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Dobrodošli u najnovije izdanje našeg poslovnog magazina i časopisa „*Ekonomski Signali*“. U ovom **dru- gom broju za 2025. godinu** radovi su nastali u uslovima izazova i prilika koje okružuju složena ekonomska i politička dešavanja u Srbiji i Kosovu i Metohiji kao delu akademskog prostora naše zemlje. Nadamo se da će vam sadržaj ovog broja pružiti korisne uvide u sadašnjost i važnost pravovremenog praćenja ekonomskih prilika kod nas i na globalnom nivou, preko ekonomskih analiza pojedinih delova ekonomije u uslovima koja su zahtevala dodatnu akademsku pažnju i istraživanje.

Prvi rad pod naslovom „*Analiza učinka bankarskog sektora tokom pandemije Kovid-19: ključne lekcije*, autora Mirjane Mrvaljević, Gordane Jovanović i Nenada Kojića, analizira samo nekoliko godina nakon globalne ekonomske krize, svetsku ekonomiju, koja se još nije u potpunosti oporavila od svojih efekata, suočila se sa novom krizom koja je značajno uticala na bankarski sektor. Za razliku od globalne finansijske krize 2008-2014, koja je nastala iz godina strukturnih problema u finansijskom sistemu, kriza izazvana pandemijom COVID-19 je drugačije

prirode. To nije uzrokovano ekonomskim faktorima a tokom ove krize, bankarski sektor je delovao kao deo rešenja, a ne kao generator krize, olakšavajući poslovanje privrednih subjekata.

Tokom ovog perioda, bankarski sektor se suočio sa sve većim porastom nenaplativih i problematičnih kredita, dok je nelikvidnost u realnom sektoru dovela do restriktivnijih kreditnih politika. U tom kontekstu, u radu se analizira bankarski sektor pre, tokom i nakon pandemije COVID-19, sa ciljem da se identifikuju suštinske lekcije koje bi mogle poslužiti kao osnova za rešavanje budućih kriza.

Drugi rad pod nazivom „*Socioekonomski i kulturni aspekti e-sporta: pregled literature*“ autora Dejana Dašića ima za cilj da se analiziraju ključne dimenzije razvoja e-sporta - na osnovu sistematskog pregleda novije naučne literature - i da se proceni njegov uticaj na savremene ekonomske trendove, društvene odnose i kulturne obrasce. Nalazi ukazuju na to da ekonomski rast industrije e-sporta proizilazi iz interakcije medijskih tehnologija, digitalne infrastrukture, ljudskog kapitala i globalnih tržišnih trendova. Iz društvene perspektive, e-sport doprinosi formiranju novih tipova društvenog kapitala, online zajed-

nica i generacijskog identiteta, dok se sa kulturnog stanovišta manifestuju kroz transformiranje prakse potrošnje medija, učešće publike i normalizaciju digitalnog ponašanja. Rad sintetiše uvide iz više disciplina i naglašava potrebu za integrisanim modelima. Ovi uvidi mogu poslužiti kao osnova za kreiranje politika, razvoj obrazovnih programa i poboljšanje institucionalne podrške sektoru e-sporta.

Treći rad pod naslovom „Uloga bankarskog rizika u oblikovanju računovodstvene politike banaka” autora Aleksandra Savića, Snežane Krstić i Biljane Ivanove, istražuje najčešće tipove rizika u bankarstvu sa naglaskom na upravljanje rizikom, u cilju postizanja optimizacije odnosa rizika i prinosa. U ukupnom kontekstu funkcionisanja banke, poboljšanje upravljanja, odnosno upravljanja bankama, je neizbežno. Upravljanje rizicima je izuzetno aktuelna tema, jer je globalna ekonomska kriza pogodila i bankarski sistem i mnoge banke koje su naišle na poteškoće i gubitke, upravo zato što nisu bile u stanju da otplate svoje investicije. Naglasak u radu je opis rizika kao fenomena u savremenim bankarskim institucijama kroz identifikaciju faktora koji vode do rizika, kao i pravilno upravljanje rizicima. Cilj istraživanja od-

nosi se na identifikaciju slabih tačaka u sektoru upravljanja rizicima, kao i davanje predloga za unapređenje tehnika rada u cilju stvaranja povoljnijeg okruženja za uspešno poslovanje banaka u dugoročnom periodu.

Četvrti rad pod naslovom „Društveno ekonomski faktori u funkciji obrazovanja,” autora Milana Stankovića, Gruja Kostadinovića i Marije Ilievske Kostadinović u opsegu analize prati pozicioniranje fenomena obrazovanja kao usluge u celini, a u ekonomskom sistemu u "organizacijama koje uče". Dakle, između zemalja i tržišta, u savremenim okolnostima polje je još uvek opterećeno mnogim problemima, zabludama, nerešenim pitanjima, brojnim dilemama i alternativama. To je pre svega posledica tradicionalnih shvatanja koja kvalifikuju ove fenomene kao podržavajuće i pasivne, a ne kao osnovne funkcije koje mogu da podstaknu osnovne instrumente rasta i razvoja, dok tretiraju "organizaciju koja uči" kao modernu, umesto naučno zasnovanu disciplinu. Moderni oblici nadgledanja ekonomske stvarnosti ističu se novim idejama, obrocima i zaključcima. Jedan od njih je da produktivnost u javnom sektoru zemalja u razvoju ne može biti niža od produktivnosti u drugim zemljama Evrope. Poznato je da u uslužnim aktivnostima postoji mala razlika u

produktivnosti između zemalja sa sličnom kulturnom matricom. Na taj način, lekar opšte prakse ili većina poslova u administraciji i obrazovanju ne može imati veću produktivnost u javnom sektoru. Stav da javni sektor ima veće zarade u proseku samo opstaje kao opšta teza zbog veće kvalifikacije zaposlenih.

Peti rad pod naslovom „Unapređenje industrije osiguranja: Konceptualni okvir za primenu mašinskog učenja zasnovanog na sistemskom pregledu” autora **Nikole Medana i Dejana Kresovića** prati industriju osiguranja koji prolazi kroz značajnu transformaciju vođenu napretkom u tehnologiji, posebno mašinsko učenje. Kako osiguravači nastoje da poboljšaju operativnu efikasnost, procenu rizika i korisničko iskustvo, mašinsko učenje nudi obećavajuće aplikacije u različitim domenima, kao što su preuzimanje, obrada potraživanja i otkrivanje prevare. Uprkos potencijalu mašinskog učenja, njegova integracija u tradicionalne prakse osiguranja suočava se sa brojnim izazovima, uključujući kvalitet podataka, regulatorne probleme i organizacionu spremnost. Cilj ovog rada je da se ispituju mogućnosti i karakteristike primene mašinskog učenja u osiguranju, Oslanjajući se na uvide iz sistematskih pregleda literature, okvir će pružiti sveobuhvatno razumevanje kako mašinsko učenje može preoblikovati prakse osiguranja. Istražujući ove aspekte, ovaj rad doprinosi struk-

turiranjem i informisanom pristupu implementaciji mašine učenja u industriji osiguranja.

Šesti rad pod naslovom „Uticaj filozofije na ekonomiju u novoj eri”, autora **Constantinosa Challoumisa, Nikole Pavlovića, i Marka Savića**, istražuje dubok i višestruk odnos između filozofije i ekonomije, prateći njihovu istorijsku konvergenciju i ispitujući kako su filozofski okviri oblikovali ekonomsku misao i politiku u svim epohama. Od metafizičkih uvida Aristotela i moralnog rasuđivanja Kanta do utilitarne etike Bentama i Mila, filozofske doktrine su dosledno uticale na ekonomske paradigme, uključujući klasične, neoklasične i bihevioralne modele. U radu se razmatraju ključni filozofski koncepti, kao što su racionalnost, autonomija, pravda i korisnost, i njihove uloge u vođenju i formulisanju politike i evolucija globalne trgovine, održivosti i tehnologije. Posebna pažnja se posvećuje tome kako savremeni izazovi kao što su globalizacija, digitalna transformacija i ekološke krize zahtevaju obnovljeno filozofsko istraživanje u okviru ekonomskog rasuđivanja. Na kraju, studija se zalaže za reintegraciju filozofske strogosti u ekonomiju kako bi se podstakla etički utemeljena ekonomija.

Sedmi rad pod naslovom „Finansiranje ekološki održive poljoprivrede” autora **Ivana Milojevića, Alek-**

sandra Milanovića i Aleksandra Rajkovića pokazuje finansiranje ekološki održive poljoprivrede što predstavlja jedan od osnovnih zadataka i temelj ekonomskog rasta i razvoja svake zemlje. Fokusirajući se na finansijsku podršku države u obezbeđivanju održivosti finansiranja poljoprivrede, u tekstu se razmatra i budžet kao polazište za sagledavanje stepena i mogućnosti zadovoljavanja osnovnih potreba koje se odnose na uspostavljanje i funkcionisanje ekološki održive poljoprivrede kao fundamentalne komponente svakog društva.

Primenom statističkih metoda, pre svega korelacionih veza, biće prikazani uzročno-posledični odnosi između elemenata finansiranja poljoprivrede i njihove glavne finansijske podrške u okviru ekonomske snage države u savremenim uslovima.

Osmi rad pod naslovom „Specifičnosti strateškog menadžmenta u javnoj upravi Republike Srpske“ autora Višnje Kojić, Borisa Spasojevića i Jasminke Medić, pojašnjavaju da bilo na državnom nivou ili u okviru bilo koje jedinice lokalne samouprave, funkcije pretežno zauzimaju politički izabrani pojedinci čiji su profesionalni i iskustveni temelji za takav odgovoran rad često upitni. Biti načelnik opštine ili načelnik u

jednoj od 64 jedinice lokalne samouprave, ili biti ministar u Vladi Republike Srpske, ili odgovorno lice u državnoj agenciji, direkciji ili javnom preduzeću, znači biti odgovoran "vlasniku kapitala", odnosno vlasniku budžetskih sredstava građanima. Građani su, kroz plaćanje poreza, dažbina i doprinosa, ti koji popunjavaju budžet i kojima se moraju prijaviti rezultati.

Građani imaju pravo da dobiju sve bolje usluge za svoj novac i da znaju da li su definisani mehanizmi za sankcionisanje i nagrađivanje menadžera, kao što je slučaj u privatnom sektoru. Oni pažljivo prate pokazatelje zloupotrebe, političke manipulacije, korupcije i svih drugih mogućih nepravilnosti u budžetu, koji finansiraju prvenstveno radom u realnom sektoru.

Koncept "moderne javne uprave" je projekat koji ima značajno obećanje u smislu depolitizacije, borbe protiv korupcije, sprečavanja zloupotrebe i odgovornijeg trošenja javnih sredstava. Uvođenjem elektronske javne komunikacije otvoren je put transparentnijem funkcionisanju državnih institucija na svim nivoima i model državnog upravljanja približen standardima Evropske komisije, za koju je borba protiv zloupotrebe ključni prioritet.

Autori predlažu mnogo širu primenu modela strateškog upravljanja i iskustava iz realnog sektora na upravljanje javnom upravom, jer bi takav pristup ojačao strateški menadžment u okviru javne uprave i približio ga stvarnim vlasnicima kapitala građanima koji finansiraju budžet koji se troši u okviru prevelikog sistema javne uprave na svim nivoima: država Bosna i Hercegovina, entiteti, gradovi i lokalne zajednice

Deveti rad pod naslovom „Digitalizacija plaćanja u uslovima izazova društva betgotovine,“ autora, **Borisa Siljkovića, Sanela Mehmedija i Dženisa Bajramovića** kroz osvrt na naslov teme predstavlja jednu od ključnih transformacija koja proizvodi značajne implikacije na poboljšanju finansijskog sistema, rasta ekonomije i ide u susret savremenih trendova. Ovaj rad je koncentrisan na proces digitalizacije plaćanja kroz tri dela što ima direktan uticaj na komplementarnost, praktične trendove ekonomija Srbije i Zapadnog Balkana. Istraživanje je pokazalo da Srbija i Zapadni Balkan zaostaju za razvijenim evropskim ekonomijama, sa konstatacijom da u našem regionu gotovina i dalje dominira kao metoda plaćanja. Ovo su pokazala i naša lična istraživanja u gradovima u Srbiji i Crnoj Gori, Kraljevu, Plavu i

Rožaju. Sve ovo upotpunili smo i uporedili sa prisustvom digitalnih plaćanja u svetu i EU. Rad kroz istraživanje je imao za cilj da sa akcijom koje bi se sprovele na svim nivoima na relaciji od finansijskih institucija do edukacije građana, bezgotovinskog društva bi za rezultat imalo inovacije, kao što su bezbednost, privatnost i inkluzivnost sve u susret izazovima društva bezgotovine.

Deseti rad u ovom broju pod naslovom „Poslovna intelegencija u funkciji unapređenja poslovanja“ autora **Nebojše Denića, Ivana Buluta Bogdanovića, Saše Mihajlovića i Stefana Milića** sa svrhom ovog rada da se predstavi opšti teorijski pregled znanja, tehnologija i alata u oblasti poslovne integracije, zasnovane na evoluciji relevantne literature, sa ciljem sistematskog opisivanja svake od tehnologija sa mogućnostima primene u preduzećima u Srbiji. U tom kontekstu, uvodni deo istraživanja objašnjava koncepte, termine, funkcije i metode poslovnih informacija i poslovnih informacija sistema. Istraživanje je usmereno ka tehnologiji i sofisticiranim alatima poslovne inteligencije, kao i istraživanju u kojima su ključni faktori i elementi važni za uspešnu primenu alata, metoda i tehnika pos-

lovne inteligencije u organizacijama u Srbiji, kao i u vezi sa ispitivanjem trenutnog stanja tržišta alata u svetu i Srbiji. Istraživanja pokazuju da ako postoji jedan ključ za opstanak poslovnih sistema i kompanija u sve više konkurentnom svetu, to je sposobnost da se brzo reaguje na promenljive uslove poslovanja, koji zahtevaju munjevito brzo otkrivanje, analizu i razmatranje. U tom smislu, gore navedene potrebe zahtevaju: sveobuhvatne, precizne i pravovremene informacije. Iz gore navedenih razloga, poslovna integracija u svetu, uključujući i naše okruženje, razvija se sve brže i brže svakim danom. Na osnovu najnovijih istraživanja u svetu i referenci najkompetentnijih autora iz oblasti poslovne inteligencije, definisani su teorijski temelji procesa poslovne inteligencije i inteligentni sistemi za podršku odlučivanju, kroz sistematsku analizu unapređenja poslovanja. Istraživanja pokazuju da je najbolji poslovni model intelligence u vreme ekonomske krize i recesije je onaj koji će pomoći organizacijama da postignu konkurentsku prednost, dok je jeftin. U tu svrhu, u poslednje vreme se sve više govori o OSBI (Open Source Business Intelligence).

