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Beyond the Numbers: the Impact of Accounting Profession Digitalisation on EU SMEs' Innovation

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Beyond the numbers: The impact of accounting profession digitalisation on EU SMEs' innovation

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Abstract: The 1990s were marked by the advent of the Internet, a revolutionary innovation in technology and the indispensable infrastructure of the digital economy. Digitalisation has permeated all fields of activity and has challenged the process of digital transformation, creating digitalised domains and sectors such as precision agriculture, the sharing economy, e-Business, the algorithmic economy and digital accounting. At the same time, digital transformation is the main driver of innovation in organisations. In turn, innovation shapes markets, supports digital transformation and the transition to a digital economy. The aim of this paper is to determine what role the digitalisation of the accounting profession plays in the EU SMEs' innovation and to answer the question: Can the digitalisation of the accounting profession affect SMEs' innovation? More specifically, this study determines the influence of Internet connection, use of ERP software, use of cloud computing services, exploitation of Office applications, running a financial-accounting software and having a policy on cyber security in financial-accounting activities on innovation in SMEs. This analysis was based on the econometric multiple linear regression model. The results of the study reflect the significant role that the digitalisation of the accounting profession plays in the innovation process of SMEs in the EU by 2021. The overall findings of the study refer to the fact that the digitalisation of the accounting profession is a driver of innovation in organisations, and that SMEs' innovation occurs during the adoption and implementation by accounting professionals of advanced computing technologies, implementation of blockchain and cloud technology, constant use of artificial intelligence to process and provide interpretation of economic transactions. This study represents an extension of the current literature on innovation in organisations focused on digitalisation of the accounting profession. In addition, this study is the first to investigate how the digitalisation of the accounting profession and accounting practices affects SMEs' innovation.

Key words: digital economy, digital transformation, accounting profession, SMEs' innovation.

JEL classification: M41, O33.

1. Background

Since the the 90's of the 20th century and up to the present day, we are experiencing the Fourth Industrial Revolution (Luyanda, 2021), which is still ongoing. The 4th Industrial Revolution defines the concept of digital economy which is characterized by technologies such as Artificial Intelligence (AI), Cloud Computing, Big Data & Analytics, blockchain, Internet of Things (IoT) and Robotic Business Automation (RBA). At the same time, digital transformation is the main driver of innovation in organizations.

Digital transformation in the European Parliament's vision (2021) is the process of integrating, testing and implementing digital technologies in routine and repetitive activities of all business entities and public institutions. The role of digital transformation used to be limited to that of a marginal efficiency factor, and nowadays it plays a role of a catalyst and factor facilitating innovation and change.

Innovation is a process of developing revolutionary products, services and business models to meet customer needs (McKinsey & Company, 2022). Innovations are based on the results of technological developments (Eurostat, 2023). Innovations do not have to be new discoveries, they can be improvements of existing products, services, business models. Digital transformation is achieved according to the type of innovation that digital technologies describe, specifically gradual innovation or revolutionary innovation (Arraou, 2016). Gradual innovation refers to an innovation that does not profoundly change existing operating procedures, while revolutionary innovation, at the time of emergence, replaces an existing technology.

- Innovation is crucial for economic entities because challenges are inevitable in business. In this sense, innovation involves several advantages (Boyles, 2022), including:
- high adaptability in case of economic, social or health crises. Innovation is necessary for economic entities to overcome the challenge of transformation;
- economic growth is indispensable to remain competitive in the context of digital transformation;
- distinction from competitors can only be achieved if the entity is innovative and implements innovations to grow the business.

2. Literature review

Tapscott (2015) defines the internet as the indispensable infrastructure of the digital economy and of the Fourth Industrial Revolution. Starting from the fundamentals of digital transformation: the internet, hardware and software products, information technology services and telecommunications, outlined by Bukht and Heeks (2017), its

boundaries are reinforced by digital services, digital platforms and digital innovation. These elements are characterized by high scalability and high speed implementation. Therefore, the mentioned elements influence various fields of activity, creating digitalised domains and sectors such as: precision agriculture, sharing economy, e-Business and algorithmic economy. Together they form the digital economy. This structure of the digital economy is shown in Figure 1. All digitalised activities are the components of the digital economy.

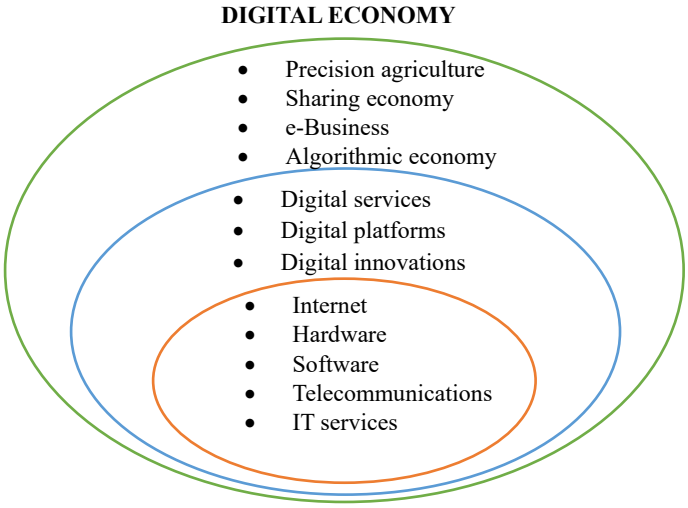

Figure 1. The digital economy structure
Source: Adapting and processing after Bukht și Heeks (2017);

Digitalisation is affecting every human activity: education, health, culture, sport, public administration, innovation and the economy. The rhythm of this transformation is accelerating, but the evolution of global digitalisation does not reflect a uniform situation. This opinion is supported by researchers at The Fletcher School at Tufts University (Chakravorti, et al., 2020) who in partnership with Mastercard have carried out a study on the digital evolution dashboard based on a combination of 160 indicators in relation to 4 key factors: demand, offer, institutional environment and innovation and change for 90 economies. The results of this study are reflected in Table 1.

