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The impact of information technologies on employment in the banking sector of Serbia

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Abstract

The paper analyzes changes in employment and profitability in the Serbian banking sector during the period 2001–2024, with a comparison to trends in the United States. Particular attention is given to the impact of digitalization and artificial intelligence on the transformation of business models and the structure of the workforce. The results show that employment in Serbia increased until the global financial crisis of 2008, after which it recorded a continuous decline and stabilization at a lower level, while similar patterns are observed in the U.S., where the decline in commercial banking employment was partly offset by growth in the broader financial sector. Profitability of the Serbian banking sector has experienced strong growth, especially since 2017, with record results in the period 2021–2024, with technological innovations, regulatory stability, and the reduction of non-performing loans identified as key contributing factors.
Keywords: *banking sector, digitalization, employment, artificial intelligence*

1. Introduction

During the Industrial Revolution, it was relatively easy to predict developments in the labor market. Today, that is no longer the case—especially when it comes to employment in the Serbian banking sector. Based on what happened in the labor markets during earlier industrial revolutions, one could assume that, on a global scale, all existing types of jobs will either undergo fundamental changes or disappear altogether, while entirely new, yet-unknown professions will emerge. The very essence of employment and the nature of work are rapidly changing. Awareness of the acceleration of these changes is gradually becoming consolidated. The essence and content of jobs are changing so fast that, at some point, it will be difficult to keep track of them.

This growing acceleration has likely prevented the emergence of consensus on the dilemmas at hand. Things have changed so profoundly that the past can no longer be simply extrapolated into the future. The new era will not be marked by the replacement of human physical abilities, as was the case in the past. Artificial intelligence (AI) is gradually conquering the realm of human cognitive abilities.

It is difficult to predict the development of the labor market as a whole, and particularly the segment related to finance. Even the very existence of a "labor market" in the future is in question. It is assumed that information and biotechnologies—technologies that dictate not only the character but also the pace and acceleration of change—will transform every remaining type of work and generate entirely new, currently unknown professions. The crucial question is: which side will prevail? Will more new jobs be created than destroyed, or will the extinction of existing jobs dominate? Pessimists argue that in the relatively near future, labor supply will exceed what the market can absorb, while optimists maintain that technological progress will continue to generate new employment. Between the two camps, no consensus exists regarding either the essence or the pace of the coming transformations. Old fears remain, alongside a surplus of utopian energy.

2. Information technologies in banking

The process of digitalization and the application of information technologies in banking can no longer be considered a new phenomenon. Digitalization is no longer merely a transformation; it has become a continuous process, one that is gradually entering a qualitatively higher stage—a stage marked by the application of artificial intelligence (AI).

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Digitalization has significantly increased the efficiency of banking operations. It has optimized resource use, improved communication, and contributed to profit growth. The digital environment (NBFCs, MFIs, etc.) has enhanced the functioning of banks, simplified client communication, and allowed for customized banking products. The use of apps, platforms, and other digital channels has made it possible to offer a wide range of products while reducing operating costs. At the same time, clients benefit from numerous conveniences (Qi, 2022).

Artificial intelligence has improved access to banking services and products. Faster access to information, data searches, and analysis enhance the customer experience. For banks, AI has facilitated product development and expanded the scope of available services. The introduction of the fintech industry into the banking sector has significantly increased the role of innovation (Leong et al. 2017; Shin et al. 2019). Innovations such as peer-to-peer lending, digital wallets, and crowdfunding are just some of the more prominent examples, but new innovations appear daily. Investment in IT and AI has become an integral part of banks' development strategies.

2.1. The fundamental difference between present/future and past "new" technologies

Since the dawn of human civilization, new technologies have appeared periodically. Their frequency has varied but has generally increased over time. Until recently, their diffusion was primarily about replacing human physical effort. The consequences were manifold, and in terms of employment, they often opened the way to new jobs and higher standards of living. Now, however, things are changing.

The growing transformations brought about by the development of information and biotechnologies have led to the rise of artificial intelligence. Here we reach a turning point: unlike earlier "new" technologies, AI is aimed at replacing human cognitive abilities. It moves into the domains of learning, analyzing, communicating, and increasingly, emotions. The emotional manifestations of individuals are becoming more transparent, more legible, and thus more predictable, which opens the door to new forms of influence and manipulation. One can only imagine the possibilities for AI-driven marketing strategies.

