DIGITAL SKILLS INFLUENCING FACTOR OF FINANCIAL PERFORMANCE IN THE MEDICAL SECTOR IN ROMANIA

Silviu Cârstina[1*], Gabriela Badareu[2]
Radu Buziernescu[3], Stelian Selesteanu[4], Yamina Sosa[5]
[1)2)3)4)] University of Craiova, Craiova, Romania
[5)] South-West Oltenia Regional Development Agency, Craiova, Romania

Abstract
The research paper addresses the contemporary topic of digitalization through both its structure and content. The case study focuses on the medical sector, where a sample of 20 companies with an average of 105 employees was analysed. The study examines the need to enhance the digital competencies of medical staff and explores the correlation between the required level of digital knowledge—driven by advancements in medical technology—and the financial performance of these companies. Data collected through questionnaire responses were processed using JASP statistical software, and the relationship between digitalization and financial performance was analysed using Bayesian methods.

Keywords
digitization, financial performance, medical sector, Bayesian analysis, telemedicine, digital transformation

JEL Classification
F65, G22, C30

Introduction

Digitalization in the medical field refers to the integration of digital technologies across all aspects of healthcare services. Regardless of the current stage of development, the effective implementation of digital tools can significantly enhance the quality of medical care.

The adoption of new digital technologies in medicine brings numerous challenges, including data confidentiality and security, system interoperability, digital accessibility and inequality, implementation and maintenance costs, ethical and accountability concerns, training and education of medical staff, resistance to change, and the management of large volumes of data.

[*] **Corresponding author,** Silviu Cârstina - silviu.carstina@yahoo.com

The demand for digitalization in the medical sector has increased and will continue to grow with the emergence of innovative medical services and the evolving operational structures of hospitals, clinics, and private practices. Key examples supporting this trend include telemedicine, electronic medical records, the application of artificial intelligence in diagnosis and treatment, connected health devices, and remote patient monitoring.

Digitalization is a central priority in transforming the healthcare system. Ensuring secure and equitable access to medical services is a fundamental right that can be facilitated through digital means (Bîzu, C.L., 2022). The current research begins by investigating how prepared medical staff are for digitalization. Unlike other studies that rely on secondary statistical data from various databases, this study examines the need for training and the development of digital competencies among healthcare personnel through primary field research. The results are direct, up-to-date, and based on data collected through a structured questionnaire, thus enhancing the originality and relevance of the study.

Equitable access to healthcare is further supported in the literature. As noted by Sachin D. and Shah M.D. (2024): "Digital activation is essential for equitable access not only to healthcare but also to education, housing, jobs, economic growth, social services, and food. Although low digital literacy was not a major disadvantage 20 years ago, today the consequences of digital exclusion are profound."

Scholarly interest in the digitalization of the medical field has peaked since 2020. The COVID-19 pandemic acted as a catalyst, with telemedicine playing an increasingly vital role during this period. From 2022 onwards, the volume of academic research on medical digitalization has expanded substantially; in 2022 alone, 499 papers on this topic were indexed in the Web of Science database (Badareu G., et al., 2025).

Training medical personnel in the context of digital transformation is expected to make a significant contribution to the improvement of healthcare service quality, while also enhancing the operational efficiency of medical institutions. The optimization of these institutions' activities is likely to result in improved financial performance.

1. Review of the scientific literature

The analysis of the correlation between digitalization—measured through the digital competencies of medical staff based on the DigComp framework—and financial performance in the medical sector constitutes the main objective of this research.

The specialized literature highlights a strong and direct relationship between digitalization and financial performance within the healthcare sector. For instance, Scafarto et al. (2023) conducted a study on a sample of 965 observations and concluded that digitalization positively influences financial outcomes. Their findings emphasized the crucial role of staff competencies, revealing that intellectual capital efficiency, human capital efficiency, and structural capital efficiency partially mediate the relationship between digitalization and organizational performance.

Similarly, Savvakis G.A. et al. (2024) investigated the role of digitalization as a factor influencing financial performance, analyzing a sample of 12,179 SMEs in the healthcare sector. The study found that during the COVID-19 pandemic, financial performance was significantly and negatively affected, but digitalization played a mitigating role, helping to counteract the pandemic's adverse effects on the sector.

