accountants are mainly responsible for technical, organizational and administrative activities that relate to preparing accounting documents, entering accounting information into accounting systems, preparing financial, accounting and statistical data bases, reports and references which chief accountants need in order to perform their duties. Bookkeepers perform purely administrative tasks related to preparing, entering, processing, inspecting and archiving mainly primary accounting documents. We should also note that the duties and responsibilities assigned to a position are listed in job descriptions and can be amended according to the specific needs of enterprises. Hence, defining universal duties that would apply to a specific position would be similar to designing a uniform accounting policy for enterprises.

3. Digital Competences Expected from the Representatives of the Analysed Accounting Positions

In order to identify more clearly the digital competences required for the three positions, we analyse researched job advertisements for chief accountants, operational accountants and bookkeepers (in accounting)[3]. Within the scope of our research, we analysed 30 ads for the position of an operational accountant, 15 ads for the position of a chief accountant and 6 ads for the position of a bookkeeper. The ads were chosen randomly. Our aim was to identify the main requirements to the digital competences which applicants for each position were expected to possess. After analysing available information, we came to the following conclusions:

[3] The job ads were published online at https://www.jobs.bg as of 12.01.2019. The key words used in the search were ‘operational accountant’, ‘chief accountant’ and ‘bookkeeper’.

- One out of the 15 published advertisements for the position of a chief accountant contained no requirements to the digital competences of applicants. The data that are presented below therefore only refer to 14 ads, of which nearly 57% required applicants to be computer literate. Half of the ads that required computer literacy, however, did not specify the skills that applicants were expected to possess. One of the ads stated that applicants were expected to be able to use the Internet; two ads required applicants to be able to use e-mail; one ad required Windows skills from applicants. Nearly 43% of potential employers required applicants to be able to use some specialised accounting software. The share of ads that explicitly stated the accounting software which applicants were expected to work with was the same. Nearly 64% of the ads required applicants to be able to work with MS Office, while slightly less than 14% of the ads only required applicants to be able to use Microsoft Excel.

- Three of the ads published for the position of an operational accountant contained no specific requirements about applicants' competence in terms of information systems and technologies. The other 27 ads required applicants to possess digital competences, 44% of them specifying that operational accountants were expected to use MS Office, and Microsoft Word and Microsoft Excel in particular. Excellent computer skills were required from applicants for the position of an operational accountant in 22% of the ads, yet, the ads did not clearly specify what 'excellent computer skills' implied. Nearly 11% of published ads explicitly stated that applicants were expected to be able to use an electronic signature and the Internet. Neary 7% of ads expected applicants to have some experience with specialised accounting software, while 30% of them specified what type of software that should be.

- Only four out of the six ads for the position of a bookkeeper stated a requirement to the technical and digital competences of applicants, 50% of them requiring good or excellent computer skills, and the other 50% specifying that applicants needed to work with Microsoft Word and Microsoft Excel. Two of the ads required applicants to use the Internet, while 75% of prospective employers required some knowledge of and experience in using a specific accounting software product.

Even though some ads that did not contain any specific requirements to applicants' computer literacy or to their ability to use information systems, the duties described in them clearly implied possessing digital competences. Examples include prospective employees 'promptly completing electronic records of enterprise customers', 'sorting and archiving accounting documents and entering data in accounting software', etc. This indicates that employers 'expect' prospective employees to possess the e-skills required for using computers and software in their work. According to data provided by the NSI, however, the percentage of individuals aged 16-72 years who can use word-processing software is less than 30%, while less than 20% of them know how to work with spreadsheets (see Table 1). We therefore believe that employers need to specify the digital skills required from applicants for a particular accounting position.