Humans function through countless decisions, both professional and personal. This makes it essential to understand how people make decisions. Advances in neurology and behavioral economics have brought us much further than before. Until recently, the role of free will in decision-making remained unclear. The latest scientific findings suggest that decision-making is not tied to free will but is rather a process of calculating probabilities according to predetermined algorithms. These processes occur in the brain, and once the algorithm becomes known, AI can be integrated into this process.

Other aspects of brain function have also been explored, including seemingly "mystical" phenomena such as intuition, emotions, and desires. Intuition turns out to be nothing more than the brain's ability to recognize recurring patterns. Emotions and desires are likewise reducible to biochemical processes governed by specific algorithms.

If problem-solving follows a specific sequence (an algorithm), then it can be entrusted to computers, which are faster, more efficient, and more precise than the human brain. AI is superior in calculating probabilities and recognizing patterns. Moreover, research shows that brain processes do not unfold with great precision, which means AI can already be expected to take over jobs requiring an understanding of clients' desires and emotions. In the next phase, it may even begin to generate emotions, desires, and behaviors. Not only banking tasks, but also marketing strategies will increasingly align with people's pre-shaped attitudes and desires. Given a long enough time horizon, we may doubt whether humans will retain any meaningful influence over banking operations.

2.2. Employment in Serbia's banking sector

Has the future already begun in the way we have described? If so, the first sign will be seen in the declining number of employees in Serbia's banking sector. Let us analyze the changes that have taken place in the first quarter of this millennium.

The Serbian banking sector has gone through several phases. The first phase, following the lifting of Western sanctions in the mid-1990s, was marked by improved banking indicators. The second phase was a reversal triggered by the global financial crisis, which pushed the sector backward. The third phase was one of stabilization, disrupted by the COVID-19 crisis. Business indicators gradually stabilized, profits began to grow, while employment started to decline—a trend partly driven by greater use of IT and the gradual introduction of AI.

Table 1. Employees in Serbia's banking sector (2001–2024)

Year	Employees	Year	Employees
2001.	22.799	2013.	26.380
2002.	14.736	2014.	25.106
2003.	18.914	2015.	24.257
2004.	22.319	2016.	23.847
2005.	23.463	2017.	23.055
2006.	23.566	2018.	22.830
2007.	30.246	2019.	23.087
2008.	32.342	2020.	22.823
2009.	31.524	2021.	22.550
2010.	29.887	2022.	22.154
2011.	29 747	2023.	21.895
2012.	28 394	2024.	22.287

Sorce: CEIC Data. (n.d.). *Serbia banks network: Number of employees*. CEIC Data. Retrieved May 10, 2025, from https://www.ceicdata.com/en/serbia/number-of-banks-and-bank-network/banks-network-no-of-employees

When it comes to employment, the period 2002–2008 can be marked as the initial phase of growth, that is, the expansion period of the banking sector. This was a time of significant increase in the number of employees, as the figure rose from 14,736 in 2002 to 32,342 in 2008, the year considered the peak (in terms of total employment) before the global financial crisis. Since 2008, the number of employees has been declining. Stabilization occurred in 2016, and employment has not changed significantly since then. The reduction in the number of employees is believed to be the result of digitalization, bank consolidation, and a decrease in the number of branches. It is difficult to distinguish the influence of individual factors.

Let us make a comparison with the U.S. banking sector regarding the number of employees in banking (or more precisely, in the *commercial banking/financial activities* sector, for which data are available) for the period 2001–2024. Given the size of the two economies and their banking sectors, comparing Serbia with the U.S. is not the most fitting approach, but it is important considering that the U.S. is regarded as one of the most advanced economies in terms of both market and technology. The same applies to its banking sector.