Luu H.N. et al. (2024) also confirmed the positive impact of digitalization, showing that it significantly increases productivity and sales without proportionally raising total costs, thereby contributing to improved operational efficiency.

The importance of digitalization from the perspective of firm size and financial capacity was explored by Lastauskaite A. (2024). The author concluded that companies in Eastern Europe benefit more from digitalization than their Western European counterparts, and that larger firms derive more advantages from digitalization than smaller ones. This suggests that financial capacity is a critical enabler for digital transformation, given the substantial costs associated with implementing digital solutions.

In their work titled Digitalization as a Solution for Improving Financial Performance, Yang Z.B., Zhang Y.F., and Zhang T. (2024) studied 370 firms in central China and found that digitalization enhances financial performance and competitiveness. They emphasized that the effective use of digital technologies promotes operational efficiency, innovation, value creation, and value capture.

Rosyidiana R.N. and Narsa I.M. (2024) analyzed 35 micro, small, and medium-sized enterprises (MSMEs) in a post-pandemic context to assess the effects of digitalization, financial literacy, and innovation on financial performance. Although they found that financial literacy had a stronger impact than digitalization, the study still underscored the importance of digital technology adoption for innovation and profit maximization in the digital era. They argued that digital-driven innovation enables SMEs to improve productivity and adapt to the post-pandemic economic landscape.

Finally, Lastauskaite and Krusinskas (2024) examined the impact of investments in production digitalization on financial performance across 634 companies from 30 European countries. Their findings suggest that the relationship between digital investments and performance varies by region and company size. In the context of global events like the COVID-19 pandemic, digital investments have emerged not only as a performance-enhancing strategy but also as a critical survival mechanism for businesses.

Collectively, these studies underscore the robust correlation between digitalization and financial performance. They approach digitalization from multiple perspectives: investment in advanced technologies, staff training and upskilling, and the integration of artificial intelligence into operational processes.

The necessity of digitalization in the medical sector has been widely demonstrated in academic literature, both in terms of technological integration in healthcare services and the imperative of enhancing staff competencies to effectively adopt and utilize these technologies.

2. Research methodology

The primary objective of this research is to analyze the correlation between the digital competencies of employees in the medical sector and the financial performance of the entities in which they operate.

To carry out this analysis, a questionnaire was administered to 20 medical entities, which collectively employ a total of 105 staff members. These 20 entities vary in terms of organizational structure and the types of medical services they provide, ensuring that

the study captures the diversity of the sector. This diversity allows for a more comprehensive understanding of the phenomenon under investigation.
The questionnaire was designed based on the DigComp digital competence framework and includes five key dimensions: information and data literacy, communication and collaboration, digital content creation, safety, and problem-solving. The first section of the questionnaire collects demographic data, such as age, education level, and the respondent's role within the organization. The second section assesses the respondent's perceived level of preparedness across each of the five competence areas.
Regarding financial performance, the study focuses on indicators that reflect the volume of medical services delivered, employee productivity, and organizational profitability.
The indicators analyzed are presented in the following table:

Table no. 1. Indicators Used in Analysing the Impact of Digital Skills on Financial Performance

Indicators used	*Domain*	*Variable*
Turnover (CA), annual labour productivity (W), net profit (Pn), ROA (Return on Assets)	Financial performance	dependent
Information and digital literacy (P); Communication and collaboration (C); Digital content (CD); Security (S); Problem-solving (Rp).	Digitalization (DIGIcomp)	independent

Source: Authors' processing, based on the European Commission's DigComp digital competence framework, 2025.

The analysis of the correlation between the indicators was performed using the statistical program JASP, where, through network-type analyses, we determined the type of relationships existing between the variables. Thus, the research conducted and the type of variables led us to use Bayesian-type analyses.
The Bayesian factor compares the probability of models: one that assumes there is a correlation ($\rho \neq 0$) and another that assumes there is no correlation ($\rho = 0$).