Table 1. Study on the Digital Evolution Scoreboard

Key factors	
The demand: Does the population have the digital skills and the tools to connect to the digital economy? **The offer:** How developed is the digital infrastructure to facilitate digital transactions? **Institutional environment:** Does the country's legislation and government actions support or hinder the development of digital technologies? **Innovation and change:** What is the status of key elements in innovation of the digital ecosystem (talent and capital, collaboration between universities and industry, new digital products and services)?	
Study results:	**Explanations:**
The results of the study are presented as an atlas that segments the digital planet according to the level of the digital economy into four distinct zones: **Stand Out Zone** (Singapore, USA, Hong Kong, South Korea, Taiwan, Germany, Estonia, Czech Republic, Israel, UAE); **Stall Out zone** (Sweden, Netherlands, Finland, Denmark, Norway, Switzerland, Australia, Canada, Japan, UK); **Break Out zone** (Latvia, Poland, Bulgaria, Serbia, Saudi Arabia, Russia, Georgia, Ukraine, Argentina); **Watch Out zone** (Romania, Italy, Hungary, Greece, Turkey, Brazil, Colombia, Pakistan, South Africa and Laos).	**The Stand Out Zone** includes economies with a high level of digitalisation and a strong drive to develop digital skills. **The Stall Out Zone** describes economies with a mature level of digitalisation, but a descending drive in the ongoing development of digital skills. **The Break Out zone** includes economies with limited digital infrastructure existing but rapidly expanding. **The Watch Out Zone** characterises economies with gaps in existing digital skills and weaknesses in drive for future development.

Source: Adapting and processing after Chakravorti, et al. (2020);

Researchers (Kroh, et al., 2018) support the idea that the intensive use of digital technologies positively influences the innovation performance of economic entities. At the same time, service innovations have higher requirements for digitalisation of internal and external information flows than product innovations.

Based on the results of the study (Eltayeb & Musa, 2024) conducted on Asia-Pacific countries (Malaysia, Indonesia, Singapore, Philippines, Thailand, Japan, India, Korea, China, New Zealand and Australia) it was

concluded that the adaptation of digital technologies supports economic growth in these countries. At the same time, adaptation of digital technologies encourages innovation, ensures knowledge transfer, supports foreign investment and supports smart partnerships. On the other hand, the implementation of advanced digital technologies in economic entities for innovation needs to take into account both national and market conditions and the level of development of economic entities (Yu, et al., 2023). However, the influence of the digitalisation level of the geographical region where the economic entity is located on their innovation is not excluded, because the higher the digitalisation level of the geographical area, the faster the innovation of entities in adjacent areas and fields spreads (Li, et al., 2023).

Researchers of the study on the impact of digitalisation on technological innovations in Germany SMEs (Radicic & Petković, 2023) find that the impact is heterogeneous. The effects of innovation are modest and depend on the form of digitalisation, which can be: digitalisation in manufacturing and logistics, digitalisation of value chains and big data analysis. At the same time, the impact of digitalisation of economic entities on innovation is more visible among entities whose main business is in the services sector (Li, et al., 2023).

The results of the study on North American SMEs (Ardito, et al., 2021) demonstrate that digital transformation has a direct positive effect on product and process innovation performance. In contrast, another study of UK SMEs (Audretsch, et al., 2023) over the period 2002-2014 identified that collaboration with suppliers and customers at national and international level, collaboration with universities at national level and with competitors at international level facilitate SME innovation.

The results of another study among SMEs in Vietnam (Vy, et al., 2023) during 2005-2015 identify the negative correlation of the globalization factor with the degree of innovation of SMEs. At the same time, at the macroeconomic level, globalization and economic policy facilitate innovation, while social globalization discourages it, and at the microeconomic level, increased competitive pressure and knowledge transfer due to globalization have a direct interdependent relationship with the innovation tendency of SMEs.

3. Data and methodology

The digitalisation of the economy has inevitably led to the digitalisation of the accounting profession, which has always been closely related to the evolution of trade, industry, the advent of money and man becoming an economic being (Pătrașcu, et al., 2017). Inevitably, the connection of the accounting profession with digital skills and knowledge of current digital solutions on the market, analytical data processing tools and innovation methods for SMEs appears.

SMEs are the backbone of the European Union (EU) economy as they account for 99% of all businesses in the EU. The classification of economic entities as SMEs is subject to compliance with at least 2 of the 3 defining criteria, represented in figure 2.

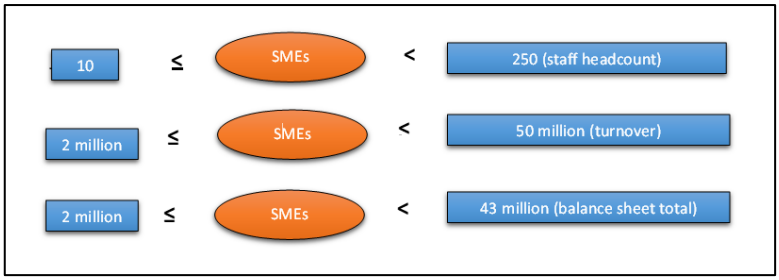

Figure 2. Defining criteria of SMEs
Source: Commission recommendation (2003/361/EC);

This study is focused on the analysis of the impact between six indicators describing the level of digitalisation of accounting professionals in EU SMEs and the SMEs Summary Innovation Index, based on a multivariate linear regression model. In the model we consider the dependent variable the SME Summary Innovation Index and the independent variables as the percentages of SMEs that have an Internet connection, use ERP software, use cloud computing services, use Office applications, operate financial-accounting software and have a cyber security policy.

The following research hypotheses were formulated as a basis for this research:

H_1 - Digitalisation of the accounting profession impacts innovation in SMEs in the European Union.