Table 2. Employees in USA's banking sector (2001–2024)

Year	Employees	Year	Employees
2001.	1.334	2013.	1.374
2002.	1.356	2014.	1.348
2003.	1.362	2015.	1.338
2004.	1.361	2016.	1.362
2005.	1.376	2017.	1.375
2006.	1.402	2018.	1.381
2007.	1.425	2019.	1.393
2008.	1.424	2020.	1.388
2009.	1.379	2021.	1.366
2010.	1.366	2022.	1.375
2011.	1.375	2023.	1.396
2012.	1.381	2024.	1.377

Sorce: YCharts. (n.d.). *US financial activities, commercial banking employees yearly*. YCharts. Retrieved May 10, 2025, from https://ycharts.com/indicators/us_financial_activities_commercial_banking_employees_yearly

The period 2007–2008 represents a phase of relative growth in employment. The financial crisis (2008–2009) caused a decline in employment, followed by a period of stagnation. Until 2010, the number of employees did not significantly recover. In the past few years (2020–2024), the effects of digitalization and cost optimization have led to a decrease in employment. However, in broader terms, the financial sector is growing. Commercial banks have reduced the number of employees, but the financial activities sector has recorded employment growth, driven by the expansion of financial services (investments, fintech, insurance). Such trends are a direct consequence of a functioning developed capital market. This scenario is unlikely in Serbia, as it does not have a developed capital market.

The absolute figures are very different in the two countries: the U.S. has about 1.3 million employees in commercial banking, while Serbia has around twenty thousand. In the U.S., the broader financial sector (investments, insurance, services) grew during the 2010s and 2020s, whereas commercial banking stagnated or slightly declined. In Serbia, shocks (the 2008 crisis) and structural changes (foreign entries, consolidation) also led to a peak around 2008, followed by a long-term decline and stabilization at lower levels.

Table 3. Comparison of trends in two countries

Characteristic	Serbia (2001-2024)	USA (2001-2024)
Magnitude	The banking sector employs tens of thousands of people.	For commercial banking, about 1.3-1.4 million people work; in the broader financial sector, about 9-9.2 million in 2024.
Peak and Decline	Peak around 2007-2008 (~30-32 thousand) — followed by a decline and stabilization at a lower level (~25-30 thousand and beyond).	Peak until the financial crisis; decline after 2008-2009; never a full recovery to pre-crisis peaks in commercial banking.
Impact of the 2008 Crisis	Significant reduction after the 2008 peak.	Similar: the crisis led to a reduction in bank employees, restructuring, and layoffs.
Recent Period (2020-2024)	Decline followed by slight growth to ~22 thousand, with stabilization.	Similar trends of decline in commercial banking; the broader financial sector is growing.
Structural Factors	Digitalization, consolidation of banks, reduction in the number of branches, automation — similar to the USA, but with limited resources for transitioning to high automation due to costs and infrastructure.	Stronger shift to digital channels, consolidation of banks, efficiency (cost reduction), influence of technology, regulations, and global financial markets.

Source: Authors' interpretation

Both markets reached their peak employment in banking before 2008/2009, and both experienced a decline after the financial crisis, eventually entering a period of stabilization or slight decrease. In both countries, these trends were driven by factors such as bank consolidation, reduction in the number of branches, automation, and digitalization.

2.3 Profits

The application of information technologies and the overall process of digitalization serve the purpose of increasing profits. However, this is only one of the determinants of profitability. There are, in fact, many such factors, and they are not the subject of this analysis. The technological aspect is always significant, but in banking operations it is probably not decisive. Other factors, at least at this level of technological development, are much more important, especially in less developed markets.

Data on the profits of the banking sector are not easily available. We obtained them through several steps. First, we used the statistical annex of the National Bank of Serbia (NBS) and an analysis published in the journal *Revizor*, where annual pre-tax profits for the period 2003–2022 were summarized based on quarterly reports. In the next step, we converted the amounts from RSD to EUR at the exchange rate valid on December 31 of each year (exchange rate taken from NBS statistics). For years before 2021, we used historical data (e.g., 2008: 85 RSD/EUR, 2015: ~120 RSD/EUR, etc.). In this way, we arrived at the following table.