The typical interpretation of the Bayesian factor (BF) is as follows:

BF < 1: Evidence in favour of no correlation ($\rho = 0$)

1 < BF < 3: Weak evidence for correlation

3 < BF < 10: Moderate evidence for correlation

BF > 10: Strong evidence for correlation.

The reference period for determining the performance indicator levels is the most recent fiscal year reported by the entities, specifically the year 2023.
The central question we aim to answer through this research is: Is there a correlation between the increase in digital competencies of employees in the medical sector and the financial performance of entities in this sector?
Considering the main objective of this study, two research hypotheses were formulated:

- Hypothesis 1 (H1): The increase in the level of digitalization, in correlation with the evolution of medical services, leads to an improvement in the financial performance of the healthcare sector.

- Hypothesis 2 (H2): As the level of digitalization increases, there is also a need for adequate training of human resources, which in turn will be reflected in the financial performance of the healthcare sector.

3. Results and discussion

For the analysis of the correlation between financial performance and digital competencies among employees in the medical sector, we used the statistical program JASP.

The first analysis conducted on the variables is provided by descriptive statistics. The results of the descriptive statistics are reflected in the following table:

Table no. 2. Descriptive Statistics

	C4	W	Pn	RO4	P	C	CD	S	Rp
Valid	18	18	18	18	18	18	18	18	18
Missing	0	0	0	0	0	0	0	0	0
Mean	1.111×10^{-6}	135585.876	293723.722	0.581	0.778	1.611	1.611	1.278	1.278
Std. Deviation	2.285×10^{-6}	87474.067	440094.122	0.319	1.114	1.145	3.664	3.594	3.594
Skewness	3.272	0.229	2.173	-0.076	1.639	0.884	2.747	3.158	3.158
Std. Error of Skewness	0.536	0.536	0.536	0.536	0.536	0.536	0.536	0.536	0.536
Kurtosis	11.409	-0.265	4.044	-1.421	2.810	0.466	7.833	10.105	10.105
Std. Error of Kurtosis	1.038	1.038	1.038	1.038	1.038	1.038	1.038	1.038	1.038
Minimum	10021.000	10021.000	85.000	0.000	0.000	0.000	0.000	0.000	0.000
Maximum	9.450×10^{-6}	301830.667	1.493×10^{-6}	0.990	4.000	4.000	14.000	14.000	14.000

Source: Authors' processing, 2025.

The level between the mean and standard deviation validates the variables considered for the study. Additionally, the levels of Skewness and Kurtosis validate the selected variables for both the financial performance and digitalization aspects.

The existence of results obtained from previous research, as well as the level of data currently available for the study, guided us towards applying Bayesian analysis. The level of correlation between the variables is reflected in the following table 3:

Table no. 3. Bayesian Pearson Correlations

Variable		C4	W	Pn	RO4	P	C	CD	S	Rp
5. P	Pearson's r	-0.045	0.480	0.021	0.085	—				
	BF_{10}	0.296	1.922	0.292	0.307	—				
6. C	Pearson's r	-0.149	-0.036	-0.246	-0.213	0.389	—			
	BF_{10}	0.343	0.294	0.458	0.408	0.954	—			
7. CD	Pearson's r	0.674	0.256	0.835	-0.167	-0.138	-0.220	—		
	BF_{10}	22.711	0.476	1520.108	0.357	0.335	0.418	—		
8. S	Pearson's r	0.697	0.228	0.857	-0.208	-0.204	-0.315	0.929	—	
	BF_{10}	34.477	0.428	3741.882	0.401	0.396	0.620	396789.029	—	
9. Rp	Pearson's r	0.688	0.220	0.851	-0.205	-0.263	-0.373	0.929	0.982	—
	BF_{10}	29.003	0.416	2951.732	0.398	0.488	0.856	396789.029	4.776×10^{-6}	—

Source: Authors' processing, 2025.

The Bayesian correlation analysis reveals strong relationships between company turnover and specific areas of digital competence—namely, digital content creation, security, and problem-solving, as defined by the DigiComp framework. Similarly, a strong correlation was also identified between net profit and the same three areas of digital competence: digital content, security, and problem-solving.