H_2 - All indicators on the digitalisation of the accounting profession play a significant role in the EU SMEs innovation.

For the analysis of the level of digitalisation of accounting professionals in SMEs, the information was provided by Eurostat - the statistical body of the European Commission from the general archive on the digitalisation of SMEs. These data were collected from 151,000 economic entities in 27 EU Member States at the level of 2021 (Cross Sectorial Data). This information is presented in extenso in Annex 1. The variables used in the analysis and their description are presented in Table 2.

Table 2. Description of the variable

Variables	Codification	Unit of measure	Description
The output/ dependent variable:			
Summary Innovation Index for SMEs	SMES_SII	%	Composite indicator reflecting the performance of the innovation system at country level. This indicator is composed of 12 structural elements, namely: human resources, attractive research systems, digitalisation, finance and support, economic investment, use of information technology, innovations, connections, intellectual assets, labour impact, sales impact and sustainable environment (European Commission, 2021). The range of this indicator, classifies countries into 4 categories of innovators, namely: emerging innovators, moderate innovators, strong innovators and leading innovators.
The input/ independent variables:			
Percentage of SMEs with Internet connection	SMES_WEB	%	The Internet provides the infrastructure (Tapscott, 2015) needed to operate all technologies and ensures stable access to the databases needed to run economic activities. The lack of internet connectivity hinders the deployment and use of digital technologies.
Percentage of SMEs using ERP software (Enterprise Resource Planning)	SMES_ERP	%	ERP allows intelligent automation of all transactions related to organisations. It merges all business processes and enables data flow between departments. It is becoming increasingly evident that decision making is mainly based on digital technology (Kirtley, 2016). These transformations are changing the way finance department functions support the business, changing the way future risks and opportunities are identified and managed, changing the way information is analysed and processed, increasing transparency and accountability.
Percentage of SMEs using Cloud Computing services	SMES_CLOUD	%	Cloud services access computing power over the Internet. They include: servers, storage and databases. Cloud services are connected to the latest innovations in technology, enabling customers to innovate quickly. Cloud technology (Ionescu, et al., 2014) provides a streamlining of the financial flow.
Percentage of SMEs using Office applications	SMES_OFFICE	%	The digital skills of accounting professionals focus on knowing how to use the Office suite of applications. Working with spreadsheets or editing Word documents is an asset for professionals, as most accounting applications allow imports based on Office applications.
Percentage of SMEs using financial accounting software	SMES_ACC	%	Accounting software ensures that a business is managed in line with current market requirements and has ready access to all available resources. Accounting software makes work easier within organisations, leads to a shorter time to complete tasks and helps to organise more efficiently and reduce errors that can occur due to carelessness (European Commission, 2021).
Percentage of SMEs insured in case of cybercrime	SMES_ICT	%	Accounting information stored in physical and electronic format is stored on computer networks or systems. Their security is called information technology security or IT security. Technological developments offer many advantages and opportunities. But they present a number of vulnerabilities of cyber applications and systems (Mihai, et al., 2015) that lead to risks related to cybercrime.

Source: Adapting and processing after Eurostat;

Figure 3 shows the values of the six indicators describing the level of digitalisation of accounting professionals in European SMEs and the SME's Summary Innovation Index at 2021 level, which can be found in table 3.

Table 3. Values of indicators used in research

Indicatori / GEO (Labels)	SMES_ WEB	SMES_ ERP	SMES_ CLOUD	SMES_ OFFICE	SMES_ ACC	SMES_ ICT	SMES_ SII
European Union - 27 countries (2021)	98.3	36.8	40.1	24.3	19.3	31.7	106.296
Belgium	100	56.1	51.7	34.9	25.7	40.45	135.996
Bulgaria	96.1	20.7	12	7.1	3.9	4.4	45.071
Czechia	95.9	35.4	43	36.6	22.9	13.45	89.095
Denmark	99.9	49	64.1	46.8	42.2	91.7	144.533
Germany	99.1	36.3	40.6	22.1	16.8	35.85	127.062
Estonia	96.9	21.5	57	38.6	43.2	10.8	114.104
Ireland	98.3	22.6	57.9	41.8	31.2	58.7	118.403
Greece	98.7	31.2	20.2	14.3	7.3	31.95	80.685
Spain	98.4	48.2	30	18.6	12.2	27.4	91.768
France	98.9	44.3	28.3	14.9	12.5	58.25	113.121
Croatia	96	22.1	38.2	23.5	20.6	10.65	69.828
Italy	98.7	31.5	60.1	34.6	31.5	20.5	101.959
Cyprus	98.4	33	49.6	33.7	21.8	20.8	108.406
Latvia	100	37.8	27.6	15.6	9.9	16.4	54.679
Lithuania	100	43.3	32.2	15.8	15.5	5.85	82.06
Luxembourg	98.4	38.4	32.3	21.8	13.5	40.7	125.867
Hungary	93.3	19.3	25.3	15.1	10.3	6.05	70.419
Malta	97.4	37.9	56.6	45.2	28.7	45.15	98.983
Netherlands	100	41.4	64.1	46.1	42.8	40.15	135.412
Austria	99.3	43.8	39.4	20.1	10.7	30.85	124.583
Poland	98.4	29.9	27.3	16.9	8.3	17.2	60.976
Portugal	96.5	50.8	33.7	20.2	14.1	14.8	87.526
Romania	90.5	16.1	13.5	7.9	6	8.35	37.355
Slovenia	99.4	34	41.6	26.9	16.3	8.4	96.4
Slovakia	94.7	29.8	35.2	22.5	18.6	12.35	65.632
Finland	100	46.8	74.5	55.4	48.4	43.8	137.658
Sweden	99.3	33.4	74.9	52.9	55	61.45	145.156

Source: Adapting and processing after Eurostat;

Analysing the percentage values of the SME Summary Innovation Index (SMES_SII), we note that the leading innovators at SME level are Sweden (145.16%), followed by Denmark (144.53%), Finland (137.66%), Belgium (136%) and the Netherlands (135.41%). Among the strong innovators are the countries with values above the EU average (106.30%): Germany (127.06%), Luxembourg (125.87%), Austria (124.58%), Ireland (118.40%), Estonia (114.10%), France (113.12%) and Cyprus (108.41%). At the other end of the scale we have the SMEs emerging innovators with the lowest values, namely: Croatia (69.83%), Slovakia (65.63%), Poland (60.98%), Latvia (54.679%), Bulgaria (45.071%) and Romania (37.355%). Countries such as Hungary, Greece, Lithuania, Portugal, Czech Republic, Spain, Slovenia, Malta and Italy are considered moderate innovators.