Table 1
E-skills of individuals aged 16 - 74 years[4], 2015 – 2017, as a percentage

Type of e-skills	***2015***	***2016***	***2017***
Copying or moving a file or folder	43.9	38.5	44.3
Using word processing software	29.6	25.7	27.9
Using spreadsheet software	15.6	14.1	16.4
Using software to edit photos, video or audio files	12.3	8.9	10.1
Writing a computer program	2.0	1.0	1.2
Transferring files between a computer and other devices	42.1	36.3	44.4
Modifying or verifying the configuration parameters of software applications	9.0	7.3	8.6
Creating electronic presentations with presentation software (e.g. slides), including images, sound, video or charts	17.8	14.0	15.0
Installing software or applications	17.2	14.4	19.9

Source: NSI, 2018, available online in English at: http://www.nsi.bg/en/content/6117/e-skills-individuals-aged-16-%E2%80%93-74, last access on 22.04.2019.

Obviously, 'the idea of accounting as a profession has gone beyond the understanding that it requires knowledge and skills in the field of accounting, financial management, analysis, planning, etc. and now relates to good social skills and competences as well' (Petrova, P., 2018). Such a statement is based on the presence and effective use of information systems, cloud technologies and specialised accounting and financial software. The ability to properly use them directly depends on the digital skills of individuals which are relatively low, as Table 1 indicates. The development of digital skills is determined by the volume of knowledge acquired in the field. Although the role of educational institutions in developing adequate skills in accountants is an issue that has been discussed by many specialists in the field (Ibidunni, O., S. Ibidunni & O. Jinadu, 2015; Petrova, P., 2018; C. Tudor et al., 2013), it is not subject of this analysis.

Based on the duties identified for each position and the analysis of the digital competences required in the job advertisements, we could summarise that:

- Digital competences of accountants relate directly to the position they occupy.
- There is a straightforward relationship between employers' requirements in terms of duties and responsibilities and the digital competences of individuals.

[4] The relative share has been calculated on the basis of total population of individuals aged between 16 and 74 years.

- The greater the number and the variety of duties assigned to an employee, the wider the scope of the digital competences required for that position. In order to develop various digital competences, individuals need to acquire knowledge and skills in different fields, such as Economics, Statistics, Finance, Taxes, Law, Strategic Management, etc. Hence the question whether this is changing the role of accountants by making them mainly fulfil financial and analytical functions. Furthermore, is the automation of the accounting process (i.e. the use of accounting software) rendering the role of accountants as designers of IT&C and information systems obsolete? Such statements are based on the author's opinion that one of the effects of the automation of the accounting process is individuals losing a significant share of their basic accounting knowledge as they are increasingly relying on output data provided by accounting software without being aware of the accounting methods that are used. The role of accountants cannot be confined to only performing routine tasks related to synthesizing, entering or processing primary data. Rather, accountants need to be able to accurately employ, analyse and interpret accounting data. Those strategic and management functions, however, could not be adequately performed unless individuals are equipped with sufficient knowledge in operational accounting. Having a large number of routine accounting activities automated is likely to result in the loss of primary knowledge and competences which are essential for analysing data and making sound economic decisions.

4. Digital Skills Required for the Positions of a Chief Accountant, an Operational Accountant and a Bookkeeper (in Accounting) Based on the Axes of User Roles, User Experience and IT&C Technologies

Based on the framework proposed by C. Tudor et al. (2013), the main duties of persons employed as chief accountants, operational accountants and bookkeepers (in accounting), and our analysis of the digital skills and competences which employers require from applicants for these positions, we suggest that the framework be optimised as follows:

- The 'IT&C technologies' axis should be replaced by 'Main tasks'. In our opinion, the IT&C technologies which C. Tudor et al. (2013) propose (see Figure 5) include software products, applications, information systems, etc. which do not automatically refer to all enterprises or to the majority of economic professions. Therefore, the digital solutions that enterprises employ in their business, administrative, auditing, controlling, budgeting and management activities may differ, even when enterprises conduct a similar line of business in one and the same sector of the economy. We believe that it would be appropriate to replace the digital competences which the authors identify based on 'IT&C technologies'

with a new axis, i.e. ‘Main tasks’ performed by employees and thus design a framework that is based on the specific functions of each position.