These observed correlations between financial performance indicators and the specific digital competence areas support the validation of the first research hypothesis (H1): there is a statistically significant relationship between the financial performance of companies in the medical sector and the level of digitalization.

However, the analysis did not find evidence of significant correlations between productivity, return on assets (ROA), and the digital competence dimensions. The absence of such correlations suggests that increased digitalization, if not accompanied by an improvement in employees' digital skills, may not translate into higher performance in terms of productivity and ROA within the medical sector.

These findings reinforce the second research hypothesis (H2), which posits that in order for digitalization to positively impact efficiency-related indicators such as productivity and ROA, it must be accompanied by targeted training and development of human resources.

In addition to the Bayesian analysis, the relationships between variables were further explored using network analysis, the results of which are presented in Table 4.

Table no. 4. Bayesian Network Analysis

Summary of Network		
Number of nodes	Number of non-zero edges	Sparsity
9	4 / 36	0.889

Source: Authors' processing, 2025.

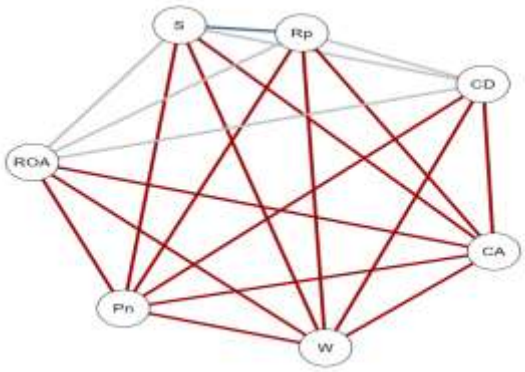

Figure no. 1: The correlation analysis between digitalization and financial performance

Source: Authors' processing, using JASP 2025.

The Bayesian analysis can automatically identify a subset of relevant variables, eliminating those that do not contribute significantly. The Sparsity level indicates that 88.9% of the variables are of particular importance in conducting the study.
It is important to consider the limitations of Bayesian analysis in these evaluations, namely: the choice of the prior distribution influences the results, especially in cases with small datasets, as is our case; insignificant data may lead to results that do not accurately reflect observable reality.
The correlation analysis between digitalization and financial performance in the medical field (figure 1) demonstrates a strong direct connection between the two, as well as the ongoing need for digitalization about technological evolution. This ensures higher quality, more efficient medical services.

5. Conclusions

The analysis conducted in this study has demonstrated a direct relationship between the level of digitalization and financial performance in economic entities across various sectors, including the healthcare sector, where the questionnaire was applied.
The study, based on responses from 105 participants in the healthcare sector, identified strong correlations between company turnover and profit and specific digital competence areas—digital content creation, security, and problem-solving—as defined in the DigiComp framework.
The continuous need for digitalization stems from the rapid and ongoing evolution of technology. Moreover, there is a direct connection between digitalization and technological innovation. As technology advances, so does the demand for digitalization, which in turn necessitates continuous digital education and training. In order to maximize the efficiency of using new and innovative technological equipment, medical staff must be consistently trained in digital competencies.
A further decisive factor in advancing digitalization in the healthcare sector is the expansion of telemedicine. This innovative service relies on a variety of medical devices designed to monitor patients' health remotely. The effective use of telemedicine requires both healthcare professionals and patients to develop and maintain an adequate level of digital literacy.
Through this study, we have underscored the importance of digitalization in the medical sector, relying on primary data collected through market research conducted via a structured questionnaire. By accessing direct sources, we obtained concrete insights into the necessity and relevance of digitalization, while also assessing the training level of human resources in this field. Furthermore, we analyzed the correlation between employee efficiency and company performance in the healthcare sector.
As digitalization continues to be implemented, new research opportunities are emerging. In future studies, we aim to monitor the impact of digitalization not only on financial outcomes but also on the quality of medical services provided.
The main conclusion drawn from this research is that the level of digitalization within an economic entity—regardless of its sector of activity—is a critical factor in the current economic environment. A company that fails to adapt to technological advancements is likely to become non-competitive and unable to meet the demands of the modern marketplace.

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