I na kraju jedanaesti rad po naslovom „Teorijske i pravne osnove

ekonomske analize prava” autora Aleksandra Stankovića analizira teorijske i pravne pozicije škole ekonomske analize prava. Ova škola prava svakako predstavlja gotovo najuticajni pristup u modernoj pravnoj teoriji. To se vidi kako u recentnim teorijskim i pravnim promišljanjima iz oblasti deliktneog, antikartelskog i privrednog prava, tako i u pojedinačnim teorijskim analizama posvećenim nekim od najsloženijih pitanja porodičnog, krivičnog i ustavnog prava, odnosno pitanjima ljudskih, građanskih i manjinskih prava i sloboda. Ovaj rad ima za cilj da istraži i podvrgne kritičkoj analizi teorijske osnove na kojima počiva ovo učenje prava, a istovremeno pokušava da pruži njihovu procenu, imajući u vidu različit vrednosni pristup usvojen od strane zagovornika ekonomske analize prava u odnosu na uobičajeni vrednosni pristup pravu uopšte.

Globalna ekonomija i svet se suočavaju sa brojnim izazovima, uključujući inflaciju, promene u lancima snabdevanja i geopolitičke tenzije. Ove promene utiču na sve zemlje, uključujući i Srbiju. Sama ekonomija Srbije je u poslednjim godinama ostvarila određeni napredak u ekonomskom razvoju, sa rastom BDP-a i stranim investicijama. Međutim, i dalje postoje problemi kao

što su visoka nezaposlenost, javni dug i potreba za reformama u različitim sektorima.

Uticaj EU na Srbiju je dominantan kroz pristupanje Evropskoj uniji i integracija u evropske strukture što može doneti dodatne prilike za Srbiju, ali i izazove u pogledu usklađivanja sa regulativama i standardima EU.

Održivi razvoj sa osvrtom da se u svetu sve više naglašava važnost održivog razvoja i ekoloških politika. Srbija takođe treba da se fokusira na zelene tehnologije i održive prakse kako bi se prilagodila globalnim trendovima.

I najbitnije po nama je da tehnološki napredak, digitalizacija i inovacije igraju ključnu ulogu u modernoj ekonomiji. Srbija ima potencijal u IT sektoru, ali je potrebno ulagati u obrazovanje i infrastrukturu kako bi se iskoristile sve prednosti.

Glavni i odgovorni urednik
Prof. dr Boris Siljković

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ANALYSIS OF BANKING SECTOR PERFORMANCE DURING THE COVID-19 PANDEMIC: KEY LESSONS

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Abstract: Only a few years after the global economic crisis, the world economy, which has not yet fully recovered from its effects, has faced a new crisis that significantly impacted the banking sector. Unlike the global financial crisis of 2008-2014, which arose from years of structural problems in the financial system, the crisis triggered by the COVID-19 pandemic is of a different nature. It was not caused by economic factors, and during this crisis, the banking sector acted as part of the solution rather than as a generator of the crisis, facilitating the operations of economic entities. Through measures implemented by governments and central banks, the banking sector became one of the key levers in mitigating the pandemic's effects, reducing corporate illiquidity and alleviating the consequences of unemployment.

During this period, the banking sector faced an increasing rise in non-performing and problematic loans, while illiquidity in the real sector led to more restrictive credit policies. In this context, the paper analyses the banking sector before, during, and after the COVID-19 pandemic, with the aim of identifying essential lessons that could serve as a foundation for addressing future crises.

Keywords: Banking sector, COVID-19, loans, economic crisis, central bank

Introduction

The crisis caused by the coronavirus pandemic immediately took on a global character. Although it can now be considered part of the past, analyses conducted by international institutions indicate that its consequences remain significant. For this reason, economic policy makers were compelled to implement substantial fiscal, monetary and social measures in order to support affected citizens and the economy [Lukić et al., 2021, p. 49]. Without these measures, the crisis would have resulted in mass layoffs, severe illiquidity within enterprises, a rapid decline in living standards, and long-term recession.

The coronavirus pandemic substantially disrupted the lives of people in the 21st century, threatening their livelihoods and public health, while simultaneously causing significant disturbances in the functioning of the banking sector (all data sources - in addition to academic and professional literature, as well as data from financial institutions, the World Bank, the International Monetary Fund, the Bank for International Settlements and the European Central Bank, including reports of commercial banks - indicate

that the coronavirus pandemic also affected the banking sector) and the overall economic environment, where illiquidity in the real sector led to more restrictive credit policies and an increase in non-performing loans [Ivanović et al., 2021, p. 6].

From the outset of the pandemic, the National Bank of Serbia supported citizens, the economy and the state through a range of monetary and regulatory measures aimed at helping them overcome the financial burden of the crisis. Among other measures, the National Bank introduced a moratorium on the repayment of obligations arising from loans and similar financial products, which proved to be an effective instrument for overcoming temporary liquidity difficulties.

The aim of this paper is to analyse the impact of the COVID-19 pandemic on the operations of the banking sector, with a particular focus on changes in risks, liquidity, lending activity, digitalisation and regulatory measures. The ultimate objective is to identify the key lessons learned by the banking sector during the crisis and to assess the extent to which these lessons may be applicable in future crisis conditions and in strengthening the

resilience of the financial system. The main hypothesis of the paper (H1) is defined as follows: The COVID-19 pandemic significantly affected the banking sector, and the lessons learned contributed to strengthening its resilience and improving risk management strategies. Supporting hypotheses:

H1a: Banks that had more developed digital business channels were able to adapt more easily to pandemic conditions and experienced fewer operational disruptions.

H1b: Monetary and fiscal policy measures significantly mitigated the negative effects of the pandemic on the liquidity and lending activity of banks.

H1c: The pandemic accelerated the transformation of banks' business models, especially in the areas of digitalisation, operational risk management and client communication.

H1d: Based on the experience of the pandemic, the banking sector improved its crisis management mechanisms and internal protocols, which may contribute to greater stability during future shocks.

The Coronavirus Pandemic Crisis and Its Consequences in the Economic Environment

The global economic outlook changed dramatically and deteriorated significantly when, at the beginning of January, a new deadly virus - SARS-CoV-2 - emerged in China, specifically in the Hubei province, causing an illness known as the coronavirus [Prašević, 2020, p. 10]. It became clear very quickly that the situation was serious once China began implementing rigorous measures, introducing lockdowns in large areas with tens of millions of inhabitants [Prašević, 2020, p. 10]. The COVID-19 pandemic produced enormous consequences that severely affected the entire world economy. Spreading rapidly from one continent to another, it claimed a vast number of lives. Consequently, the protection of human health became one of the primary objectives even for the banking sector. However, as the pandemic intensified, its consequences became increasingly widespread. The declaration of the new disease as a pandemic signalled significant effects on economic developments in the banking sector, primarily through the potential emergence of a global economic recession which, by all indicators, would differ from previous

ones precisely because of the unusual factor that generated it [Praščević, 2020, p. 10].

The global coronavirus pandemic posed numerous unexpected challenges for enterprises regardless of their size or activity, as part of measures aimed at containing the spread of the virus. This resulted not only in internal organisational changes but also in adjustments in managing key external stakeholders - such as customers and suppliers [Ahmić & Skopljak, p. 33]. The coronavirus pandemic triggered the greatest economic crisis recorded since the Second World War [Ivanović et al., 2021, p. 5]. This crisis has its own specific characteristics compared to previous ones: it is marked by sudden and almost simultaneous shocks on both the aggregate supply and aggregate demand sides [Ivanović et al., 2021, p. 5]. However, a major distinguishing factor of this crisis is the impossibility of predicting its duration, its further course or its long-term impact on the banking sector.

The introduction of numerous epidemiological measures restricting people's movement caused significant changes in consumer habits, including how individuals purchase products and services [Me-

lović et al., 2021, p. 122]. Purchasing behaviour shifted primarily towards products essential for basic human needs and goods aimed at protecting public health (such as face masks, gloves and disinfectants). Conversely, falling incomes due to rising unemployment and the inability of enterprises to pay wages had a negative impact on consumers' purchasing power, contributing to a decline in demand for loans. On the supply side, the negative consequences of the pandemic were reflected in the reduced productivity of employees (due to health concerns and changes in work arrangements) and disruptions in the procurement of raw materials. This led to a sudden reduction in the supply of certain product categories, such as durable food items [Melović et al., 2021, p. 122]. As a result, sales and profits declined, and many enterprises - unable to resolve unforeseen financial difficulties - were forced to postpone repayments of their obligations to the banking sector.

A large number of enterprises, particularly in tourism and passenger transport, faced extreme labour surpluses. This vicious circle, characteristic of any economic crisis, inevitably affected the banking sector. The rise in unemployment contributed to increased poverty, which

in turn widened existing wealth disparities within society. There is no doubt that a sharp decline in economic activity would deepen economic problems, raise unemployment levels, reduce living standards and potentially increase poverty and inequality (Marjanović & Đukić, 2020, p. 92).

The COVID-19 pandemic compelled enterprises to continuously analyse the costs and losses incurred. Extraordinary circumstances required banks to adapt their operations across all business segments. Perhaps the only positive aspect of the crisis triggered by the pandemic is that banks were forced to identify weaknesses within their operations and find effective ways to overcome them. Interruptions in business, difficulties in the delivery of goods and restrictions on movement during lockdowns will leave long-lasting consequences for future business operations in all sectors. Nevertheless, the imposed circumstances significantly accelerated the digital transformation of banks. Banks were required to redirect their activities to digital platforms, enabling them to mitigate the negative effects of the pandemic and maintain a certain level of operation during that period. In this context, banks that had already shifted a

substantial share of their operations to digital platforms generally held a comparative advantage.

The Banking Sector in the Republic of Serbia Before and During the Coronavirus Pandemic

Following the global economic crisis, from 2010 to 2019, the share of liquid assets in the total assets of the banking sector in the Republic of Serbia was stable, and it may even be said that it slightly increased over the observed period. The ratio of liquid assets to short-term liabilities of banks decreased over time - from 70% at the beginning of the analysis to 50% in 2020 - most likely as a consequence of the coronavirus pandemic. Due to the pandemic, a decline in new loan disbursements was expected in 2020 compared to 2019, and this decline continued into 2021, despite fiscal and monetary measures aimed at stimulating banks' lending activity.

Total profit before tax in 2010 increased by 27% relative to the previous year. However, as many as eleven banks reported losses, while the highest profit was recorded by Banca Intesa a.d. Beograd. The growth in profit was driven by higher interest income, reduced credit

losses, increased fees and commissions, as well as other income. Return on assets amounted to 1.1%, while return on equity stood at 5.3%. Net interest income decreased in 2012, most likely as a result of changes in foreign exchange rates. Operating expenses rose during the observed period. A sharper decline in profitability occurred in 2013. Out of a total of 30 banks, exactly half operated profitably, resulting in an overall sector loss of -2.1 billion dinars. Consequently, both ROA and ROE recorded negative values. Net interest income was the only category that saw an increase. Nonetheless, in 2014 banks cumulatively achieved a worse result than in 2013, although a moderate recovery trend in profitability had begun. ROA and ROE returned to positive values in 2014, amounting to 0.12% and 0.58% respectively. Net interest income and other income were the main contributors to the growth of banking sector revenues. [National Bank of Serbia, 2014].

Traditionally, the banks with the largest share of total assets also achieved the highest profits in 2014 (five of them), while as much as 60% of total sector losses were attributed to a single bank - Srpska banka a.d. Beograd, which at the time was undergoing a business model restruc-

turing. The biggest "loser" in 2015, as a result of accumulated approved but uncollected non-performing placements, was Hypo Alpe Adria Banka a.d. Beograd, while Banca Intesa a.d. Beograd traditionally held first place in total realised profits. The ROA indicator increased by 0.2 percentage points compared with the end of 2014, while ROE rose by a full percentage point. The most significant rise in banking returns occurred in 2017, when as many as 22 banks operated profitably, while 7 banks (with a market share of only 6.8%) recorded losses. Consequently, ROA reached 2.08% and ROE as much as 10.57%, representing increases of 1.4% and 7.17% respectively for ROA and ROE. A little over 10% growth in total banking sector profits was recorded in 2018, owing to the profits of 25 banks and losses of two banks with a combined market share of 0.6%. [National Bank of Serbia, 2019].

A somewhat smaller profit was recorded in 2019 compared with 2018 - a decline of around 10% - resulting from the profits of 22 banks and losses of four banks, whose combined market share amounted to 1.3%. Due to the decrease in profit levels, ROA fell from 2.12% to 1.72%, and ROE from 11.27% to 9.79%. This downward trend in profitability con-

tinued during 2020 and 2021. [National Bank of Serbia, 2020].

It was expected that credit standards for households and other non-financial institutions would tighten to some extent, primarily due to the deterioration of economic prospects, increased credit risk and lower risk tolerance among banks. A bank must protect itself against risks by absorbing financial and operational losses. It serves as a guarantor of secure operations and credibility building, with a key role in supporting and ensuring continuous and uninterrupted business activity and the long-term stability of the institution - which is why risk management must be continuously analysed. [Ristanović, 2019].

Measures of the National Bank of Serbia and the Effects of Their Implementation

Finding an optimal balance during the pandemic between providing short-term support to public health and the economy, and ensuring the medium-term sustainability of public finances, represented one of the major challenges for policymakers in all countries. As the crisis affected the entire economy, the National Bank of Serbia (NBS) introduced

two moratoria that ensured equal treatment for all citizens and businesses, helping them to overcome the crisis more easily. More than 90% of borrowers used the first moratorium, and over 80% used the second one, benefiting from a total repayment freeze of five to six months. In this regard, the central bank also adopted targeted measures to support those borrowers whose financial difficulties were more severe due to the pandemic.

Credit activity remained not only a stable source of financing for the private sector, but its structure - both by currency and by sector and purpose - was well balanced, contributing to the even recovery of consumption and investment. The structure of credit growth also remained favourable: within corporate lending, investment loans recorded the highest growth of the year, while within household lending, housing loans grew the most.