- Although we share the authors’ view that different types of digital competences should be distinguished from each other based on the experience of users by introducing the levels of basic knowledge (know-that); the ability to use that knowledge (know-how) and the digital competences acquired, we believe that the hierarchical distinction between different positions in the same profession (i.e. bookkeepers, operational accountants and chief accountants in our case) implies some hierarchical development of the experience gained from the level of basic knowledge to the level of acquired competences. In our opinion, the use of such an axis would be effective, provided that there is no clear-cut distinction between positions. We therefore propose that the framework should be optimised for the different positions by eliminating the ‘user experience’ axis.

Based on the findings above, the following distinction could be made between the digital competences of accountants:

- For the position of a chief accountant (see Figure 6)

<table>
<tr><td rowspan="5">Roles in the IT&C system</td><td rowspan="5">User</td><td>Using accounting-information system(s).</td><td rowspan="5">Preparing charts, tables, diagrams, presentations, etc. to present financial, accounting, tax, statistical information to internal and external users. Establish communication about arising issues and situations with government bodies and institutions, internal and external entities and organisations. Planning and organizing meetings with inside and outside parties. Generate, upload and submit financial and accountting information. Using and analysing reports, references, forms, registers, declarations, etc. that are generated by the accounting system.</td><td rowspan="5">Organisational and technical duties</td><td rowspan="5">Main duties performed by a person employed as a chief accountant</td></tr>
<tr><td>Using business-management and/or financial-budgeting system(s).</td></tr>
<tr><td>Using programme(s) for generating tables, charts, text files with tabular or other illustrative information.</td></tr>
<tr><td>Using cloud technologies and other systems/applications for uploading, storing and sharing data.</td></tr>
<tr><td>Using e-mail, electronic signatures and other programmes/ systems/ applications to communicate with internal and external entities.</td></tr>
</table>

Roles in the IT&C system	**Manager**	Using appropriately the functions of accounting, taxation, IT, financial, budgetary, communication systems to organize and manage financial accounting activities and projects.	Preparing declarations, reports, references, non-financial documents (e.g. non-financial declarations under the Accountancy Act, etc.). Designing, updating and amending the accounting policy of the enterprise.	Managerial duties	Main duties performed by a person employed as a chief accountant
		Using appropriately the functions of accounting, taxation, IT, financial, budgetary, communication systems to design and implement a suitable individual accounting policy of the enterprise, and to prepare financial, accounting, statistical reports and statements used by the managers of the enterprise.	Assigning and preparing financial statements, declarations and other tax and financial-accounting documents for the enterprise. Determining the order of documents turnover.		
		Using appropriately the functions of accounting, taxation, IT, financial, budgetary, communication systems to resolve effectively any strategic and operational issues and crises.	Providing financial-accounting and taxation consultancy to persons and enterprises while keeping up-to-date with and applying any amendments in the provisions of applicable accounting and tax legislation.		
		Using digital solutions, applications, systems, software products, etc. to analyse external and internal risks and threats.	Inspecting, correcting and analysing the financial documents of an enterprise, as well as any other relevant information so as to assist the process of making sound economic and managerial decisions.		
		Using appropriately the functions of accounting, taxation, IT, financial, budgetary, communication systems to make, promote and implement financial and managerial decisions they are authorized for.	Preparing or assigning the preparation of analytical documents about various economic sectors or the economy in general. Preparing or assigning the preparation of risk-assessment reports. Assisting the managers of the enterprise in planning the budget for the following reporting period.		