Regarding SMEs' internet connectivity, in countries such as Finland, the Netherlands, Lithuania, Latvia and Belgium, 100% of all SMEs registered in 2021 were connected to the internet. The lowest percentage of SMEs connected to the Internet is in the Czech Republic (95.9%), Slovakia (94.7%), Hungary (93.3%) and Romania (90.5%).

As regards the percentage of SMEs using ERP software in 2021, the leaders are Belgium (56.1%), Portugal (50.8%), Denmark (49%), Spain (48.20%) and Finland (46.8%). The EU average in 2021 was 36.8%. The lowest percentages were observed in Bulgaria (20.7%), Hungary (19.3%) and Romania (16.1%).

Regarding cloud services as a technological innovation, the ranking according to the percentage of SMEs using cloud computing services is roughly similar to the indicators detailed above. Similarities are also found among the leading innovators in the use of Cloud Computing services, namely: Sweden (74.9%), Finland (74.5%), the Netherlands (64.1%) and Denmark (64.1%). At the opposite pole are the emerging innovators, namely: Hungary (25.3%), Greece (20.2%), Romania (13.5%) and Bulgaria (12%). In terms of the percentage of SMEs using Office applications, these are closely linked to the basic digital skills needed by an accounting professional. The leaders are Finland (55.4%), Sweden (52.9%), Denmark (46.8%) and the Netherlands (46.1%), while Germany (22.1%),

Luxembourg (21.8%), Belgium (34.9%) and Ireland (41.8%) are around the EU average (24.3%). At the bottom of the ranking, alongside emerging innovators such as Bulgaria (7.1%), Romania (7.9%), France with 14.9% of SMEs, Greece (14.3%) and Hungary (15.1%).

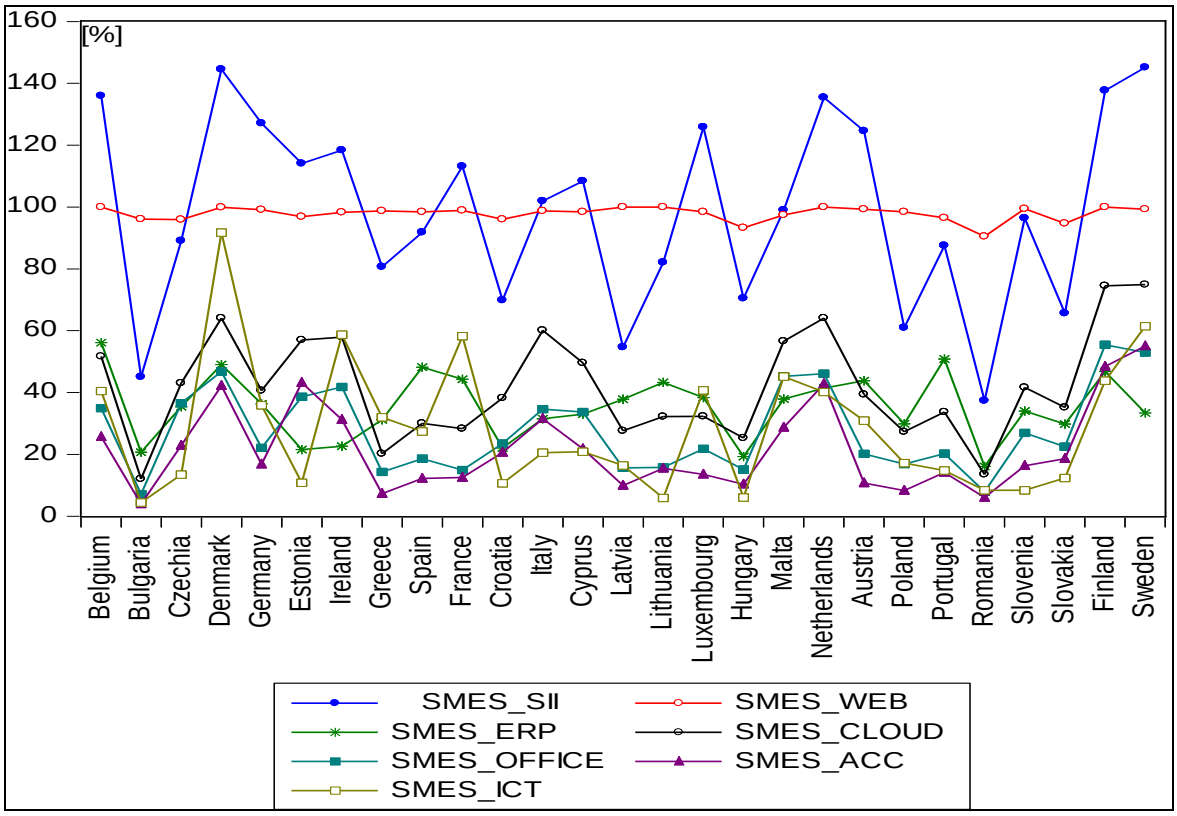

Figure 3. Values of the Summary Innovation Index and indicators on the digitalisation of the accounting profession in SMEs in the European Union in 2021

Source: own from Eviews 10.1;

As regards the percentage of SMEs using financial accounting software, the countries with the highest percentage are Sweden (55%), Finland (48.4%), Estonia (43.2%), the Netherlands (42.8%) and Denmark (42.2%), while at the bottom of the ranking are Hungary (10.3%), Latvia (9.9%), Poland (8.3%), Greece (7.3%), Romania (6%) and Bulgaria (3.9%).