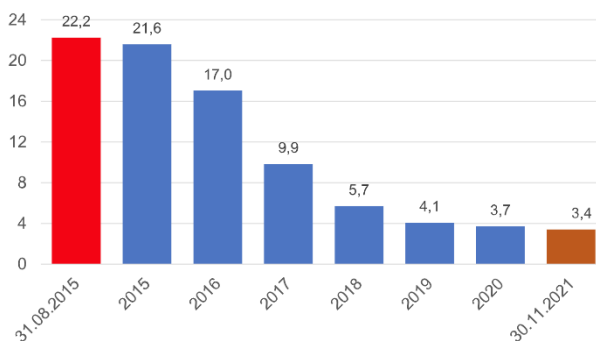
Increased trade barriers at the beginning of the pandemic created difficulties in accessing many foreign markets. It is estimated that the volume of global merchandise trade declined by 5.3% during the pandemic, while its value fell by 7%. At the same time, the value of imports into the European Union decreased

by 11.6%, and exports by 9.4%. Supported by economic measures, and owing to the growing diversification of production across products and regions, Serbian exporters adapted relatively quickly to the new circumstances. This is also confirmed by the movement of Serbia's export concentration indices, which indicate that supply-side factors prevented the fall in external demand from translating into a larger decline in Serbian exports. Observed by country, the export concentration indicator has been declining continuously since 2015, reaching in 2020 the lowest level to date, indicating the widest geographical dispersion of exports ever recorded. This means that Serbia, even under pandemic conditions, further increased the geographical diversification of its exports, which enhanced their resilience to disruptions in external demand. Export concentration by products was also lower in 2020 than in 2019.

In 2021, the banking sector underwent consolidation, with all structural changes driven by decisions of bank owners. Owing to the prior

detailed assessments carried out by the National Bank of Serbia, these changes are expected to enhance the efficiency, stability and competitiveness of the banking sector in the coming period.

Учешће проблематичних кредита (NPL) у укупним кредитима (у %)



Graph 1. Source: National Bank of Serbia

The National Bank of Serbia continued to support easier loan repayment and improved access to finance. Despite various challenges, the NBS remained fully committed in 2021 - and in the years that followed - to preserving the stability of the financial system, whose most important segment is the banking sector. Throughout this period, the sector's capital adequacy remained high (above 20%), with a favourable capital structure (almost 95% consisting of the highest-quality core capital). Liquidity also remained strong, with the liquidity ratio in-

creasing from 2.2 in 2019 to 2.5 in 2024. [National Bank of Serbia].

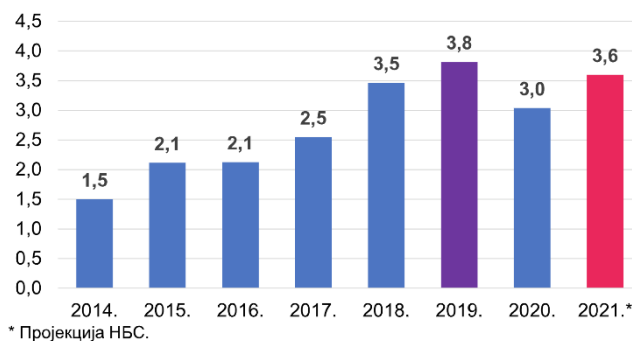
The central bank continued to support the economy and citizens with the aim of mitigating the negative economic effects of the crisis. Borrowers most affected by the pandemic were granted, under prescribed conditions, a six-month grace period for the repayment of obligations to banks and financial leasing providers. These relief measures were provided to 50,978 borrowers, amounting to a total of 111 billion dinars. As additional support for improving access to finance for households and the construction sector, the National Bank of Serbia extended the validity of temporary measures introduced in 2020 by another 12 months. This ensures that in the following years banks may continue to implement measures that facilitate housing finance for households, allow the easing of repayment terms for housing loans (by extending maturities), and enable the approval of certain types of shortterm loans through simplified

procedures. [National Bank of Serbia].

As a result of all these measures, as well as the combined impact of broader economic policies aimed at supporting economic activity and employment, the quality of bank credit portfolios was not only preserved but further improved. This is evidenced by the share of non-performing loans, which fell to 3.4% in November 2021 - the lowest level since this indicator has been monitored - with a continued downward trend in subsequent years, reaching 2.5% in 2024. [National Bank of Serbia].

Macroeconomic and financial stability also helped Serbia maintain its position as an attractive investment destination.

Стране директне инвестиције, прилив
(у млрд евра)



Graph 2. Source: National Bank of Serbia

Graph 2 shows that according to the latest data, the inflow of foreign direct investment amounted to around €3.6 billion, bringing Serbia close to the record levels last seen in 2019. Foreign direct investment has remained well diversified and, as in previous years, predominantly directed towards export-oriented sectors. These consistently high levels of FDI, which for many consecutive years have fully covered the current account deficit, have significantly contributed to the sustainability of the country's external position.

Lessons Learned and Recommendations Following the COVID-19 Pandemic: Key Takeaways

The COVID-19 pandemic has left profound effects on health systems, economies, and societies worldwide, while simultaneously providing valuable insights into how states, institutions, and organisations should act under crisis conditions. Analysing the experiences gained allows the identification of key lessons that can improve future risk management, enable faster and more efficient responses, and strengthen system resilience to similar challenges. The most important findings and recommendations emerging

from this global crisis are presented below:

1. *Balancing health protection, economic support, and fiscal sustainability is crucial for system stability.*

The pandemic demonstrated that policy must simultaneously protect public health, support the economy, and maintain the sustainability of public finances. Finding the “optimal balance” proved to be one of the greatest challenges for governments worldwide.

2. *Moratoria and targeted central bank measures are effective tools for mitigating short-term shocks.*

Two moratoria enabled borrowers to navigate periods of greatest uncertainty. The high uptake rates (over 90% and over 80%) indicate that such measures are widely accepted and essential during crisis conditions.

3. *Equal treatment of citizens and businesses enhances stability and trust in the financial system.*

Providing equal conditions for all borrowers contributed to social equity and reduced systemic risk.

4. *Maintaining and promoting credit activity is key to a rapid economic recovery.*

Stable and well-structured credit growth - particularly in investment and housing loans - served as a cornerstone for the recovery of consumption and investment, confirming the active role of the banking sector in economic stabilisation.

5. Diversified exports increase economic resilience to global disruptions.

During the pandemic, Serbia further reduced dependence on specific markets and products, increasing both the geographical and sectoral spread of exports. This mitigated the impact of declining external demand and enhanced export resilience.

6. Bank consolidation, when carefully regulated, can improve sector efficiency and stability.

Ownership changes in the banking sector in 2021, following detailed NBS assessments, did not compromise stability but contributed to the sector's long-term competitiveness.

7. High capital adequacy and liquidity are fundamental pillars of resilience.

Capital adequacy above 20% and stable liquidity ratios (from 2.2 to 2.5) demonstrate that regulatory requirements and prudent NBS

policies provided a strong buffer during the crisis.

8. Targeted relief for the most vulnerable borrowers supports portfolio stability and prevents an increase in non-performing loans (NPLs).

Grace periods and other measures helped tens of thousands of borrowers avoid illiquidity, resulting in a record-low share of NPLs (3.4% in 2021 with a downward trend to 2.5% in 2024).

9. Macroeconomic stability attracts investment even during crisis years.

Despite the pandemic, the inflow of foreign direct investment remained high (around €3.6 billion), primarily into export-oriented sectors, ensuring coverage of the current account and external sustainability.

10. Coordinated fiscal, monetary, and regulatory policy is key to successfully bridging a crisis.

The pandemic experience has shown that swift and well-coordinated policy responses reduce economic contraction, support the banking sector, and accelerate recovery.

Conclusion

Since the onset of the pandemic, the number of studies analysing its effects on the banking sector and the economy as a whole has increased significantly. Governments worldwide were compelled to implement a range of measures to mitigate the health and economic impacts of the crisis, with some of these measures directly targeting the banking sector, which had to quickly adapt to new operational conditions in order to maintain its function in supporting the economy.

Despite high levels of uncertainty, the banking sector in Serbia successfully adapted its operations during and after the COVID-19 pandemic. One notable trend has been the intensification of bank consolidation, accompanied by workforce reductions and accelerated digitalisation of services. Remote work and hybrid operational models, alongside significant growth in electronic and mobile banking, have become standard practices likely to persist in the future.

Liquidity in the banking sector remained at a satisfactory level throughout the pandemic. This was largely supported by measures implemented by the Government and the National Bank of Serbia, including reductions in the reserve requirement, morat

oria, and targeted support programmes for the most vulnerable borrowers. Although credit activity declined temporarily - an expected consequence of reduced economic activity and heightened uncertainty in the real sector - the banking sector successfully maintained stability, asset quality, and capital adequacy.

Based on the analysis, all hypotheses formulated in this study are confirmed: **Main hypothesis H1:** COVID-19 significantly impacted the banking sector; however, the lessons learned contributed to strengthening its resilience. This is fully confirmed. Measures by the NBS, digitalisation, stable liquidity, and preserved capital clearly indicate an increase in sectoral resilience. **Supporting hypotheses:** H1a: Banks with well-developed digital channels adapted more easily to crisis conditions. H1b: Monetary and fiscal measures mitigated the negative effects of the pandemic on liquidity and credit activity. H1c: Business models of banks transformed towards greater resilience and digitalisation. H1d: Internal crisis management procedures were improved to maintain sector stability.

The experiences gained during the pandemic offer important lessons for the further development of the

banking sector. The crisis demonstrated that support measures for citizens and businesses must be timely, well-targeted, and flexible, as such measures mitigate economic contraction and preserve financial stability. Digitalisation emerged as a key pillar of stable operations - banks investing in digital channels, process automation, and remote services displayed greater resilience and adaptability to new conditions.

The pandemic also highlighted the importance of maintaining adequate liquidity and capital strength, which allowed banks to absorb risks while continuing to provide credit support to the real economy. Diversifying credit portfolios, revenue sources, and markets reduces dependence on individual sectors and mitigates vulnerability to global shocks. Furthermore, the crisis emphasised the need for continuous enhancement of crisis management processes - from better risk planning and monitoring to faster coordination with regulatory institutions.

Collectively, these lessons provide a solid foundation for building a more resilient, stable, and technologically advanced banking sector, capable of responding to future challenges while developing more efficient and innovative models of operation.

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ANALIZA UČINKA BANKARSKOG SEKTORA TOKOM PANDEMIJE COVID-19: KLJUČNE LEKCIJE

Rezime: Samo nekoliko godina nakon globalne ekonomske krize, svetska ekonomija, koja se još nije u potpunosti oporavila od svojih efekata, suočila se sa novom krizom koja je značajno uticala na bankarski sektor. Za razliku od globalne finansijske krize 2008-2014, koja je nastala iz godina strukturnih problema u finansijskom sistemu, kriza izazvana pandemijom COVID-19 je drugačije prirode. To nije uzrokovano ekonomskim faktorima, a tokom ove krize, bankarski sektor je delovao kao deo rešenja, a ne kao generator krize, olakšavajući poslovanje privrednih subjekata. Kroz mere koje su sprovele vlade i centralne banke, bankarski sektor postao je jedna od ključnih poluga u ublažavanju efekata pandemije, smanjenju korporativne nelikvidnosti i ublažavanju posledica nezaposlenja.

Tokom ovog perioda, bankarski sektor se suočio sa sve većim porastom nenaplativih i problematičnih kredita, dok je nelikvidnost u realnom sektoru dovela do restriktivnijih kreditnih politika. U tom kontekstu, u radu se analizira bankarski sektor pre, tokom i nakon pandemije COVID-19, sa ciljem da se identifikuju suštinske lekcije koje bi mogle poslužiti kao osnova za rešavanje budućih kriza.

Ključne reči: Bankarski sektor, COVID-19, krediti, ekonomska kriza, centralna banka

Mrvaljević, M., Jovanović, G., Kojić, N. Analysis of banking sector performance during the Covid-19 pandemic: key lessons

SOCIO-ECONOMIC AND CULTURAL ASPECTS OF E-SPORTS: A LITERATURE REVIEW

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Review Article

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Abstract: E-sports have, over the past decade, evolved into one of the most dynamic phenomena of digital culture, with significant economic, social, and cultural implications. The aim of this paper is to analyze the key dimensions of e-sports development - based on a systematic review of recent scientific literature - and to assess its impact on contemporary economic trends, social relations, and cultural patterns. The findings indicate that the economic growth of the e-sports industry stems from the interaction of media technologies, digital infrastructure, human capital, and global market trends. From a social perspective, e-sports contribute to the formation of new types of social capital, online communities, and generational identity, while from a cultural standpoint they manifest through the transformation of media consumption practices, audience participation, and the normalization of digital behaviors. The paper synthesizes insights from multiple disciplines and highlights the need for integrated models that connect macroeconomic factors, organizational structures, and the individual practices of players and audiences. These insights may serve as a foundation for policymaking, the development of educational programs, and the improvement of institutional support for the e-sports sector.

Keywords: e-sports, socio-economic aspects, cultural identity, digital culture, e-sports market

Introduction

In the past decade, e-sports have transformed from a marginal pastime of enthusiasts into a global phenomenon with millions of viewers, a complex eco-system of actors, and an increasingly visible influence on the economy, education, and cultural practices. Literature reviews show continuous growth in academic publications on e-sports across multiple disciplines - from business and economics, sport sciences, and sociology to media studies and law (Reitman et al., 2020). This interdisciplinarity is both a strength and a challenge: although the field is theoretically diverse and empirically rich, a stable theoretical core and clearly articulated socio-economic and cultural analytical frameworks are still lacking (López-Cabarcos et al., 2024).

On the economic level, e-sports are increasingly positioned as a specific segment of the creative and digital economy - with revenue streams from media rights, sponsorships, advertising, ticket sales, licensing, and digital goods. Cross-country empirical analyses show that e-sports performance correlates with broader macro-economic indicators (income per capita, digital infrastructure, social stability, and human capital), situating e-sports within the wider context of

socio-economic development (Kashcha et al., 2022). Research indicates that countries with higher levels of digitalization, stronger investments in education and information technologies, and more developed entertainment markets tend to observe greater success of their competitors and organizations within the global e-sports system.