Roles in the IT&C system	**Designer/Developer**	Analysing accounting, information, financial, statistical, communication and business systems they operate with and suggesting solutions for optimizing their performance, based on the knowledge and skills acquired while using them.	Analysing, assessing and initiating the optimisation, updating or replacement of accounting-information systems and digital solutions which are currently used by the enterprise to enter, process, analyse, store and protect accounting, tax, financial, statistical, economic and budget data.	Optimisation of the employed system	Main duties performed by a person employed as a chief accountant
		Understanding the functions of different units that generate, process and analyse accounting information and be aware of the overall activity of the enterprise in order to improve employed digital solutions.			
		Initiating and promoting the process of adopting new/updated digital products, software solutions, systems, etc.			
Roles in the IT&C system	**Controller**	Using digital solutions, applications, systems, software products, etc. to ensure the security of data and information generated, stored and processed by the enterprise. Employees must be aware of the risks of wrong data processing or data loss, as well as potential leakage of information.	Monitoring and supervising the activity of the team they manage and/or the work of operational accountants. Monitoring and supervising reporting of employees who are directly responsible to the chief accountant. Introducing or assigning the introduction of measures for preventing, detecting and eliminating any accounting, financial or tax violations. Organising and executing ex-post control over annual inventory count.	Control duties	Main duties performed by a person employed as a chief accountant
		Using digital solutions, applications, systems, software products, etc. to monitor and supervise the fulfilment of assigned tasks (such as the preparation of annual accounting statements, revaluation of assets, etc.).	Monitoring and supervising the correct implementation of the accounting policy which the enterprise has designed and adopted. Inspects and verifies accounting registers, financial statements and other tax, financial, accounting, budget and statistical documents.		
		Using digital solutions, applications, systems, software products, etc. to ensure the overall security of enterprise assets.	Monitoring and supervising the implementation of the corporate policy for data processing and data storing. Monitoring and supervising the overall accounting-financial, tax and economic state of the enterprise. Ensuring that accounting records are made correctly and that the principles of accounting ethics are observed in the process of performing various accounting activities.		

Figure 6. Basic digital competences required for the position of a chief accountant
Source: the author

- For the position of an operational accountant (see Figure 7)

Roles in the IT&C system	**User**	Using the accounting information system.	Preparing tables, da tatext files (e.g. statements, reports, etc.) to provide financial, administrative, accounting, tax, statistical and other information to internal users (e.g. the chief accountant, the CEO and other senior managers) and external users (such as clients, suppliers, financial or public companies, etc.). If authorized, establishing communication with government bodies and institutions about arising issues and problems. Taking part in meetings with inside and outside parties. Preparing, uploading and submitting operational accounting-financial information. Preparing, entering and archiving data from primary accounting documents into the accounting information system. Recording any economic operations in accountting registers in due time. Preparing references, reports, registers, forms, declarations and other documents by using the accounting information system.	Organisational and technical duties	Main duties performed by a person employed as an operational accountant
		Using business-management and/or financial-budgeting systems (if authorized).			
		Using programme(s) to generate text files and spreadsheets.			
		Using cloud technologies and other systems/ application to upload, store and share data.			
		Using e-mail, electronic signature and other programmes/systems/ applications to communicate with internal and external entities.			

Roles in the IT&C system	**Manager**	Using appropriately the functions of accounting, taxation, IT, financial, budgetary, communication systems to perform financial-accounting and project activities and tasks.	Preparing or (when working in a team and if authorized to do so) assigning the preparation of reports, references, registers, declarations, forms and other financial and non-financial documents.	Managerial duties	Main duties performed by a person employed as an operational accountant
		Using appropriately the functions of accounting, taxation, IT, financial, budgetary, communication systems to implement the designed accounting policy of the enterprise and to prepare financial, accounting and reporting documents for the chief accountant and the managers of the enterprise.			
		Using appropriately the functions of accounting, taxation, IT, financial, budgetary, communication systems to effectively solve any issues, problems and crises.	Providing operational financial-accounting and tax information to the chief accountant, the manager or another superior employee.		
		Using digital solutions, applications, systems, software products, etc. to analyse the risks and threats of wrongly prepared documents or documents that do not meet applicable legal requirements.	Inspecting, correcting and analysing the information required for preparing accurate financial and non-financial references, registers, declarations, payrolls, reports and other accounting, financial and tax documents.		
		Using appropriately the functions of accounting, taxation, IT, financial, budgetary, communication systems to make, promote and implement operating financial-accounting decisions they are authorized for.	Organising and monitoring the process of reporting operational activities of financial, accounting and tax nature by employees who are directly responsible to the operational accountant. Taking part in or managing commissions when taking inventory of assets or inspecting the work of financially liable persons.		