The situation is similar for the percentage of SMEs insured against cybercrime. Most SMEs insured against cybercrime are in countries such as Denmark (91.7%), Sweden (61.45%), Ireland (58.7%), France (58.25%), Malta (45.15) and Finland (43.8%). The lowest percentage of SMEs insured against cyber attacks are in Slovenia (8.4%), Romania (8.35%), Hungary (6.05%), Lithuania (5.85%) and Bulgaria (4.4%).

The main descriptive statistical indicators of the analysed indicators are presented in Figure 4. The other descriptive statistical indicators calculated can be found in table 4. These statistics reflect the fact that there is considerable potential for the digitalisation of SMEs for innovation. At the same time, the descriptive statistics reflect significant discrepancies between EU Member States.

Table 4. Descriptive statistics

	SMES_ACC	SMES_CLOUD	SMES_ERP	SMES_ICT	SMES_ OFFICE	SMES_WEB	SMES_SII
Mean	21.84815	41.88519	35.35556	28.75556	27.77407	97.87037	98.61989
Median	16.80000	39.40000	35.40000	20.80000	22.50000	98.40000	98.98300
Maximum	55.00000	74.90000	56.10000	91.70000	55.40000	100.0000	145.1560
Minimum	3.900000	12.00000	16.10000	4.400000	7.100000	90.50000	37.35500
Std. Dev.	14.06634	17.36116	10.56530	21.48237	13.83364	2.297961	31.17253
Skewness	0.863258	0.251454	-0.036797	1.058702	0.451469	-1.551012	-0.234793
Kurtosis	2.675867	2.199507	2.194932	3.797133	2.050605	5.254129	2.026907
Jarque-Bera	3.471657	1.005418	0.735245	5.758676	1.931227	16.54160	1.313349
Probability	0.176254	0.604890	0.692379	0.056172	0.380750	0.000256	0.518573
Sum	589.9000	1130.900	954.6000	776.4000	749.9000	2642.500	2662.737
Sum Sq. Dev.	5144.407	7836.654	2902.267	11998.80	4975.612	137.2963	25264.90
Observations	27	27	27	27	27	27	27

Source: own from Eviews 10.1;

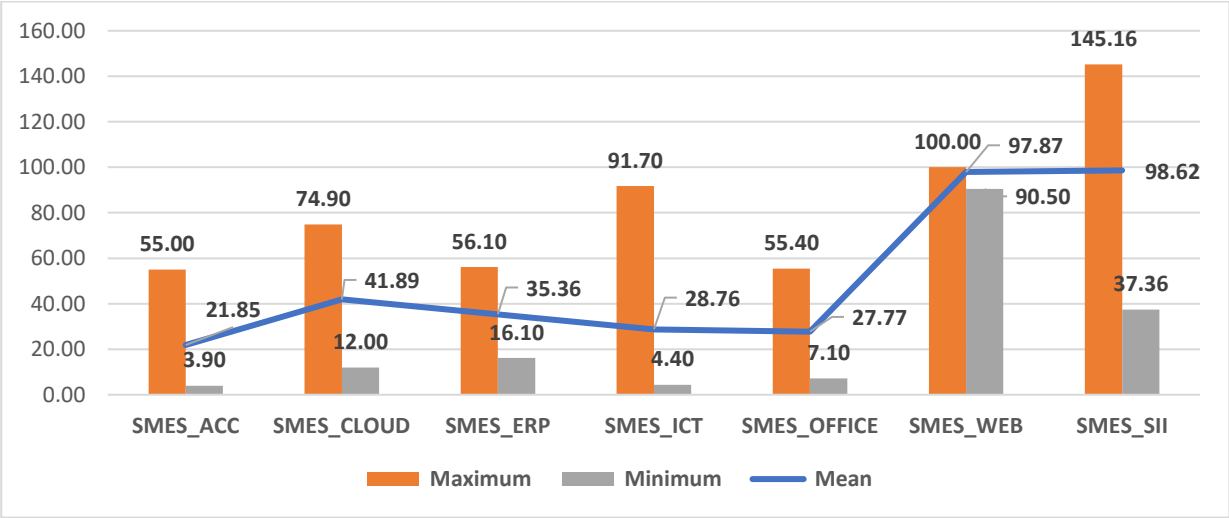

Figure 4. Minimum, maximum and mean statistical values of linear regression model indicators
Source: own from Eviews 10.1;

Based on figure 4 and the results obtained in table 4, we can observe that the standard deviation for both the SMEs Summary Innovation Index and the six indicators describing the level of digitalisation of accounting professionals in EU SMEs show small values, indicating that the data are tightly clustered around the mean. The tightest clustering is for the independent variable - percentage of SMEs with Internet connection (2.30), and the least tight clustering is recorded for the dependent variable - the SMEs Summary Innovation Index (31.17). At the same time, the Kurtosis variable shows us the distribution of the data, thus, the dependent variable shows a negative skewness, while four of the six independent variables show positive skewness, namely: the percentage of SMEs using a financial-accounting program, Cloud Computing services, Office applications and the percentage of SMEs having a cyber security policy. Negative skewness shows the extent to which the normal data distribution curve moves away from the middle, to the right, while in the case of positive skewness the curve moves to the left.

4. Results and discussion

In order to analyse the relationship between indicators on the digitalisation of the accounting profession and the EU SMEs Summary Innovation Index, a multivariate linear regression model was applied, defined in the following relationship (general case):

$$y_i = \alpha + \beta_1 x_{1i} + \beta_2 x_{2i} + \beta_3 x_{3i} + \cdots + \beta_p x_{pi} + \varepsilon_i, \quad i = \overline{1,N} \quad (1)$$

where α is the free term, β_1,β_2,...,β_p are the model coefficients, ε is the residual variable, and N is the number of elementary statistical units.