At the same time, recent studies demonstrate that e-sports have significant implications for the knowledge economy, educational practices, and cultural communication. Research on the economic, educational, and cultural effects of e-sports highlights that e-sports can serve as a space for developing digital competencies, teamwork, strategic thinking, and new forms of professional careers - but also as a source of risks related to commercialization, addictive behaviors, and unequal access to digital resources (Reitman et al., 2020; Dašić et al., 2024). Thus, e-sports become relevant not only for the economics of sport and media but also for educational policy and broader public policies related to youth, culture, and digital transformation.

From a cultural perspective, e-sports are increasingly interpreted as part of broader processes of digital culture, media convergence, and the transformation of how younger generations

consume, produce, and share content. Studies of the popularity and cultural significance of e-sports show that competitions, streaming platforms, and online communities contribute to the formation of new types of collective identity, fandom culture, and transnational communities organized around games, teams, and influencers (Omole, 2024). These communities function not merely as passive audiences but as active participatory environments where values, behavioral norms, gender roles, inclusion, and questions of digital fairness are negotiated.

Despite rapid growth, several authors argue that scientific understanding of e-sports is still “emerging.” Bibliometric analyses indicate that the literature is predominantly focused on defining e-sports, differentiating them from traditional sports, and analyzing business potential within the entertainment industry (López-Cabarcos et al., 2024; Cranmer et al., 2020). Meanwhile, studies that systematically address the social, economic, and cultural aspects of e-sports are relatively rare and often fragmented across disciplines, lacking an integrated overview that connects macro-economic trends, local cultural contexts, and micro-level community and individual dynamics.

This paper therefore aims to provide, based on a systematic review of recent scientific literature, an overview of the socio-economic and cultural aspects of e-sports. The first section presents the theoretical framework and key methodological approaches used in previous reviews and bibliometric analyses of e-sports research (Reitman et al., 2020; López-Cabarcos et al., 2024). The second section analyzes key economic and socio-economic dimensions of e-sports - the structure of the global market, determinants of country-level success, the role of digital infrastructure and education, and effects on local economies and labor markets (Kashcha et al., 2022; Dašić et al., 2024). The third section focuses on cultural and identity-related aspects: social capital within e-sports communities, the transformation of leisure time into “professionalized” practice, and questions of cultural diversity, gender equality, and the normalization of e-sports as a “real” sport (Omole, 2024).

Through this review, the paper seeks to integrate the literature across three analytical levels: (1) the macro level (socio-economic structures and the global market), (2) the meso level (organizations, clubs, leagues, educational institutions), and (3) the micro level (individuals, players, spectators, and online communities). Such an

approach enables e-sports to be understood as a complex system that simultaneously generates economic value, shapes cultural patterns, and influences the educational and social trajectories of young people. Based on the identified findings, the discussion outlines future research directions as well as recommendations for policymakers, educational institutions, and e-sports industry actors aimed at ensuring responsible and sustainable development of this evolving phenomenon.

Theoretical Framework

In the literature, e-sports are defined as organized, competitive electronic gaming conducted within the context of video games, often accompanied by spectatorship, media distribution, and economic interests (Tang, 2023). It is widely accepted that e-sports only partially align with classical models of sport - resulting in ongoing debates about its status as a “sport” and its further institutionalization. Yamanaka et al. (2021) emphasize that the field is still in a formative stage, both theoretically and empirically fragmented. Accordingly, a theoretical framework must incorporate traditional sport theories (e.g., theories of sport institutionalization) as well as theories of digital culture, media, and globalization.

From an economic perspective, a key theoretical approach is to view e-sports as part of the digital and creative economy - where value is generated through media production, content creation, streaming, sponsorships, and international competitive structures. In an empirical study, Parshakov (2018) demonstrates that GDP per capita positively correlates with earnings per capita in e-sports, pointing to a link between economic development and competitive success. Additionally, Kashcha, Yatsenko, and Gyömörei (2022), in their analysis of 18 countries, find that economic stability carries greater weight than social stability in determining e-sports performance. Theoretically, this supports a model in which digital infrastructure, internet accessibility, human capital, and economic policy (investment, legislation, tax incentives) serve as decisive factors.

At the same time, a comprehensive theoretical framework must also encompass the socioeconomic dimension - e-sports as a vehicle for social mobility but also a potential site of reproducing inequalities. For example, youth support systems, access to technical equipment, education, and social capital influence opportunities to participate and succeed in e-sports (Riatti, 2021).

The cultural framework situates e-sports within the broader landscape

of digital culture, media, and online communities. Research shows that e-sports foster new forms of social interaction, fan cultures, spectatorship, and identity construction. Pitroso (2023), in a critical review of gaming communities, interprets e-sports as a space where subcultures, digital fandom, and youth representations are formed. Tjønndal (2025) argues that e-sports also intersect with cultural policy - both global media corporations and national strategies increasingly recognize its cultural and symbolic relevance.

Furthermore, cultural aspects include issues of gender equality, inclusion, belonging, and the normalization of digital practices. Rogstad (2022) analyzes the literature on gender in e-sports and finds that theoretical discussions frequently refer to hegemonic masculinity in the context of gaming and fan behavior.

Although numerous empirical studies address individual aspects (economic, social, cultural), comprehensive theoretical frameworks that systematically integrate these dimensions remain scarce. For instance, Li (2025), in a review of performance-influencing factors, highlights the lack of models that jointly consider technical (informatics), physiological, and media competencies of players. Similarly, Gábriš and colleagues (2024), in their analysis of e-sports integrity,

stress the need for a conceptual framework to manage integrity-related risks.

From a theoretical standpoint, a three-dimensional model may be proposed:

(a) Economic/industrial dimension - viewing e-sports as an agglomeration of the digital economy and media industries;

(b) Social dimension - understanding e-sports as a space of youth practices, fan engagement, and community formation;

(c) Cultural/symbolic dimension - examining identity formation, media practices, and global online communities.

Within this model, it is essential to consider the dynamics between global markets, local cultural contexts, and individual actors (players, spectators, streamers).

Structure of the Global Esports Market and the Macroeconomic Determinants of Growth

The global esports market today represents a complex ecosystem in which the gaming industry, media, sponsorships, streaming platforms, technology companies, and public policy intersect. Although the public often refers to the “esports market value” as a distinct figure, recent

research indicates that a large portion of esports' economic value is actually embedded within the broader video game ecosystem and is significantly underestimated when only direct revenues from competitive leagues and tournaments are considered (Ahn, Collis, Jenny, 2020).

Global revenues of the formalized esports market have shown steady growth, reaching nearly USD 1.38 billion in 2022, with forecasts indicating an increase to approximately USD 1.86 billion by 2025 (Newzoo, 2022). More recent secondary market analyses, which aggregate data from multiple industry reports, estimate the market at around USD 1.64 billion in 2022 and USD 1.98 billion in 2023, with projected growth to roughly USD 2.89 billion in 2025 and the potential to approach USD 10.9 billion by 2032, driven by an annual growth rate of around 20–21% (DemandSage, 2025). Long-term projections from analytical firms such as Grand View Research similarly confirm strong expansion, estimating that the global esports market may reach approximately USD 7.46 billion by 2030 (Grand View Research, 2025). At the same time, Newzoo forecasts that the number of “esports enthusiasts” - viewers who follow esports content at least once per month - will grow to around 318

million by 2025, with the total global audience expected to surpass 640 million viewers, firmly positioning esports as a mass global media phenomenon (Newzoo, 2022; DemandSage, 2025).

However, Ahn and colleagues (2020) show that these market values are significantly underestimated when the entire ecosystem is included - game publishers, streaming platforms, teams, leagues, and physical and digital products. Based on their expanded “Entire Esports Ecosystem” model, the authors estimate that the *true* market size in 2019 was closer to USD 25 billion, with game publishers generating approximately two-thirds of total revenues. This finding is crucial for understanding market structure: intellectual property (IP) ownership and control over narrative and technical infrastructure (patches, game balance, tournament formats) are concentrated in the hands of a relatively small number of global publishers.

From the perspective of actor structure, Scholz (2019) views esports as a specific form of “sports business” in which traditional sports logics (teams, leagues, sponsors, media rights) coexist with the digital platform economy (streaming, digital goods, online communities). Carrillo Vera and Aguado Terrón (2019)

present a holistic esports ecosystem model in which central actors include: game publishers, teams and organizations, tournaments and leagues, content distribution platforms (Twitch, YouTube, regional platforms), sponsors and advertisers, technology companies (hardware, peripherals), and audiences who act simultaneously as consumers, co-producers, and promoters of content. This model highlights that economic value is created through interaction among market and non-market actors - from cities that finance esports arenas to universities that support esports programs.

Chikish, Carreras, and García (2019) argue that esports represents a “new era” of the sports industry, requiring adaptation of existing theoretical models in sports economics. They emphasize the characteristics of a multisided platform market structure: on one side are players and spectators; on the other, sponsors and brands; and mediating between them are leagues and publishers who set rules, define access to tournaments, and control revenue distribution. This structure creates high entry barriers for new actors while enabling rapid global scaling of successful formats (e.g., franchise leagues such as the *League of Legends Championship Series*).

The regional structure of the global esports market shows a clear concentration of revenue and audience share in the Asia-Pacific region, which represents the largest portion of the global esports industry according to recent market analyses (Mordor Intelligence, 2025). This region continues to dominate due to its large population of gamers, high digital penetration, and the rapid institutionalization of esports ecosystems. North America also maintains a significant share of the global esports market. Industry reports identify North America as one of the leading regions in terms of commercial development, infrastructure, sponsorship activity, and professionalization, accounting for more than one-third of global market value in 2024 (Grand View Research, 2024). In terms of viewership patterns, audience data similarly emphasize Asia-Pacific as the strongest esports hub globally. Recent statistics show that the Asia-Pacific market accounts for more than half of global esports viewership, reinforcing its status as the central geographic driver of industry expansion (Demand Sage, 2025). Meanwhile, other regions – including Southeast Asia, Latin America, and parts of Europe – are experiencing growth in audience engagement, though publicly available reports do not provide sufficient evi-

dence to categorize them as major global revenue centers at the same level as Asia-Pacific or North America. Overall, while regional growth outside the dominant markets is observable, available industry data confirm only that Asia-Pacific and North America are the clearly established leaders in the global esports landscape (Grand View Research, 2024; Mordor Intelligence, 2025; DemandSage, 2025).

Spatial organization represents a further dimension of market structure. Zhu and colleagues (2022) analyze the esports industry in the Yangtze River Delta, showing that industry development spreads from central cities (Shanghai) to smaller and medium-sized urban centers through networks of technological transfer, shared labor markets, and integrated infrastructural investments. Similarly, Zhan and colleagues (2021) identify a “polycentric” spatial structure of the esports industry in Shanghai, where clusters of studios, arenas, and tech companies form urban zones specialized in the digital creative economy.

Another important segment of market structure concerns labor markets and employment patterns. Zhao, Li, and Lin (2023) show that China’s esports sector has developed a complex “business ecosystem” in which

media corporations (e.g., Ten-cent), local governments, property developers, esports clubs, and tournament operators interact, creating new employment forms but also significant precarity risks (unstable, short-term creative industry jobs). This indicates that the structure of the esports market is not only a matter of revenue flows but also of institutional arrangements regulating labor, social protection, and risk distribution.

Finally, Jordan-Vallverdú and colleagues (2024) show through bibliometric analysis that economics, management, and industry policy form one of the dominant thematic clusters in esports research, highlighting the growing relevance of questions related to market structure, industrial organization, and regulation.

Esports growth cannot be understood solely as the result of “internal” gaming industry factors; it is strongly shaped by broader macroeconomic, technological, and institutional contexts.

First, digital infrastructure and technological development are key determinants. Studies consistently show that broadband Internet, 4G/5G networks, and access to streaming platforms are prerequisites for sustainable esports ecosystems on both player and audience sides. Zhu

and colleagues (2022) emphasize that technological spillovers between cities - via shared innovation clusters and tech parks - significantly explain spatial patterns of esports industry growth in China. Duan and colleagues (2023) highlight that China's esports industry relies on long-term investments in ICT infrastructure and digital public services, creating a favorable "ecosystem environment" for companies.

Second, demographic structure and the rise of the middle class accelerate demand for esports. Kim, Nauright, and Suveatwatanakul (2020) show that the post-COVID-19 expansion of esports is closely linked to shifts in youth consumer behavior - increased online time, greater acceptance of digital entertainment, and a growing willingness to spend on virtual goods. In countries with rapidly expanding urban populations and rising disposable income (e.g., China, Southeast Asia), this translates into increased demand for esports content, live events, and merchandise.

Third, industrial policy and state regulation play a dual role - as a driver and as a potential constraint on growth. Zhao and colleagues (2023) show that esports in China has become part of broader strategies of "cultural confidence" and the digital cultural economy, with local and

national authorities actively financing esports cities, arenas, and festivals to attract investors and young talent. Conversely, Li (2024) shows that the same regulatory environment can also generate "bubble" risks: rapid capital inflows into China's esports sector, driven by optimistic projections, were followed by correction when regulators imposed limits on minors' gaming time and tightened rules on online games. Using a bubble detection framework, the author demonstrates that China's esports market experienced an overvaluation episode and subsequent correction, highlighting the industry's sensitivity to financial and regulatory shocks.

Fourth, global financial conditions, access to capital, and investment cycles significantly influence growth speed. Scholz (2019) notes that esports teams and leagues depend heavily on venture capital and strategic investments from media and technology corporations, making the industry vulnerable to global shifts in interest rates and risk appetite. Ahn and colleagues (2020) similarly argue that the largest share of value is captured by big tech firms and game publishers, while teams, tournaments, and local organizers remain much more sensitive to financial fluctuations.

Fifth, urban and regional development strategies are increasingly important macro-economic drivers. Zhu and colleagues (2022) show that cities in the Yangtze River Delta are systematically using esports as a tool for branding, economic diversification, and attracting creative workers. Zhan and colleagues (2021) emphasize that spatial-planning policies supporting esports clusters (office space, content production studios, event zones) positively affect local value creation and employment. Duan and colleagues (2023) argue that this “endogenous development” of esports can support structural transformation of regional economies, but warn that coordination with other sectors (education, tourism, ICT) is essential to avoid overdependence on a single industry.

Finally, the globalization of media markets and digital platforms reinforces strong network effects, as Newzoo (2022) and other industry analyses show that the expansion of global audiences for live gaming and esports content enables monetization through transnational sponsorships and digital advertising, making esports less dependent on local macroeconomic conditions and more closely aligned with global trends in the digital economy. At the same time, this reliance on global

platforms increases the sector’s vulnerability to shifts in algorithms, content governance policies, and the evolving business models of major technology companies.