Roles in the IT&C system	**Designer/Developer**	Analysing accounting, information, financial, statistical, communication and business systems they operate with and suggesting solutions for optimizing their performance, based on the knowledge and skills acquired while using them.	Analysing, assessing and promoting the optimisation, updating or replacement of accounting information systems and digital solutions that are currently used by the unit they work in to enter, process, analyse, store and protect accounting, tax, financial, statistical, economic and budget data.	Optimisation of the employed system	Main duties performed by a person employed as an operational accountant
		Understanding the functions, tasks and needs of the unit they work in so that they could improve the digital solutions employed in that unit.			
		Initiating and promoting the process of adopting new/updated digital products, software solutions, systems, etc.			
Roles in the IT&C system	**Controller**	Using digital solutions, applications, systems, software products, etc. to ensure the security of data and information generated, stored and processed by the unit they work in.	Monitoring and supervising the work of the team they head (when working in teams and if authorized to fulfil management duties). Inspecting incoming and outgoing references, declarations, forms, reports, contracts on payables and receivables and other accounting, financial, statistical and tax documents.	Control duties	Main duties performed by a person employed as an operational accountant
		Using digital solutions, applications, systems, software products, etc. to monitor and supervise the fulfilment of assigned tasks (when working in teams and if authorized to fulfil managing duties).	Monitoring and supervising the correct implementation of the accounting policy that has been designed and adopted by the enterprise. Supervising and analysing the movement of accounts within the system.		
		Using digital solutions, applications, systems, software products, etc. to ensure the security of enterprise assets.	Monitoring, executing and supervising the implementation of the corporate policy on data processing and data storing. Exercising ex-ante, current and ex-post internal financial control on observing the financial, budgetary and payment discipline of the entity. Ensuring that the principles of accounting ethics are complied with when performing accounting activities.		

Figure 7. Basic digital competences required for the position of an operational accountant
Source: the author

- For the position of a bookkeeper (in accounting) (see Figure 8)

Roles in the IT&C system	**User**	Using the accounting-information system(s).	Preparing tables, data text files (e.g. reports, statements, etc.) to provide mainly accounting-administrative and statistical information to internal users (such as the operational accountant and the chief accountant, the CEO and other senior managers) and to external users (e.g. clients, suppliers, etc.). Establish communication (if authorized to do so) about arising issues and situations with internal and external entities and organisations. Generating, uploading and submitting financial and accounting information for administrative purposes. Preparing, entering and archiving primary accounting documents in the accounting-information system. Recording any economic operations in the accounting information system in due time. Preparing references, reports, forms, registers and other administrative documents by using the accounting information system.	Organisational and technical duties	Main duties performed by a person employed as a bookkeeper
		Using the administrative managing and/or financial-budgetary system(s).			
		Using programme(s) to generate text files and spreadsheets.			
		Using cloud technologies and other systems/applications to upload, store and share data.			
		Using e-mail, electronic signature and other programmes/systems/ applications to communicate with internal and external entities.			

Roles in the IT&C system	**Manager**	Using appropriately the functions of accounting, administrative, IT&C systems used in the organisation to perform financial-accounting and administrative activities and duties.	Preparing reports, references, forms and other financial and non-financial documents. Fulfilling administrative tasks related to financial transactions.	Managerial duties	Main duties performed by a person employed as a bookkeeper
		Using appropriately the functions of accounting, administrative, IT&C functions they employ to implement the accounting policy of the enterprise and to prepare financial, accounting and reporting statements for the operational accountant, the chief accountant and the managers of the entity.			
		Using appropriately the functions of accounting, taxation, IT, financial, budgetary, communication systems to resolve effectively any strategic and operational issues and crises.	Providing primary operational administrative, financial-accounting and statistical information to the operational accountant and the chief accountant, the manager or another person they are directly responsible to.		
			Reviewing and correcting the information required for preparing correct financial and non-financial references, registers, payrolls, reports and other accounting, administrative, financial and tax documents.		
		Using appropriately the functions of accounting, taxation, IT, financial, budgetary, communication systems to make, promote and implement financial and accounting decisions of administrative nature they are authorized for.	Being part of or managing commissions that take inventory of assets or inspect a financially liable person.		