In our case, the multivariate linear regression model has the following representation:

$$SMES\_SII_i = \alpha + \beta_1 SMES\_ACC_i + \beta_2 SMES\_CLOUD_i + \beta_3 SMES\_ERP_i + \beta_4 SMES\_ICT_i + \beta_5 SMES\_OFFICE_i + \beta_6 SMES\_WEB_i + \varepsilon_i, \quad i = \overline{1,27} \quad (2)$$

For the detection of the parameters 〖α,β〗_1,β_2,...,β_5 the least squares method was applied. Their values and the tests applied to verify the significant role of the least squares method were used to detect the parameters 〖α,β〗_1,β_2,...,β_5. Their values and the tests applied to verify the significant role of the six indicators on the digitalisation of the accounting profession in the innovation of SMEs in the EU are presented in table 5. The results were obtained using the Eviews 10.1 software package.

Table 5. Parameters and indicators values of the multivariate linear regression model

Dependent Variable: SMES_SII				
Method: Least Squares				
Included observations: 27				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
α	-68.40681	182.2655	-0.375314	0.114
β_1	-0.124354	0.751910	-0.165385	0.303
β_2	1.930671	0.926137	2.084651	0.050
β_3	0.495403	0.384003	1.290101	0.211
β_4	0.532865	0.185371	2.874590	0.009
β_5	-1.206071	0.991991	-1.215809	0.238
β_6	0.914848	1.993156	0.458995	0.351

Source: Author's Computation from Eviews 10 Output;

According to the data in table 5 we can mention that in general the indicators describing the degree of digitalisation of accounting professionals in European SMEs have a positive influence on their Summary Innovation Index, except for the percentage of SMEs using financial-accounting software and those using Office applications. Thus, in 2021, the percentage of EU SMEs using a financial-accounting software package will reduce the Summary Innovation Index by 0.124%, while the percentage of SMEs using Office applications will decrease by 1.206%. On the other hand, the percentage of European SMEs that have integrated cloud computing services into the work of accounting professionals, use ERP software, are connected to the Internet and are secured against cyber attacks have a direct and positive effect on the SMEs Summary Innovation Index. Thus, while a one unit increase in changes in the percentage of European SMEs that have integrated Cloud Computing services into their accounting activity will lead to a 1.93% increase in the Summary Innovation Index, a one unit increase in changes in the percentage of European SMEs connected to the Internet will lead to a 0.91% increase in the Innovation Index, with no change in the other variables. A direct, positive and significant effect on the innovation index is also caused by the percentage of European SMEs using ERP software and the percentage of SMEs that are cybercrime insured, leading to an increase of 0.49% and 0.53% respectively.

Figure 5 shows graphically the correlations between the SMEs Summary Innovation Index with each of the six indicators on the digitalisation of the accountancy profession, highlighting the regression line.

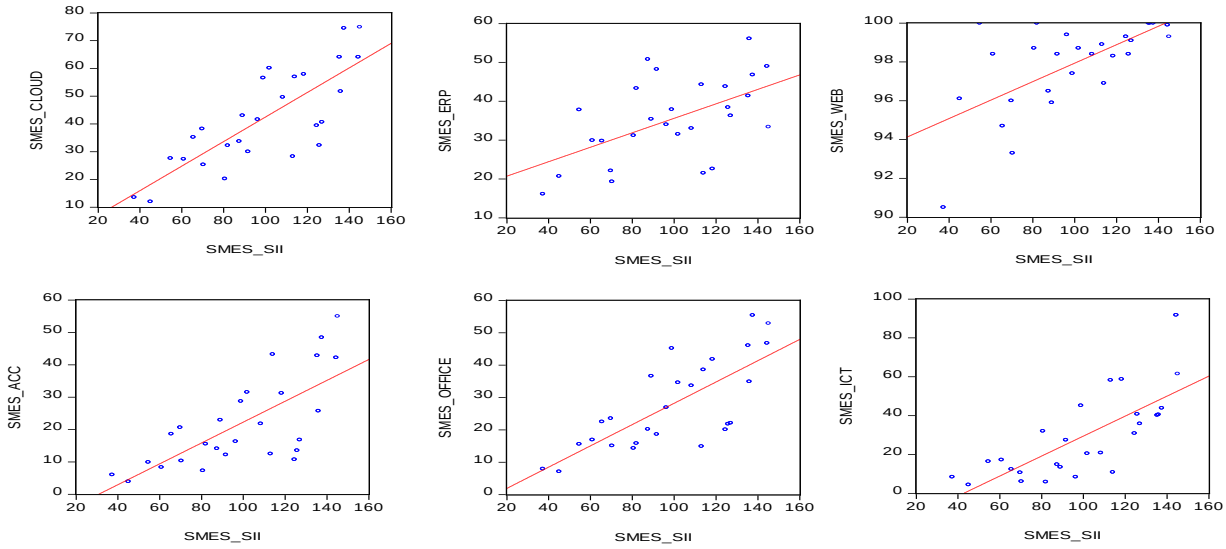

Figure 5. Association graph of indicators on the digitalisation of the accounting profession and the EU SMEs Summary Innovation Index

Source: own from Eviews 10.1;

Table 6 shows the values of the analysed model characteristics, statistical tests and indicators based on information theory.