Bibliometric research, such as the work of Jordan-Vallverdú et al. (2024), shows that questions of economic value, regional development, labor relations, and industrial policy are increasingly intertwined in scholarly debates - indicating that esports is becoming firmly positioned within broader discussions of the digital and creative economy, rather than remaining a niche topic of sports management.

Taken together, the global esports market is characterized by high concentration of control in the hands of game publishers and major platforms, as well as significant territorial differentiation - from China’s mature but regulation-sensitive scene, to stable high-income markets (United States, Western Europe), to emerging markets in Southeast Asia and Latin America. The macroeconomic determinants of growth - digital infrastructure, demographics, industrial policy, financial cycles, and urban strategy - operate synergistically: where aligned, esports can become a catalyst for socio-economic and cultural development; where misaligned, the industry remains

fragmented, dependent on a handful of global platforms, and vulnerable to rapid booms and busts.

Esports, Social Capital, and the Formation of Cultural and Generational Identity

Esports are, in contemporary literature, increasingly rarely viewed merely as a niche form of digital entertainment and more and more as a space in which social relations, cultural patterns, and generational identities are simultaneously constructed. Research indicates that participation in esports communities - whether as a player, spectator, or “hybrid” fan who both plays and follows competitive leagues - can generate specific forms of social capital, a sense of belonging, and subjective well-being (Yeomans et al., 2025; Pang et al., 2025).

At the same time, esports is not a neutral field: cultural norms, gender relations, generational codes, and online toxicity shape who feels welcome and who feels marginalized (Crothers et al., 2024; Tang et al., 2025). In this context, esports can serve both as a resource for the accumulation of social capital and youth empowerment, and as a space for the reproduction of inequalities and stigmatization.

New empirical studies directly connect esports with social capital theory. Yeomans and colleagues (2025) develop the concept of “esport social capital” and show that active forms of participation - competitive play, streaming, and systematic engagement in clubs/teams - significantly predict both the level of social capital and a stronger sense of social connectedness and subjective well-being. Passive forms, such as occasionally watching streams, are not equally consistent predictors (Yeomans et al., 2025). These findings imply that esports do not “produce” social capital automatically; what matters is how structured and intensive participation is.

The systematic review by Sachan and colleagues (2025) shows that the relationship between virtual identities, participation in gaming/esports communities, and social capital outcomes is mediated by the salience of different identities (gender, ethnicity, gaming identity, fan identity) and the extent to which they are marginalized within the community itself. When identities are accepted and supported, online communities act as a resource for both “bridging” and “bonding” capital - connecting heterogeneous groups while simultaneously deepening close, supportive ties. When they are marginalized,

the same spaces become sources of exclusion and erosion of social connectedness.

Pang and colleagues (2025), on a sample of online gamers, show that frequent participation in gaming communities increases perceived social capital (especially bonding capital - close, emotionally significant ties) and, through it, life satisfaction. Although their study does not focus exclusively on esports, the implications are relevant: esports clubs, Discord servers, and fan communities can function as “hubs” of digital social capital, particularly for young people who have limited resources in offline contexts.

In the domain of fan communities, Barney and Pennington (2023) show that identification with esports, patterns of online engagement, and motives (sociability, excitement, learning) are closely interrelated. Intensive participation in fan practices - following teams, creating memes, discussing matches, participating in fan Discord communities - not only fosters a sense of belonging but also builds “symbolic capital” within the community (for example, the status of an “insider” who knows the team’s history, players, and game meta). This symbolic capital is often converted into social capital in

the form of recognition, support, and friendship networks.

Conceptually closer to sports management, Calapez and colleagues (2024) analyze esports fan identity in the context of the sponsor-sponsee relationship and show that a stronger fan identity enhances cognitive and emotional closeness to the sponsor’s brand. Although the study focuses on marketing outcomes (brand loyalty, purchase intention), the underlying mechanism is one of social capital: belonging to a “tribe” (team, game, league) extends to branded symbols, which become part of group identity.

In her doctoral thesis on “motivation-based esports spectator identity,” Chang (2024) shows that esports spectator identity can be clustered according to dominant motives (e.g., competence/learning, socialization, escape from everyday life) and that certain clusters (such as those with strong social motives) exhibit higher intentions to regularly attend events and deeper integration into the community. This supports the idea that social capital in esports develops particularly where communities are structured around shared motives and values, rather than solely around “content consumption.”

Xue, Newman, and Du (2019) demonstrate that esports is not merely

a collection of matches and results, but a “narrative ecosystem” in which stories about players, teams, and communities are used to articulate identity and belonging. By analyzing esports narratives, the authors show that fans, through these stories, share a sense of “we” - either as members of a specific team/franchise or as part of the broader gaming culture. Narratives about “underdogs,” about the rise of talented players from marginalized backgrounds, or about historic rivalries between teams act as cultural repertoires through which young people articulate their generational identity.

Barney and Pennington (2023) find that esports fans often combine elements of “sports” and “gaming” identity, with some practices – collective viewing, cheering, participation in online discussions – resembling traditional sports fan cultures, while others (memes, modding, participatory culture) bear the hallmarks of digital sub-cultures. For younger generations, particularly digital natives, esports becomes one of the main symbolic spaces in which sports, technological, and pop-cultural codes are unified.

Empirical studies indicate that generational identity in an esports context is not merely a matter of individual attitudes but also of collective

practices. Yeomans and colleagues (2025) show that the strongest effects on social connectedness and well-being occur where esports functions as a regular, structured activity (clubs, leagues, regular online teams), rather than as occasional entertainment. In this way, esports can take on some of the functions of traditional youth organizations: it enables the development of routines, rituals, and “inside jokes” that cement group identity.

Calapez and colleagues (2024) further show that esports fan identity extends beyond the field/screen through the use of club colors, merchandise, and symbols in every-day life (from profile pictures on social networks to clothing and accessories). This indicates that esports can function as a “cultural style” for young people - a set of symbolic choices that signal belonging to a particular generational scene.

Although esports offers a potentially rich source of social capital, it also reproduces certain inequalities. Crothers and colleagues (2024) show that women in esports, even when they are not professional players, regularly experience gender-based harassment and toxicity, leading to “self-concealment” strategies (e.g., avoiding voice communication, using neutral nicknames). Instead of

esports being a space for accumulating social capital, it becomes ambivalent: simultaneously a source of friendships and a source of psychological strain.

Tang and colleagues (2025) analyze young women participating in mobile esports and show how traditional gender norms and “masculine-coded” gaming culture produce stigma - esports engagement is viewed as “inappropriate” or “a waste of time,” which forces some participants to hide their involvement from family and the wider environment. Yet it is precisely through esports communities that these participants find support and a sense of collective identity that partially compensates for offline stigmatization. Players’ experiences cannot be understood through a single category (e.g., gender) but through the intersection of gender, race, sexuality, and age. For players with multiple marginalized identities, online communities can be both a refuge and a site of further discrimination. This is crucial for understanding social capital: for some groups, bridging and bonding capital is built primarily in subcultures and “niche” communities, while broader esports scenes remain partially closed or hostile.

On the other hand, by acknowledging these experiences, some seg-

ments of the esports community attempt to develop alternative norms and cultural codes. For example, Tang et al. (2025) point to the importance of game and community design that fosters cooperation and inclusion, while Crothers et al. (2024) emphasize the need for institutional measures (moderation, sanctioning toxicity, supporting women as players and moderators). In this sense, social capital in esports is not given; it is the result of ongoing struggles over rules of conduct, visibility, and recognition of different identities.

Taken together, the results of these studies suggest that esports is becoming one of the key spaces in which younger generations articulate their social, cultural, and value identities. Xue et al. (2019) and Barney and Pennington (2023) show that stable fan communities, based on narratives, rituals, and symbols, develop through esports. Yeomans et al. (2025) underscore that these communities have real effects on social capital and well-being.

At the same time, the work of Crothers et al. (2024) and Tang et al. (2025) reminds us that access to these resources is unequal: for women and other marginalized groups, the path to full participation in esports culture is often “through obstacles.” This means that social capital

in esports is at once a resource and a line of division - an instrument of generational cohesion, but also an arena in which it is negotiated who has the right to be a "real" gamer and a "real" member of the community.

For future research, these studies point to the need to analyze esports within the broader framework of digital citizenship and participatory culture: as a space in which young people not only consume content but also actively co-create rules, values, and forms of cultural expression that will define their generation.

Conclusion

Over the last decade, esports has evolved into a complex socio-economic and cultural phenomenon that transcends the boundaries of the entertainment industry. Analysis of the structure of the global market shows that it is a highly concentrated ecosystem in which key control is held by game publishers and global digital platforms, while teams, leagues, and local organizations operate under conditions of high financial uncertainty and dependence on external actors. At the same time, the economic growth of esports strongly depends on macroeconomic factors - digital infrastructure, industrial policies, regional development strate-

gies, access to capital, and demographic trends. In this sense, esports must be viewed as a segment of the broader digital economy, whose rise is not linear but sensitive to regulatory and financial shifts.

On the other hand, the analyzed studies clearly show that esports has profound social and cultural implications. It acts as a significant source of social capital, particularly through structured forms of participation - clubs, teams, leagues, fan communities, and online platforms. In these spaces, young people develop relationships of trust, mutual support, and belonging, while at the same time shaping their generational and cultural identities. Esports narratives, rituals, and symbols become part of their every-day practices and broader cultural codes. Yet these processes are not unequivocally positive: tensions, inequalities, toxicity, and barriers to access are present, especially for women and marginalized groups. For this reason, esports simultaneously represents a space of opportunity and a field of struggle for inclusion, recognition, and cultural visibility.

This paper also has its limitations. Although the theoretical synthesis is extensive, it relies on the analysis of available literature that is itself fragmented, methodologically diver-

se, and unevenly distributed across regions. Most empirical studies come from East Asia, North America, and several European countries, while other areas (the Balkans, Eastern Europe, Africa, Latin America) remain under-researched. Cross-sectional studies dominate, whereas longitudinal investigations, experimental designs, and in-depth ethnographies are much rarer. This limits the ability to clearly establish causality and to understand the long-term effects of participation in esports on identity, socialization, and youth well-being.

Based on the findings presented, future research directions should move along several lines. First, there is a need for comparative, intercultural research that would make it possible to identify both specificities and universal patterns in the development of esports communities. Second, there is a need for models that more deeply integrate economic, social, and cultural factors in order to jointly understand structural conditions and individual practices. Third, research on toxicity, inclusion, and gender relations in esports requires in-depth qualitative approaches to capture everyday interactions, mechanisms of marginalization, and strategies of resistance. Fourth, future work may focus on institutional aspects – regu-

lation, working conditions, professionalization, educational programs, and the role of local policies in developing esports ecosystems.

Overall, esports should be understood as a dynamic, multi-layered, and rapidly evolving field in which economy, culture, technology, and social structure intersect. This paper has sought, through an integrated theoretical and analytical approach, to highlight the complexity of the phenomenon and to encourage future research that will enable a deeper understanding of both its potential and its risks for contemporary society and the generations to come.

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SOCIO-EKONOMSKI I KULTURNI ASPEKTI E-SPORTA: PREGLED LITERATURE

Rezime: E-sport se tokom protekle decenije razvio u jedan od najdinamičnijih fenomena digitalne kulture, sa značajnim ekonomskim, socijalnim i kulturnim implikacijama. Cilj ovog rada je da se analiziraju ključne dimenzije razvoja e-sporta - na osnovu sistematskog pregleda novije naučne literature - i da se proceni njegov uticaj na savremene ekonomske trendove, društvene odnose i kulturne obrasce. Nalazi ukazuju na to da ekonomski rast industrije e-sporta proizilazi iz interakcije medijskih tehnologija, digitalne infrastrukture, ljudskog kapitala i globalnih tržišnih trendova. Iz društvene perspektive, e-sport doprinosi formiranju novih tipova društvenog kapitala, online zajednica i generacijskog identiteta, dok se sa kulturnog stanovišta manifestuju kroz transformiranje prakse potrošnje medija, učešće publike i normalizaciju digitalnog ponašanja. Rad sintetiše uvide iz više disciplina i naglašava potrebu za integrisanim modelima koji povezuju makroekonomske faktore, organizacione strukture i individualno-dualne prakse igrača i publike. Ovi uvidi mogu poslužiti kao osnova za kreiranje politika, razvoj obrazovnih programa i poboljšanje institucionalne podrške sektoru e-sporta.

Ključne reči: e-sport, društveno-ekonomski aspekti, kulturni identitet, digitalna kultura, tržište e-sporta

THE ROLE OF BANKING RISK IN SHAPING BANKS' ACCOUNTING POLICIES

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Review Article

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Abstract: The subject of the research in this paper is the analysis of the most common types of risks in banking with an emphasis on risk management, in order to achieve the optimization of the risk-return ratio. In the overall context of the functioning of a bank, improving management, i.e. bank governance, is inevitable. Risk management is an extremely topical topic, since the global economic crisis has also affected the banking system and many banks have run into difficulties and losses, precisely because they were unable to repay their investments. The scientific objective of the research is the scientific description of risk as a phenomenon in modern banking institutions, the identification of factors that lead to risk, as well as proper risk management. The social objective of the research relates to the identification of weak points in the risk management sector, and the provision of proposals for improving work techniques in order to create a more favorable environment for the successful operation of banks in the long term.

Keywords: risk, banking system, management, operationalization, accounting policy

Introduction

The dynamics of modern business are causing changes in banking systems around the world. The development of financial markets is increasingly pushing the deposit-credit activity of banks into the background. With the expansion of banking operations based on the collection of fees and commissions, the process of transformation of traditional banks into modern forms of organization and operation was initiated. Modern banking operations are accompanied by increasing and more complex risks, which brings to the fore the issues of regulation, as well as the issues of identifying, monitoring and managing the risks to which banks are exposed.

The process of globalization and internationalization of the financial market has led to an increase in the scope of risks and the creation of new types of business risks, which was influenced by several factors. Increasingly present numerous risks call into question individual banking transactions, because they affect the increase in uncertainty of the outcome of banking and other transactions.

The focus of the bank control process is increasingly moving towards

the control of the risk to which banks are exposed in their operations, while taking timely corrective measures, if necessary. In this way, banks are free to enter into businesses that will bring them an acceptable return, provided they hold a sufficient level of capital to cover their exposure to risk in those businesses and provided that, according to the current Banking Law, they can perform such business.