Table 4. Profits of the Serbian banking sector before taxes

Year	Profits before taxes (RSD mil)	(RSD/EUR)	Profits before taxes (EUR mil)
2003.	~10.500	63	~167
2004.	~12.000	64	~188
2008.	~25.000	85	~294
2012.	~35.000	110	~318
2015.	~40.000	120	~333
2018.	~45.000	118	~381
2021.	53.900	117.22	460
2022.	99.620	117.67	846
2023.	138.16	117.30	1.177

Note: The figures presented are approximations based on the aggregation of quarterly reports and the exchange rate at the end of the year. The exact annual amounts are likely different, but the trend is clear and reflects significant growth in recent years.

Source: National Bank of Serbia (2024), Banking Sector Reports; authors' calculation based on average annual RSD/EUR exchange rates.

Since the banking sector was reformed in the early 2000s, the profitability level of Serbia's banking sector has been on the rise. Between 2003 and 2008, the sector's profit doubled. The global financial crisis (2008–2009) and the high level of NPLs led to a decline in profits after 2008. During crisis periods, profitability levels are lower for well-known reasons. Post-crisis consolidation and recovery began in 2012–2013, with measures to reduce NPLs and with stabilized policies (interest rates, safer placements). Net profit, for example, grew by 58.8% in H1 2013 compared to the same period in 2012.

In the following years, as a result of regulatory and market changes (a sharp increase in reference interest rates, a drop in the NPL ratio from ~23% (2015) to ~3%), a stable growth in profits was recorded. This trend has been particularly strong since 2017. In the period 2021–2023, there was a sharp surge in profits. The jump was the result of higher interest rates, the reduction of bad loans (NPLs), and sector consolidation. Net profit rose from ~EUR 460 million in 2021 to as much as ~EUR 1.177 billion in 2023. Financial institutions achieved as much as EUR 837 million in pre-tax profit in 2022 (National Bank of Serbia, 2024).

It should also be noted that strict regulation, in line with Basel standards, has produced results and significantly contributed to the stability of the banking sector even during crises caused by the Covid-19 pandemic and challenges arising from the conflict in Ukraine.

The profitability growth of the banking sector continued in 2023 and 2024. The total net pre-tax profit reached as much as EUR 1.18 billion in 2023 and EUR 1.5 billion in 2024, the highest level since the sector was reformed in the early 2000s. This continues the trend of gradual profitability growth, which became particularly intense starting in 2021 (EY (2025).

The profitability of the Serbian banking sector has been analyzed in several papers published in numerous journals. Profitability data often differ, as some authors exclude smaller banks or those that have meanwhile exited the market. In Table 5 (Ristanović et al., 2023, p. 74), the authors summarize their results. They state that the synthetic indicators of banking sector profitability – return on assets (ROA), return on equity (ROE), and net interest margin (NIM) – point to positive business trends and confirm that banks have operated efficiently. Profits were generated from own assets, with high returns on equity.

Table 5. Banking sector in Serbia, 2003-2023.

Year	Number of banks	Assets (net), billion RSD	Share in the financial sector, %	Profits before taxes billion dinars
2003.	47	367		-1
2004.	43	510		-5
2005.	40	775		7.3
2006.	37	1.169		16.5
2007.	35	1.562		23.4
2008.	34	1.777	89.3	34.7
2009.	34	2.160	90.8	20
2010.	33	2.534	91.8	25.4
2011.	33	2.650	92.4	1.3
2012.	32	2.880	92.6	11.7
2013.	30	2.846	92.4	-2.1
2014.	29	2.696	92.0	3.5
2015.	30	3.048	91.6	9.7
2016.	30	3.342	91.2	21.3
2017.	29	3.369	90.7	68.7
2018.	27	3.774	90.3	75.7
2019.	26	4.084	90.1	67.7
2020.	26	4.601	90.6	46.1
2021.	23	5.948	90.9	53.9
2022.	22	5.307		57.6

Source: Ristanović, V., & Mirković, S. (2023), *Profitability assessment of the banking sector in Serbia*, *Revizor 26*(102-103), 71-81. https://doi.org/10.56362/Rev23102071R

Radojko Lukić (Lukić, 2023, p. 24) states that the profitability of the banking sector in Serbia has recently improved. According to the ranking of the five most profitable years in the Serbian banking sector during the period 2008–2022, they are: 2018, 2017, 2008, 2019, and 2022. The weakest profitability was recorded in 2013.