Table 6. Values of statistical indicators and applied tests

Dependent Variable: SMES_SII			
Method: Least Squares			
Included observations: 27			
R-squared	0.826345	Mean dependent var	98.61989
Adjusted R-squared	0.774249	S.D. dependent var	31.17253
S.E. of regression	14.81110	Akaike info criterion	8.447045
Sum squared resid	4387.373	Schwarz criterion	8.783002
Log likelihood	-107.0351	Hannan-Quinn criter.	8.546942
F-statistic	15.86183	Durbin-Watson stat	2.163582
Prob(F-statistic)	0.000001		

Source: Author's Computation from Eviews 10 Output;

The data in table 6 reflect that the linear regression model analysed describes a direct and strong influence of the indicators on the digitalisation of accounting professionals in European SMEs on organisational innovation. R-squared is a statistical measure that indicates how much of the variation of a dependent variable is explained by an independent variable in a regression model. The high value of the R-squared coefficient shows that the digitalisation of the accounting profession in European SMEs influences 82.63% of the variation in the level of innovation of SMEs. Based on the above, the first research hypothesis (H1) is validated according to which the digitalisation of the accounting profession influences the innovation of SMEs in the European Union.

The low values obtained by the three indicators based on information theory (Akaike info criterion, Schwarz criterion and Hannan-Quinn criterion) confirm the correctness of the regression model analysed and ensure that relevant research results are obtained. The Durbin-Watson statistic applied to verify the hypothesis of autocorrelation errors shows that the data series analysed are not affected by the autocorrelation phenomenon, as the values of the statistic are in the range 2 and 4. According to these statements it appears that the independent variables affect only the output variable, and do not influence each other.

Table 7. Correlation Matrix of the Variables

	SMES_SII	SMES_WEB	SMES_ERP	SMES_ CLOUD	SMES_ OFFICE	SMES_ACC	SMES_ICT
SMES_SII	1.000						
SMES_WEB	0.644	1.000					
SMES_ERP	0.549	0.658	1.000				
SMES_CLOUD	0.793	0.483	0.299	1.000			
SMES_OFFICE	0.741	0.403	0.260	0.971	1.000		
SMES_ACC	0.713	0.357	0.177	0.950	0.944	1.000	
SMES_ICT	0.746	0.496	0.447	0.569	0.581	0.542	1.000

Source: Author's Computation from Eviews 10 Output;

Based on the data presented in table 7, it can be noted that the six indicators describing the level of digitalisation of accounting professionals in the European SMEs analysed are directly correlated with the SMEs' Summary Innovation Index, these correlations being of medium intensity. At the same time, we observe that the most significant and strongest correlations with the SMEs Summary Innovation Index are with the percentage of SMEs using Cloud Computing services, the percentage of SMEs using Office applications, the percentage of SMEs using financial-accounting software and the percentage of SMEs insured in case of cybercrime, these being +0.793; +0.741; +0.746 and +0.713. At the opposite pole, the weakest correlation of the SMEs Summary Innovation Index is with the percentage of SMEs with Internet connection and the percentage of SMEs using ERP software of 0.644 and 0.549. According to the above, the first research hypothesis (H2) is not validated, as a result, not all six indicators on the digitization of the accounting profession play a significant role in the innovation of SMEs in the EU, because the level of influence on the Summary Innovation Index differs.

The CUSUM test is used to check the stability of the parameters of the analysed model. This test is well known as a representative method in detecting structural changes in time series models (Xinhong , et al., 2008). The results of the CUSUM test are shown in figure 6.

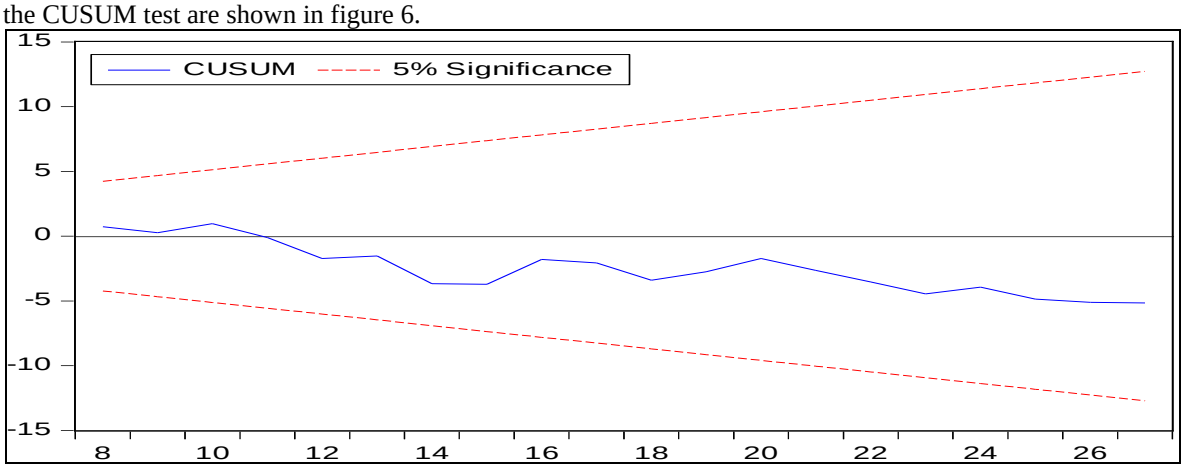

Figure 6. CUSUMS test results for model parameter stability verification
Source: own from Eviews 10.1;

Based on the graphical representation we can say that because the 5% line lies between the upper and lower bounds, the parameter estimates of the multivariate linear regression model are stable over time. This fact denotes that the model can be used on future data series as well.

The actual values of the SMEs Summary Innovation Index for the 27 EU Member States in 2021 versus the estimated values from the multivariate linear regression model are shown in figure 7.