Risks become an inseparable component of economic activity, so banks must be trained to respond to market changes in the best possible way. Every bank faces different types of risks in its operations that can negatively affect its operations. All the bank's resources may be exposed to the risk of reduction or disappearance, and hence the bank's interest to manage all these risks, to reduce them to a minimum, and in the case of their materialization, to compensate them from reserves or in some other way, so as not to financially endanger the bank's operations. Therefore, risk management is an integral part of the bank's business management, and constant work in this area is needed to avoid failure that can seriously threaten the business.

The work analyzes the risks that modern banks have to deal with in their daily operations, how these risks affect their operations, ways of adequately dealing with all the challenges that business brings in today's times in itself, as well as familiarization with the legal regulations of our banking system and banking operations. Risks in banking, their analysis and strategy related to their management represent one of the key factors in the business of every bank. The fact that we are living in a time of great changes leads us to deal more seriously with this issue, because as everything around us changes, so will the risks. This is the main reason why risk management is becoming an increasingly topical topic, where new moments worthy of attention can arise every day. The importance of this research lies in a better understanding of the problems that the risks entail, as well as an attempt to lead the same way through certain policies, procedures and strategies, as well as harmonization with the appropriate legislation and regulations, whereby the adoption of those regulations aims to strengthen the stability and security of the banking sector, and thus the stability of the entire

banking system of Serbia. The fact that certain decisions of the National Bank of Serbia are aimed precisely at risk management shows how important risk is.

Risk and types of risk in banking business

Risk is a multifaceted, multidimensional and complex concept that is a daily part of the life and work of all individuals and economic entities, but as a scientific field in economics, it has a rather short history.

Risks in bank operations are a characteristic of every banking job, so even neutral banking jobs are not without risks, and with the adoption of new instruments, new techniques and strategies, new banking products, the list of risks is constantly expanding. For bankers, any change (change in interest rates, change in deposits, debtor's inability to repay the loan, deregulation, moral hazard, etc.) carries with it a certain level of risk. The globalization of banking business and the trends of mega mergers and acquisitions of large banks push bank management to identify the most important risks (Baule & Tallau, 2016).

Banks, as financial intermediaries, provide services, assuming different intermediation risks, such as credit

risk, liquidity risk or interest rate risk. These risks are largely related, one event related to a certain group of risks can cause the appearance of other types of risks. Therefore, the management of the bank pays great attention to the problems of identification, measurement and control of the risks to which the given bank is exposed in its operations.

Risk management is a central part of the bank's strategic management. It is a developmental and continuous process that permeates the entire organizational structure of the bank. Methodologically and systematically treats all risks related to the bank's operations in the past, present and, especially, in the future.

The primary responsibility for understanding and therefore managing the bank's risk lies with the Board of Directors, which sets risk limits, based on the assessment of the risks to which the bank is exposed and the risk bearing capacity. At a lower level, risk management is assigned to the Risk Management Committee whose task is to identify, assess and manage the bank's risk (Chollet & Sandwidi, 2018).

In the conditions of global banking operations, there are numerous risks that call into question individual banking operations, collection or, in the last case, a change that increases

the uncertainty of the outcome of the transaction and, as a whole, increases the uncertainty of the bank's income. With the development of investment banking and the process of globalization of the financial system, there has been an additional increase in the risk that banks face in their operations.

Banking business operates with the constant presence of various forms of risk. As risk is inevitable in banking, hence the fact that the work of banks consists in continuous overcoming of risk. By reducing the risk to an acceptable level, the possibility of potential losses for shareholders, depositors and other creditors of the bank is reduced.

There are several definitions of risk, but in general, risk represents any uncertain fact in financial operations, the realization of which has a direct or indirect impact on the result and position of the bank. Risk in banking could be defined as the possibility that the invested funds will not earn the expected rate or level of return, i.e. that there will be a loss in the specific business.

Economists, statisticians, bankers, insurance companies - each of them sees risk in their own way. Risk is defined, among other things, as: possibility of loss, probability of loss, uncertainty, deviation of actual from

expected results or probability of any outcome that is not expected.

So, although there is no general definition of risk, there are common elements, namely uncertainty and loss.

Risk can be material and immaterial (Gojković et al., 2023). Material risk is a risk reflected in the possibility of losses on a transaction, client or business. Intangible risk represents the possibility, with an uncertain probability, that the reputation of the bank may be damaged, which is the basis of trust in an individual bank and the damage of which may endanger the entire operation of the bank. Regardless of the type of risk, the risk of doing business in banks is expressed in monetary terms.

The following five factors have a decisive influence on the risk of bank operations in modern conditions (Finger et al., 2018):

T – technology risk - with the development of technology, there has been a massive use of electronics in banks in terms of hardware and software, from processing information to processing requests from clients and their accounts.

R – the risk of changes in regulations - represents the risk that arises from changes in laws and other regulations that can directly negatively

affect the bank's ability to earn or indirectly on its ability to adapt to changes in regulations.

I – interest rate risk - the risk that occurs due to changes in interest rates, which in modern conditions of high level of competition on the financial market are given to commercial banks, because individual banks do not have a dominant influence on them, but are formed on the market.

C – customer risk - risk related to the possibility that the bank's client will be taken over by competing banks. There, the bank's biggest clients are at the greatest risk, over which there is often a real market war between the banks, on whose deposits and placements the bank depends the most.

K – risk of capital adequacy - risk of solvency - if it turns out to be real that the previous risks have materialized, this can lead to the risk that solvency is threatened, i.e. capital adequacy of a commercial bank. Thus, the bank enters the zone of non-compliance with the (international) standards of banking operations that are incorporated into the national legislation.

Any uncertainty and unplanned and sudden occurrence in certain business activities of the bank can be defined as a risk. However, the definit-

ion of risk itself must be narrower, bearing in mind that banks operate with specific goods (money), so banking risk can be defined as the probability of loss arising as a result of the effect of uncertain events in bank operations. In modern conditions, due to very dynamic changes in the economic environment and the environment in which banks operate, the bank's exposure to risk increases.

There are various possibilities of risk sharing in banking operations. Given the large number of sources of risk, grouping and dividing risks is not a simple task. Bearing in mind the fact that from the bank's point of view, it is important that the risk is always linked to the functional operation of the bank, then it is usual to observe banking risks always from a functional approach, i.e. risk binding for certain global activities of the bank. This approach enables a rough division of banking risks depending on the subject and purpose of the research.

Factors that influence the occurrence of risks faced by a business entity and its business activities are (Radovanović et al., 2024):

- external,
- internal,
- mixed.

The risks to which a business entity is exposed are determined by the industry in which the company operates,

the external environment and the internal structure and organizational culture.

The bank is exposed to numerous risks, the most important of which are credit risk, liquidity risk, interest rate risk and foreign exchange risk, but there are also other risks such as operational risk, country risk, exposure risk and investment risk, etc.

Risk management strategy of the bank

Risk management is an essential component of the competitiveness of every business entity, including banks as financial institutions. Money is a "goods" that the bank manages and disposes of, i.e. "trades". With that, it can be said that money is a market category.

The bank is obliged to establish a comprehensive and reliable risk management system, which is included in all its business activities and which ensures that its risk profile is always in accordance with the already established risk appetite. The risk management system must be proportionate to the nature, scope and complexity of the bank's operations, i.e. its risk profile and to include appropriate strategy, policies, procedures for identifying and assessing risks, appropriate internal

organization, appropriate information system.

The bank should have the ability to assess the probability that the risky event will materialize, that it will affect the bank's operations, and to assess its consequences if it occurs. It is necessary for the bank to react adequately, taking appropriate preventive measures to prevent, or if the risky event has already occurred, to minimize its impact on the bank's operations. In order to successfully deal with risk, a bank must have the organization, human resources and reserved funds.

The risk management sector is in the function of maintaining risk within a tolerant framework of action, for which it is essential to ensure (Hurley et al., 2014):

- reliable information and accurate reports on the threat, occurrence or effect of risk,
- measuring the effect of risk in monetary equivalent – expressed through a reduction in the bank's earnings or through damages caused to the bank's assets,
- adequate strategies, programs and plans to prevent and suppress the effect of each risk through appropriate business policies, procedures and standards.

The bank accepts risk and operates with its consequences, considering that it manages and disposes of other people's funds (stakeholders). It limits the effect of risk by setting exposure control limits or applies one of the previously mentioned strategies. It also manages the business policy of diversification of individual and total risk.

The bank allocates reserve funds to cover possible losses both in a specific business and in general, if it enters into business taking responsibility for risks. What will be the amount of funds intended to cover the risk of the bank's overall operations depends on the bank's financial capacity.

In their operations, banks use standard risk assessment methods, which provide information about the bank's overall strength, financial and operational weaknesses or adverse trends, problems or worsening conditions, and about risk management practices.

The risk management strategy is transferred to the responsibility of the risk management committee of the board of directors, as well as to the director or manager of the risk management function. Certainly, an adequate Framework for identification, measurement, monitoring and control of risks should be documen-

ted by the manager of the risk management structure. In this way, it provides conditions for the consistent application of strategy, policies and procedures along all business units that should assume the risk of financial institutions.

The risk management framework in financial institutions should be critically evaluated and adjusted in accordance with the overall risk profile and risk appetite of financial institutions, as well as with existing external and internal regulations. The risk management function in banks covers all sources of materially treated risk in all portfolios and business operations, but adequate supervision is carried out along all business units, i.e. line.

From the point of view of the organizational structure, the risk management strategy includes three lines of risk taking (Mies & Menk, 2019):

- business units that provide risk - first level, responsible for identification, assessment and minimization of risk in relation to a given level of utility, i.e. yield,
- risk management function – second level, responsible for identifying, monitoring, controlling and quantifying risks, for creating a methodology and mechanism for risk management, coordination and assistance in

terms of measuring the performance of business units and

- internal audit - the third level, which provides an independent assessment of risk management at the level of financial institutions.

The risk management strategy in financial institutions predetermines the analytical framework of risk management, which includes all risks to which financial institutions are exposed, defining the tendency to accept certain risks, determining the capacity and profile of acceptable risks, defining the scope of risks to be managed, processes, procedures that are applied, as well as all other business segments and individuals participating in the creation of the strategy, i.e. Framework for risk management. In addition, it includes abilities, knowledge, skills, tools and methodology for risk management, a created internal control system, modern IT support, capital adequacy and an organized reporting system. In the strategy defined in this way, the Risk Management Framework should be comprehensive from the point of view of the organizational and management structure, and especially it should be flexible in order to be able to adapt to any change in business goals and activities in any situation (Mitrović et al., 2024).

The risk management strategy provides conditions for effective management of all risks. This is all the more so, as only one financial transaction can cause several types of risk, i.e. one type of risk can initiate other risks. As the interaction of different risks can cause an increase or decrease in risk, a risk management strategy usually recognizes and expresses in a certain way the interaction of all business activities. The applied strategy, during risk management and analysis, provides the management with a clear attitude towards the risks to which the financial institution is exposed. In order to successfully implement a risk management strategy, a financial institution must have an appropriate organizational structure that enables effective monitoring of the interdependence of risks at all levels of financial institutions. In other words, all business lines are equally responsible for the risks they take (Indić et al., 2023).

If an adequate risk management strategy is not applied, they will not be able to be analyzed, evaluated and settled, therefore they will not be controlled either, which is a serious problem for every bank. Only by applying an adequate strategy, an accurate management risk assessment is obtained, where the bank is

located and helps to define future activities and plans from the point of view of risk exposure and acceptability. In order to determine the overall exposure of financial institutions to risks, it is necessary to measure different types of risks and according to product and service lines, in such a way as to include their short-term, medium-term and long-term goals and impacts on the operations of financial institutions.

The term and concept of bank risk management

In modern conditions, the bank operates in the environment of other banks, clients and the economy as a whole, which introduces elements of risk into banking operations, while it should be borne in mind that the dynamics of changes in society and the economy, in modern conditions, are very accelerated, which represents a source of various risks for banking operations.

The risks that every bank faces are inevitable. They must be evaluated, controlled and financially, to the maximum extent possible, neutralized so as not to endanger the bank's operations. Risk management is coordinated with the size and organizational structure of the bank, the scope of

activities and the types of work it performs (Savić et al., 2023).

The general goal of risk management is to optimize the trade-off between risk and return. In this sense, the focus of banking risks is the management of credit and market risks, on which the solvency risk, as the definitive risk of the bank, crucially depends. Interest and currency risks are integral components of market risk. Liquidity risk is a specific banking risk that modern banks can ultimately manage through the financial market, provided they have a strong solvency position and high credibility on that basis.

In principle, risk management has two main goals - avoiding bank insolvency and maximizing the rate of return on capital with a correction for risk. If the bank's risks were underestimated, it would have a negative impact on the bank's solvency and profitability, i.e. actual losses would push the rate of return on equity below expected levels. Underestimation of credit and market risks in the modern environment in which banks operate today endangers bank solvency, bearing in mind that, in modern conditions, solvency can change significantly faster than in traditional business conditions (Sassen et al., 2016).

Risk management is a process in which managers identify, assess, monitor and control risks associated with the bank's business activities, i.e. financial institution where they work. In large financial institutions, risk management is used to identify all risks associated with certain business activities and to aggregate risk information so that exposure can be assessed on a comprehensive basis.

Risk management is a relatively new discipline and developed from insurance business, because in the management of insurance business it was noticed that the traditional way - through compensation of damages - cannot successfully minimize business risk in any activity. Risk management at banks implies a complex mechanism that combines risk protection contracting with insurance companies with measures of the bank's internal risk management policy.

Risk management is a continuous and evolving process that flows through organizational strategy and the implementation of that strategy. It represents a dynamic process. The goal of risk management is twofold (Penjišević et al., 2024):

- preservation of the bank's assets and funds and
- protection of potential profits from losses.

The risk management system includes (Armour, 2012):

- strategy and policies for risk management, as well as procedures for identifying and measuring, i.e. risk assessment and risk management,
- appropriate internal organization, i.e. organizational structure of the bank,
- an effective and efficient process of managing all risks to which the bank is exposed or may be exposed in its operations,
- adequate system of internal controls,
- appropriate information system,
- an adequate internal capital adequacy assessment process.