Roles in the IT&C system	**Designer/Developer**	Analysing accounting, information, financial, statistical, communication and business systems they operate with and suggesting solutions for optimizing their performance, based on the knowledge and skills acquired while using them.	Analysing, assessing and proposing the optimization, updating or replacement of accounting-information systems and digital solutions that are currently used by the unit they work in to enter, process, analyse, store and protect accounting, tax, financial, statistical, economic, budget and, above all, administrative information.	Optimisation of the employed system	Main duties performed by a person employed as a bookkeeper
		Understanding the functions, tasks and needs of the unit they work in so that they could improve the digital solutions employed in that unit.			
		Initiating and promoting the process of introducing new/upgraded digital products, software solutions, systems, etc.			
Roles in the IT&C system	**Controller**	Using digital solutions, applications, systems, software products, etc. to protect the data and information generated, stored and processed by the unit they work in.	Monitoring and supervising the team they manage (during teamwork activities and if authorized to perform managing duties). Supervising incoming and outgoing primary references, forms, reports, contracts on receivables and payables and other accounting, financial and tax documents.	Control duties	Main duties performed by a person employed as a bookkeeper
			Monitoring and supervising the correct implementation of the accounting policy, as well as the financial and tax discipline designed and adopted by the enterprise.		
		Using digital solutions, applications, systems, software products, etc. to protect the assets of the enterprise.	Monitoring, executing and supervising the implementation of the corporate policy regarding data processing and data storing.		
		Using digital solutions, applications, systems, software products, etc. to exercise preventive and current control over any created or submitted wrongly prepared documents or documents whose contents is not in compliance with applicable legal requirements.	Ensuring that the principles of accounting ethics are observed when accounting and administrative activities are performed.		

Figure 8. Basic digital competences required for the position of a bookkeeper (in accounting)
Source: the author

Conclusion

The development and employment of adequate digital competences in the accounting practice is in line with the development of modern society and the adoption of innovative software products and solutions to assist accounting employees in their activity. This, however, has gradually shifted the focus of the work tasks of accountants to the acquisition of digital competences required for their tasks and responsibilities at the workplace. A similar finding may be approached from two different points of view. The first one refers to the undisputed fact that acquiring such skills is no longer a matter of gaining competitive advantages, but an essential element of the basic competence required from accountants when fulfilling their professional duties. The growing number and variety of tasks which accounting professionals have to perform nowadays requires a wider range of modern, up-to-date and adequate competences. This, in turn, seems to be in conflict with the concept of making accounting 'less complicated'. We support the hypothesis that there is a causal relationship between employers' requirements in terms of the professional duties of accounting employees and the level of their digital competences and therefore believe that companies need to design their individual methodologies for developing and assessing the basic digital competences which accountants in different positions need to possess. This could also become an element of the staffing policy of enterprises and an opportunity for individuals to focus on acquiring those digital skills and knowledge that would promote their further professional growth. Such methodologies must be designed after conducting an exhaustive analysis of the digital competences required from accounting professionals (in different positions) in the Republic of Bulgaria.

Secondly, the digitalisation of the economy is likely to result in having the accounting profession excluded from the National Classification of Professions and Positions and employing automated digital solutions to perform the operational and technical tasks that have traditionally been fulfilled by accountants. Nevertheless, designing such solutions relates to defining specific technological requirements to and features of the accounting software, an idea which cannot be materialsed without the expertise of accounting professionals who are aware of the operational, administrative, financial and managerial functions of accounting. Selecting the best method of amortization, for example, should be influenced both by the specifics of the company business and by accountants' accurate knowledge of the advantages and disadvantages of the different methods of amortization. This is essential not only for designing an automated accounting system, but also for ensuring effective analyses and control of the systematized and summarised output data provided by the system. In our opinion, the accounting profession is far from becoming obsolete in result of having the accounting practice digitalized and automated at the current state of socio-economic and legislative development in our country.

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