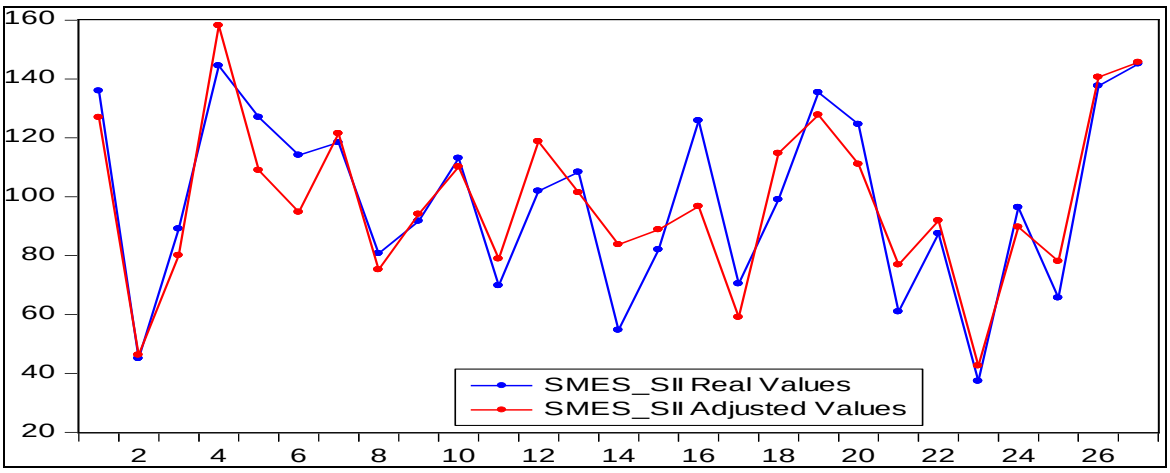

Figure 7. Actual & estimated values of the SMEs Summary Innovation Index for the EU-27 in 2021
Source: own from Eviews 10.1;

According to the data presented in figure 6 we can say that the linear regression model approximates with a high degree of accuracy the data series of the Summary Innovation Index of European SMEs and the indicators on the digitalisation of the accounting profession that are included in the model. The smallest differences between actual and adjusted values were obtained for Sweden, Finland, France, Spain and Bulgaria.

5. Discussions & Conclusions

The results of a survey by Accountancy Europe (2021) state that innovation in SMEs will come with the digitalisation of SMEs and accounting professionals. It also lists three barriers to SME digitalisation, namely: lack of digital skills of existing staff and accounting professionals, lack of financial resources and lack of awareness and regulatory requirements. The digitalisation of SMEs can be achieved in two important directions: the digitalisation of accounting systems and the digitalisation of business models.

The results of our study reflect the significant role that the digitalisation of the accounting profession plays in the innovation process of SMEs in the EU by 2021. It results that SME innovation occurs during the adoption and implementation of advanced computing technologies by accounting professionals. The digitalisation of the accountancy profession starts from connecting computers to the internet, operating ERP software, using financial-accounting software and having digital skills. The increasing digitalisation of accounting professionals is supported by the implementation of cloud technologies, blockchain, the constant use of artificial intelligence to process and interpret economic transactions, and having an insurance policy against cybercrime.

Based on the hypotheses formulated at the beginning of the research and the results obtained, we can say that digitalisation of the accounting profession is a factor of innovation in SMEs in the European Union, but not all indicators of digitalisation of the accounting profession play a significant role in the innovation of organisations. What is certain is that the digitalisation of accounting professionals in EU SMEs explains 82.63% of the innovation phenomenon in organisations. According to the multivariate linear regression model we identified that the increase in the percentage of SMEs using financial-accounting software and Office applications leads to a decrease in the Summary Innovation Index, while the increase in the other indicators on the digitalisation of accounting professionals leads to a positive change in the Summary Innovation Index of organisations.

The use of Office applications in accounting reflects the fact that accounting professionals have the digital skills needed to exploit advanced digital technologies that support innovation in organisations. At the same time, software has been used among accounting professionals as a form of record keeping in accounting other than the journal and master-cashier form. As a result, both Office applications and financial accounting software do not influence the creation of new business models, products or services, nor do they contribute to process improvements. These applications are basic and indispensable for accounting professionals, but they do not create added value in terms of innovation.

The values of descriptive statistical indicators confirm the existence of significant gaps in the digitalisation of accounting professionals and SMEs' innovation between leading innovators and emerging innovators. Geographical gaps will be persistent and visible because digitalisation requires a change in the way a business entity operates, thinks and presents itself. In order to bridge the gaps, accounting professionals in SMEs in EU Member States should implement a series of measures on testing new advanced digital technologies, increasing the level of digital skills, collaborating with partners supporting smart, sustainable and sustainable activities. These activities can be achieved through unrestricted access to publications in the field of digitalisation and innovation for SMEs, innovation-oriented public-private partnerships, practical partnerships to advance information and communication technologies and advanced digital skills development programmes.

The leader in EU SME digitalisation and innovation remains Denmark, which is at the top of the rankings, and at the other end of the spectrum are countries such as Hungary, Bulgaria and Romania, which are considered emerging

innovators in digitalisation and innovation. Based on the established rankings, emerging innovators should focus on the models and strategies used by Denmark, Finland, Sweden to develop their own development plans in terms of digitalisation of SMEs, accounting professionals, and innovation of economic entities.

The main limitations of this study relate to the number of dependent variables taken into account, the lack of values for some indicators in Eurostat databases and the low degree of comparability of existing data in this database. The concept of the six indicators on the digitalisation of the accounting profession is a selective approach based on professional experience. This concept can be broadened or narrowed.

This research offers many directions for future research. There is a possibility to complement this study with qualitative research that would provide much more detailed information focusing on the views of respondents from a representative sample of SMEs accounting professionals on innovation in business entities. Case studies could also provide clarity on the role of different contextual factors, as these are crucial in developing innovation capacity among SMEs.

Another line of research could investigate whether business innovation is associated with a particular type of innovation, in terms of process, management or marketing. A more comprehensive research on this topic could focus on a much more comprehensive database, covering a period before the Covid-19 pandemic and a period after. Future studies could provide more evidence on the pattern in which the digitalisation of the accountancy profession impacts the level of innovation of SMEs.

In addition, to the authors' knowledge, this study is the first to investigate if the digitalisation of the accounting profession and accounting practices jointly affect SMEs' innovation.

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