The risk management process consists of six steps (Boyd & De Nicolo, 2005):

Determination of goals - risk management program, where it is precisely decided what the business entity expects from that program. The primary goal is to preserve the efficiency of the business entity. A secondary goal is to protect employees from injury. Other goals are related to cost reduction, socially responsible behavior, good public relations, etc.

Risk identification - before doing anything, the risk / risk manager of the business entity must be aware of the

risks and must reveal the risks to which the company's operations are exposed. Therefore, one important aspect of risk identification is the perception of risk exposure, i.e. potential damages associated with a certain type of risk, in the following categories:

- physical assets (movable and immovable property),
- financial resources (own and others),
- human resources and
- responsibility.

Risk identification is the phase of risk management in which, in addition to the specification of risks in the general classification system and the definition of subjects, the cause-and-effect relationships of individual risks are determined. Risk identification deals with risk perception, which refers to the ability to perceive a potential situation in which damage occurs, that is, to notice a risk that can be an active cause of damage, as well as to notice dangers that can increase the effect of that risk.

Therefore, risk identification is the process of identifying the exposure of a business entity to uncertainties. The risk description aims to present the identified risk in a structured format, most often using a table.

In risk identification, a combined approach is applied - client know-

ledge, risk analysis questionnaires, diagrams, analysis of financial statements, historical review of work, case studies, etc.

The basic classification of risks in relation to the operations of a business entity is:

- critical risk – leads to bankruptcy of the business entity,
- an important risk - leads to jeopardizing the liquidity of the business entity, but the negative effects can be abstracted (either by increasing efforts to collect due debts of the debtor or by a loan from a commercial bank) and
- unimportant risk - does not threaten the liquidity and solvency of the business entity, i.e. its effects do not significantly affect the operations of the business entity.

Risk assessment – represents the general process of risk analysis and assessment. The company's experts determine the potential loss and the probability of loss occurrence.

Risk analysis consists of the identification, description and assessment of risks. Risk assessment can be qualitative, quantitative and semi-quantitative in terms of the probability of occurrence of a risk event and possible consequences.

The obtained results of the risk analysis can be used to obtain a risk

profile that gives a significance rating for each risk and provides an instrument for defining priorities in risk regulation.

After the risk analysis process is completed, the assessed risk is compared with the risk criteria established by the bank. Risk evaluation is important for making decisions about the importance of risk for a business entity and whether a certain risk should be regulated or accepted.

It is important for the company to establish a system of internal and external reporting on the existence of risks, whereby internal reporting is intended for the needs of management, various organizational parts of the business entity and employees, while external reporting implies regular reporting to the company's stakeholders.

Consideration of alternatives and selection of means for risk management

– podrazumeva dva rešenja:

- risk control - is aimed at minimizing the risk of loss to which the business entity is exposed and
- risk financing - implies the harmonization of available funds intended for the regulation of losses, which arise from the risks that remain after the application of risk control techniques.

Regulation (mitigation) of risk is the process of selecting and implementing measures to modify risk. Each system of risk regulation aims at effective and efficient business operations of the business entity, effective internal control and business compliance with valid legal regulations and business practices.

Methods for risk management are (Golubović & Janković, 2023):

- *risk control methods* are avoidance, prevention and risk reduction, that is. loss prevention and control, as well as minimizing various losses if they occur.
 - The risk avoidance method means that the person does not want to accept the risk. This is achieved by not engaging in action that may lead to risk and is a negative approach to risk management.
 - The risk reduction method implies the application of modern prevention methods. Prevention represents a set of activities aimed at preventing the occurrence of a harmful event and, if it occurs, the consequences are as small as possible.
- *risk financing methods* include risk retention and transfer. Retention may be associated with specific allocations in the budget

to cover uninsured losses and may be supported by fundraising. The transfer can be realized through contractual provisions, through bonds, pre-contracts, so-called. uninsured transfer, through insurance, etc.

- The risk retention method is a common method of dealing with risk, when a person takes no action, whether consciously or not, to avoid, reduce or transfer risk. Low amount and low potential loss risks should be retained.
- The risk transfer method implies that the risk can be transferred from one person to another, if that person is more willing to bear the risk (loss insurance process, where an individual protects himself from the risk of loss by buying or selling an asset that is estimated to have no loss).

We can conclude that the basic guidelines for risk management are (Ilić & Tasić, 2021):

- don't risk more than you can afford to lose - it's about risk that something has to be done about - transferred or avoided. The rule does not say what should be done with that risk, because it is about the occurrence

of maximum possible losses, the potential size of which cannot be reduced, and can be covered from bank loans or cash reserves of the business entity or from cash flow,

- keep in mind the possibility of chance - the risk should not be transferred, because the probability of loss, i.e. the potential size of the loss if it occurs, very high. The essence is to determine the probability of loss and to make a decision accordingly and

don't risk a lot for a little - the actual degree of retention of each individual risk consists in looking at the ratio of costs and benefits. It is essential to find a reasonable relationship between costs and benefits.

Application of the decision – administrative procedure of application of the decision related to retention or transfer of risk with or without reserves, i.e. formation of money funds.

Assessment and re-examination – an ongoing function of the risk management manager. It implies constant evaluation and correction of the operationalization of risk management, bearing in mind that, over time, the risk may change, ie. disappear or a new risk may arise. Also,

errors may occur during risk management and should be corrected.

Monitoring and controlling the risk management process means that effective risk management involves a certain reporting and control structure to ensure that risk is timely identified and assessed, and that appropriate controls are implemented in response to a risk event.

Good management of a business entity requires that the business entity adopts a methodical approach to risk management that protects the interests of shareholders, ensures that the Executive Board fulfills its obligations aimed at realizing the strategy, building the value of the business entity and improving the performance of the business entity. It also ensures that adequate management controls are in place and functioning satisfactorily.

Successful risk management makes businesses more flexible, with the ability to respond to environmental changes, improves the probability of achieving strategic goals, provides investors with an adequate relationship between risk and return, makes risk bearable, improves capital allocation and reduces the cost of its use. Therefore, risk management in the modern environment requires a comprehensive and integrated approach to risk management in companies. It

is carried out by the board of directors, management and other professional staff, who apply the strategy that defines risk management, define goals, the required organizational structure and the targeted risk profile of the company.

Operationalization of risk management through accounting policies

The bank, as an institution that is exposed to risks, is obliged to identify, assess and measure the risks to which it is exposed in its operations. It is also obliged to have a special organizational unit in its operations that deals with risk management.

The Law on Banks enumerates risks in banking operations, elaborates on risks in banks, risk management and organization of risk management. The Banking Act defines the following risks (Danisman & Demirel, 2018):

- credit risk,
- liquidity risk,
- interest and currency risk and other market risks,
- operational risk,
- risks related to the country of origin of the person to whom the bank is exposed,

- risks of the bank's exposure to one person or a group of related persons,
- risks of the bank's investments in other legal entities and in fixed assets.

The Bank, in its own acts, prescribes procedures for the identification, measurement and assessment of risks, as well as risk management. These acts contain the following provisions and procedures (Hemed, 2022):

- provisions ensuring the functional and organizational separation of risk management activities and regular business activities,
- procedures for identification, measurement and risk assessment,
- risk management procedures,
- procedures that ensure the control and consistent application of all the bank's internal risk management procedures,
- procedures for regular reporting to bank authorities and regulatory bodies.

Credit risk is one of the most important risks to which a bank is exposed. The great importance of credit risk management stems from the potential danger that a large number of loan beneficiaries will not be able to properly fulfill their obligations, which can lead the bank to a certain state of insolvency. That is why there is a great responsibility of bankers,

primarily those employed in the credit department, to monitor the effect of all factors that affect the quality of the bank's loan portfolio and to respond in a timely manner to adverse trends that can lead to bank bankruptcy.

In terms of liquidity risk, the bank manages its assets and liabilities so that it can meet its due obligations at any time and can permanently fulfill its obligations. In the function of effective liquidity risk management, it is prescribed that the bank's competent authority adopts and implements a liquidity management policy that includes: planning the inflow and outflow of funds, monitoring liquidity and adopting appropriate measures to prevent and eliminate the causes of illiquidity. The NBS prescribes the method of determining the bank's liquidity levels, including the critically low level of liquidity. Due to the importance of the bank's liquidity risk and the organization's way of managing that risk, in 2000 the Basel Committee for Banking Supervision issued a document called "Sound Practices For Managing Liquidity in Banking Organizations", which includes the principles that every banking organization should respect and incorporate into its liquidity risk management policy and procedures.

In relation to foreign exchange and interest rate risk management, the bank is obliged to harmonize the volume and structure of assets in order to enable efficient management of market risks, to establish special policies and procedures for identifying market risks and managing those risks

Interest rate risk management is an important and organized activity in the business of every bank. This risk is of great importance for the bank, because changes in interest rates on the assets and liabilities side affect the amount of the interest margin in a positive or negative sense. The most important role in the management of interest rate risk is played by the Board for asset and liability management in the bank.

Foreign exchange risk arises due to a change in the exchange rate, i.e. this risk for the bank is the risk of recording a loss due to changes in exchange rates. Therefore, foreign exchange (currency) risk management is of great importance for the successful operation of the bank. The foreign exchange risk indicator is the ratio between the bank's total open foreign exchange position and the bank's capital. The bank is obliged to maintain the relationship between assets and liabilities so that its total open foreign exchange position at the end of each

working day does not exceed 20% of its capital (Kerezan, 2016). If this indicator is above the allowed criteria for two consecutive days, the bank is obliged to inform the NBS about it. Foreign exchange risk management implies the effort of the management of a commercial bank to balance positions in the balance sheet on the asset side with positions on the liability side, according to the currencies that are on the balance sheet. Apart from the policy of balancing individual balance sheet items, the policy of compensation through transactions on the financial derivatives market is also effective.

Operational risk is a complex and widespread risk, considering that it is found in all business activities of the bank and that the causes that lead to it are not always visible. It can manifest itself independently or synergistically with other types of risk that are more easily discernible. Operational risk is not always documented and is the result of (un)professional behavior of management and bank employees. Operational risk management means managing the organization of work and business, personnel resources and technical support in the bank, in accordance with current regulations and adopted business practices.

The risks of the country of origin of the person to whom the bank is exposed imply negative effects that may arise on the financial result and capital of the bank due to the inability of the bank to collect claims due to reasons that are a consequence of the political, economic or social conditions in the country of origin of that person. The bank is obliged to establish an adequate country risk management system that includes risk identification, risk measurement, monitoring, control, determination of authority and responsibility, regular information system and improvement of the system. The bank is obliged to determine and periodically change country risk exposure limits individually by country of origin of the debtor and on a regional basis, as well as to determine the appropriate level of value corrections and provisions by country.

The bank's exposure risks include the risk of exposure to one person or a group of related persons, as well as the risks of the bank's exposure to a person related to the bank. Management of exposure risks is carried out in accordance with legal restrictions.

The bank's investment risk include the risks of its investments in other legal entities and in fixed assets and investment real estate. The bank's investment risk management is also carried out in accordance with the

legal limitations of these investments based on the Law.

The responsibility of the bank's Board of Directors in relation to risk management is to, if necessary, and at least once a year, consider already established procedures for identifying, measuring and assessing risks, as well as for risk management for each type of risk.

The bank's executive board is obliged to analyze the effectiveness of the application of appropriate procedures for risk management at least quarterly and submit a report on this to the bank's board of directors.

The bank's board for monitoring the bank's operations (auditing board) is obliged to report to the Board of Directors at least once a month about its activities and about the identified irregularities, as well as to propose a way to eliminate them, i.e. ways to improve policies and procedures for risk management and implementation of internal control systems (CO-SO, 2014).

The bank's asset and liability management committee monitors the bank's exposure to risks arising from its balance sheet liabilities and claims, as well as off-balance sheet items, at least once a month. It proposes measures for managing interest

rate risk and liquidity risk (Savić et al., 2024).

In order to ensure adequate IT support for the risk management system, banks are required to establish an information system that will provide a database that is necessary for the timely and continuous management of risks to which they are exposed in business, compliance with the limits of prudent business operations in banks established by regulation, as well as deviations from the policies and procedures established by the bank's Board of Directors.

Regulatory aspects of risk management and their implications for banks' accounting policies in Serbia

Regulation helps improve the security of the banking industry. Recent regulations had a decisive influence on the development of the organizational part that deals with risk management. The supervisory framework sets limits and guidelines that encourage risk management and stimulate the development of internal risk management models within banks. International regulation under the auspices of the Basel Committee contributed to the promotion of a more precise definition of risk, the development of a more adequate methodology

for their measurement and the introduction of the concept of "risk capital". At the same time, the regulations that set the minimum required capital represent a strong incentive for improving the methodology of risk measurement and control at banks. This proves another special hypothesis.

The problem of regulation lies in the differences between the goals of the banks and the goals of the authorities that prescribe the regulation. In order to make the world of finance safer, a lot of time has been spent globally in the last thirty years to set uniform business standards. The world of finance turned to the strengthening of corporate governance, the introduction of international accounting and reporting standards, as well as the preparation of the New Basel Framework (Basel II).

New laws and by-laws can generate unpredictable bank behavior with the aim of banks avoiding them. With its New Framework (2006 Revised Framework) for required minimum capital, the Basel Committee on Banking Supervision - BCBS - wants to alleviate some of the shortcomings associated, now with the already former regime, under the Basel I agreement (Basel Committee, 2019).

In the Banking Law, three segments indicate that we are getting closer to

complying with the Basel II rules (Aspal et al., 2019):

- the part that refers to the regulation of minimum capital adequacy in banks in relation to risk-weighted assets (minimum 8%, and according to the previous and current law 12%), but also to the right of national controllers to determine this quantitative standard selectively in relation to individual banks, depending on their risk profile,
- introduction of operational risk in the process of determining the riskiness of the bank's credit portfolio and
- the part that refers to the control function of the National Bank of Serbia.

Adopted amendments to the Law on Banks in Article 28 of the Law, which governs the way of managing the risks to which the bank is exposed in its operations, have been harmonized with the principles and recommendations of the Basel Committee for the Control of Banks (Basel II) and the tendencies of comparative banking legislation, so that the new paragraph 3 of this article prescribes that the bank is obliged to ensure the functional and organizational separation of risk management activities and regular business activities of the bank.

What is not done by the Law can be regulated by accompanying bylaws - decisions, because the National Bank of Serbia is authorized to do so in the Law.