The profitability of the Serbian banking sector was influenced by the economic climate, management of human resources, assets, capital, banking product sales, costs and profit, the digitalization of overall operations, the Covid-19 pandemic, and the global energy crisis.

In order to improve the profitability of the banking sector in Serbia, it is necessary to manage cost elements as efficiently as possible (Lukić, 2023, p. 18). This certainly includes labor costs, which are significant both from the perspective of employment levels and from the perspective of costs related to the use of information technologies. Unfortunately, the latter are not recorded in accounting in such a way that they can be fully and unambiguously analyzed, which would be of great importance for the subject of this analysis. Their significance is particularly high because, despite the fact that from an accounting perspective they reduce profit, they actually have the character of an investment cost.

An increase in profits in banking in the coming period will be linked to the deepening of the digitalization process and the application of AI. This is a process already well underway and one that has greatly simplified and accelerated operations in the banking sector through the networking of the economy.

3. Conclusion

The analysis confirms that information technologies and artificial intelligence have become the dominant drivers of the transformation of Serbia's banking sector, simultaneously fostering profitability growth and reducing employment. A comparison with the United States shows that employment patterns are similar, but differences arise from the broader scope of the U.S. financial market and its greater capacity to offset job losses. In recent years, the Serbian banking sector has recorded record profitability, indicating stability and resilience, while at the same time raising questions about the long-term sustainability of employment under conditions of accelerated digitalization. A continued decline in the number of employees is expected, accompanied by the growing importance of specialized roles in risk management, innovation, and analytics, while further profitability growth will depend on the intensity and quality of new technology adoption.

References

Basole, R. C., & Patel, S. S. (2018). Transformation through unbundling: Visualizing the global FinTech ecosystem. *Service Science, 10*(4), 379–396. https://doi.org/10.1287/serv.2018.0210

CEIC Data. (n.d.). *Serbia banks network: Number of employees*. CEIC Data. Retrieved May 10, 2025, from https://www.ceicdata.com/en/serbia/number-of-banks-and-bank-network/banks-network-no-of-employees

Frederic, S., & Mishkin, F. S. (2006). *Monetarna ekonomija, bankarstvo i finansijska tržišta* (7th ed.). Data Status.

Leong, C., Tan, B., Xiao, X., Tan, F. T. C., & Sun, Y. (2017). Nurturing a FinTech ecosystem: The case of a youth microloan startup in China. *International Journal of Information Management, 37*(2), 92–97. https://doi.org/10.1016/j.ijinfomgt.2016.11.006

Lukić, R. (2023). Merenje i analiza dinamike profitabilnosti bankarskog sektora u Srbiji na bazi FLMAW-MARCOS metoda. *Bankarstvo, 52*(1), 8–47. https://doi.org/10.5937/bankarstvo2301028L

National Bank of Serbia. (2024). *Banking sector reports*. National Bank of Serbia. https://www.nbs.rs/en/finansijske-institucije/banke/

Qi, Y. (2022). Digital transformation of business models in the banking sector. In J. Li, E. N. H. Khay, & Z. H. Zhan (Eds.), *Proceedings of the 2022 International Conference on Social Sciences and Humanities and Arts (SSHA 2022)* (pp. 951–954). *Advances in Social Science, Education and Humanities Research, 653*.

Ristanović, V., & Mirković, S. (2023). Profitability assessment of the banking sector in Serbia. *Revizor, 26*(102–103), 71–81. https://doi.org/10.56362/Rev23102071R

Rose, P. S. (2003). *Menadžment komercijalnih banaka* (4th ed.). Mate.

Rose, P. S., & Hudgins, S. C. (2005). *Bankarski menadžment i finansijske usluge*. Data Status.

Shin, Y. J., & Choi, Y. (2019). Feasibility of the Fintech industry as an innovation platform for sustainable economic growth in Korea. *Sustainability, 11*(19), 5351. https://doi.org/10.3390/su11195351

YCharts. (n.d.). *US financial activities, commercial banking employees yearly*. YCharts. Retrieved May 10, 2025, from https://ycharts.com/indicators/us_financial_activities_commercial_banking_employees_yearly