The introduction of Basel II in Serbia was completed by the package of regulations adopted by the Executive Board of the National Bank of Serbia in June 2011. This package of regulations, which aligns the rules for calculating bank capital adequacy and risk management with Basel II, i.e. six decisions published in the "Official Gazette of the RS", no. 45/2011 and 46/2011, namely:

- Decision on the adequacy of the bank's capital (with attachments) which implemented pillar I,
- Decision on bank risk management, which implemented pillar II,
- Decision on publication of bank data and information, which implemented pillar III,
- Decision on the control of the banking group on a consolidated basis,
- Decision on reporting on the capital adequacy of the bank and
- Decision on bank reporting.

The adoption of these regulations aims to strengthen the stability and security of the banking sector, and thus the stability of the entire banking system of Serbia, the improve-

ment of the supervisory function through the development of the concept of risk-based supervision and harmonization with the relevant regulations of the European Union (Capital Requirements Directive - CRD). Those regulations have been applied since December 31, 2011, except for the provisions related to the recognition of suitability of credit ratings assigned by rating agencies and which have been applied since September 1, 2011, as well as certain provisions for which a transitional period for full implementation is prescribed.

The new Basel framework will represent the legitimacy of our banks in the international business world, so it is necessary to make all preparations for its application in a timely manner (Zekić & Brajković, 2022).

The Basel Committee was established at the end of 1974 by the governors of the central banks of the G-10 member countries, at the location of the Bank for International Settlements. The committee meets regularly four times a year. The members of the Committee are representatives of: Belgium, Canada, Germany, Italy, Japan, Luxembourg, the Netherlands, Spain, Sweden, Switzerland, Great Britain and the United States of America (BIS 2004).

The function of the Basel Committee is to formulate general standards and

guide-lines of supervision and to propose examples of best banking practices in the expectation that legislative bodies in individual countries will take measures for their implementation so that they best match the specificities of the domicile system.

In 1988, the Committee decided to introduce a system for measuring capital adequacy, popularly known as the **Basel Accord (Basel I)**. Until 1992, this system enabled the implementation of a framework for measuring credit risk, whereby the minimum standard of capital adequacy is 8%. Since 1998, Basel I has been implemented in all countries where internationally active banks operate (over 100 countries). In 1996, the Committee published an addendum to the 1998 Capital Agreement, which, in addition to credit risk, extends its focus to capital requirements that cover the bank's exposure to market risk (Ekinici & Poyraz, 2019).

The revised capital agreement (Basel II) was officially adopted on June 26, 2004 by the members of the Committee. The goal was to adopt Basel II in national legislation by the end of 2006. It is also planned to implement the most advanced approaches for measuring the required level of capital from the end of 2007. This document presents a new set of standards

for determining minimum capital adequacy for banks.

It is generally accepted that all legislation requires banks to maintain a minimum level of capital whose basic function is to serve as a basis for further growth and development, as well as defense in the event of unexpected losses (Savić & Bonić, 2022).

With the development of technology, risk management methodologies and the financial markets themselves, the capital agreement of 1988 has become less useful for many banks, primarily because it does not allow differentiation of financial institutions and their level of riskiness. Many leading banks have developed significantly more advanced control and management techniques, primarily through the improvement of internal processes and the application of the most advanced risk measurement techniques and sophisticated risk management methods.

The main difference between the original and the revised capital agreement refers to the fact that Basel II calculates capital adequacy by reflecting specific risks specific to a particular bank and at the same time gives an initiative to improve the risk management process. Basel II consists of three pillars that complement each other and present the agreement as one logical unit, which should con-

tribute to increasing the overall stability of the security of financial systems. They are (Raphael, 2013):

Pillar I – minimum level of capital for credit, market and operational risk,

Pillar II – function of supervision (supervision),

Pillar III – market discipline.

Pillar I establishes models of minimum capital requirements for credit, market and operational risk in order to enable banks and supervisors to choose the most acceptable. Since the fact is that banks are exposed to different types of risk and different intensities of risk, the same measurement method does not give appropriate results. This standard proposes several options for calculating the necessary capital to cover these risks, depending on the adopted acts of the regulatory authorities, the attitude or permission of the supervisor, technological equipment and the availability and training of the bank's personnel. Banks have at their disposal three basic risk exposure quantification models within the framework of capital adequacy (which differ in their sensitivity to risk and level of sophistication), namely:

- base indicator approach (BIA),
- standardized approach (TSA) and

- advanced measurement approach (AMA).

Pillar II of the Basel Accord II refers to the overall risk profile of the bank and is based on a new approach to the function of supervisory supervision. Supervisors should encourage banks to develop internal models for calculating capital costs according to their risk profile and monitor their success in doing so. The purpose of this interaction is to ensure an active dialogue between banks and supervisory authorities that will enable the implementation of quick and decisive measures aimed at reducing the level of risk to which the bank is exposed or increasing the level of capital, in cases where it is determined that capital adequacy is not met. The supervisor's preoccupation will be the risk factors that are not fully covered when calculating the capital adequacy ratio. These are external factors - interest rate risk, business risk. The Basel Committee on Banking Supervision has identified four fundamental principles of supervisory supervision:

- the principle of internal capital adequacy assessment (ICAAP),
- supervision principle (SREP),
- capital above the minimum level and
- supervisor intervention.

Pillar III promotes the strengthening of market discipline through the establishment of a system of mandatory disclosure of business data that will enable market participants to make a proper assessment of the basic indicators of the operations of financial institutions such as: capital, risk exposure, risk management process and, finally, determining the capital adequacy of a particular bank. In this way, market participants can better understand the risk profile of a bank and the adequacy of the level of capital it holds as a cover for a certain level of risk. Disclosure rules are based on compliance with the principle of materiality, which means that if some information is omitted or misrepresented, it may change or influence the already made assessment or decision of the user of that information. As a rule, the obligation to disclose data is semi-annual, unless that data is already disclosed in the form of some other reports whose frequency is higher.

The Basel agreement is not at all simple, and all banks will have neither the knowledge nor the technical capabilities to implement it in the short term, nor the financial ones, because the costs for implementing Basel II are high. In addition, costs will be incurred during system maintenance. However, all this does not

mean that they should not adhere to the adopted strategy on the implementation of the standard and do everything to one day fully implement it. It is also a fact that Basel II is not a finished product and there are many other jobs that need to be done before starting its implementation. The first step is the drafting and adoption of regulations and with them detailed instructions or methodologies on implementation, which will oblige all banks, both large and small, both banks with foreign capital and banks with domestic capital. Then follows the testing of banks in terms of readiness for the implementation of Basel II. This is followed by the preparation of banks for the implementation of Basel II, which includes the education of employees, the establishment of an adequate IT system that will provide the necessary data and be a support model for the management of certain risks, as well as the definition of different policies and procedures for risk management. The last step is to resolve issues that practice proves to be controversial for the further development of banks' operations based on the principles of quality risk management. The successful application of new principles largely depends on personnel who have the relevant knowledge and skills to implement the new standards.

After identifying the weaknesses of the financial systems and the shortcomings of the Basel II standards, accumulated during the world financial and economic crisis, the process of amending these standards was started. The main goal of introducing **Basel III** standards is to improve the ability of the banking sector to absorb shocks arising from financial and banking pressures (thereby reducing the risk of their further transfer to the real sector), improving risk management and bank management in general, and increasing the transparency of bank operations. It is an expression of the commitment of the Committee to strengthen the regulatory framework of banks, the supervision of banks and the function of risk management in banks.

One of the main tasks of the new Basel III regulatory framework is to strengthen two complementary approaches that support the basic concept of bank stability: micro and macro prudential regulation.

Microprudential regulation at the level of the banking sector increases the level of resilience of banking institutions in a period of stress by means of the following regulations:

- higher and better quality of the bank's capital, with a much greater focus on common share capital to absorb losses,

- more comprehensive risk coverage in relation to capital market activities and
- supervision, risk management and standards on the data disclosure procedure.

Macroprudential policy uses prudential tools to limit systemic or financial risks, thereby limiting the occurrence of disruptions in the provision of key financial services that can have serious consequences for the real economy. The macroprudential approach introduces completely new elements into the regulatory framework:

- the capital buffer helps banks fight against credit gaps. Their function is protection in conditions of stress, i.e. its purpose is to absorb losses in financial crisis conditions,
- the introduction of leverage ratio, which represents the relationship between the bank's capital and exposure, which follows the accounting measure of exposure and
- introduction of two standards for liquidity coverage.

Basel III introduces an additional capital requirement, which allows banks to absorb potential losses in periods of negative effects or financial and economic pressures. In other words, banking systems will be able to withdraw capital in stressful situations, with the fact that the closer the

bank's capital level is to the minimum requirement, the greater are the restrictions on profit distribution (less money available for paying dividends, bonuses and other compensations).

Conclusion

Banking, by its very nature, is a risky activity, so losses can appear in the banks' balance sheets, if the banks do not manage well all the risks they are exposed to. In addition, banks today face more and more types of risks and their manifestations. Given that the environment in which banks operate has changed significantly, the issue of banking risk management is becoming increasingly topical. Risk management in banking business has two main goals - avoiding bank insolvency and maximizing the rate of return on capital with a correction for risk.

Risk management is one of the key elements of banking management. During the last decades, the global economic crisis strongly influenced risk management to gain even more importance within the overall management of commercial banks. Credit risk is still the dominant risk in world banking, and the situation is similar in the Republic of Serbia. Liquidity risk, market, operational and other risks are also gaining impor-

tance in world banking. However, credit risk is still the most important risk of the average commercial bank. The high level of non-performing loans is one of the most important modern challenges related to credit risk. In the banking sector of Serbia, the level of problem loans exceeds 20% of total loans for a long time.

In today's business conditions of banks, it is necessary to ensure two basic principles - business security and profit assurance. It is necessary to ensure security in the operations of banks, because in this way banks gain confidence in their work from clients, and this means that they are obliged to protect their interests and to continue their operations in continuity. If they did not operate in this way, the banks would be condemned to lose trust and clients, which would quickly lead such banks to a situation where their customers would be taken over by their competition and they would go bankrupt.

In modern business conditions, banks are inevitably faced with numerous risks and they are forced to organize their operations in order to protect against the negative effects of those risks. In order to achieve this protection, banks must have human resources that have the appropriate knowledge and skills to manage various types of risks, so that they can

accept jobs with higher risks. In this regard, these personnel must be able to foresee the possibility of risks, to detect their symptoms and to prevent these risks from occurring, in order to reduce the losses that they could lead to.

Defining banking risks is necessary in the function of risk management, because in this way their content, manner and degree of influence on the bank's operations are emphasized. The presented banking risks and their definitions indicated how they affect the bank's performance and potential insolvency. In order to contribute to the better operation of the bank and to avoid losses and insolvency, it is necessary to look at the impact of those risks on the operation of the bank.

The task of every bank that takes risk management seriously involves identifying and evaluating the risks that occur in bank operations and developing an adequate strategy for their reduction based on a detailed analysis of the identified risks. The essence of risk management strategy no longer lies in the question of whether to take a risk or not, but how much risk a modern bank is able to take. It is of great importance for the bank to investigate all the risks that come from the environment and its operations, in order to determine the

degree of risk that it can bear and control, i.e. to reduce it to realistically acceptable limits

Risk management is a complex activity determined by numerous factors. Given that risks cannot be avoided, the question is how to manage them. The management process is determined by the organization and operationalization of management, which is also regulated by certain regulations. The organization assumes an appropriate organizational form of risk management and operational management. Operationalization aims to find an adequate set of activities for each type of risk in order to reduce that risk to a minimum level.

The fact that certain decisions of the National Bank of Serbia are aimed precisely at risk management shows how important risk is. The bank's activity on risk management as one of the most important business functions, legal regulations and decisions of the National Bank of Serbia, which govern banking operations, oblige the formation of a special organizational unit for dealing with risks, a special classification of claims and special liquidity indicators.

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ULOGA BANKARSKOG RIZIKA U OBLIKOVANJU RAČUNOVODSTVENE POLITIKE BANAKA

Rezime: Predmet istraživanja u ovom radu je analiza najčešćih tipova rizika u bankarstvu sa naglaskom na upravljanje rizikom, u cilju postizanja optimizacije odnosa rizika i prinosa. U ukupnom kontekstu funkcionisanja banke, poboljšanje upravljanja, odnosno upravljanja bankama, je neizbežno. Upravljanje rizicima je izuzetno aktuelna tema, jer je globalna ekonomska kriza pogodila i bankarski sistem i mnoge banke su naišle na poteškoće i gubitke, upravo zato što nisu bile u stanju da otplate svoje investicije. Naučni cilj ponovnog pretraživanja je naučni opis rizika kao fenomena u savremenim bankarskim institucijama, identifikacija faktora koji dovode do rizika, kao i pravilno upravljanje rizicima. Društveni cilj istraživanja odnosi se na identifikaciju slabih tačaka u sektoru upravljanja rizicima, kao i davanje predloga za unapređenje tehnika rada u cilju stvaranja povoljnijeg okruženja za uspešno poslovanje banaka u dugoročnom periodu.

Ključne reči: rizik, bankarski sistem, menadžment, operacionalizacija, računovodstvena politika

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Review Article

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Abstract: Positioning of the phenomena of educations as a service overall, and in the economic system in "organizations which learn", therefore between countries and the market, in modern circumstances the field is still loaded with many problems, fallacies, unresolved issues, and numerous dilemmas and alternatives. That is above all an aftermarthof traditional understandings which qualify these phenomena as supporting and passive, and not like basic functions which can encourage the fundamental instruments of growth and development, while they treat the "organization which learns" like fashionable, instead of a scientifically based discipline. Modern forms of overseeing the economic reality excel with new ideas, considerations and conclusions. One of the sais that productivity in the public sector of countries in development cannot be lower than the productivity in other countries of Europe. It's familiar that in service activities there is little difference in productivity between countries with a similar cultural matrix. That way, a general practice doctor or a majority of jobs in administration and education cannot have greater productivity in the public sector. The stance that the public sector has greater earnings in average only persists as a general thesis because of the greater qualification of the employees.

Keywords: socioeconomic relations, development, education

Introduction

As few phenomena in human history have made such radical changes and impacts in recent years, such as socio-economic ones, as the basis for the education system, changing the economic map of Europe and the world, which heralds the beginning of a more complex balancing of their forces, as countries become more and more interdependent and people are more and more aware of common opportunities, giving them common goals and a system of values. It is evident that the time brought by the new millennium will be a time of cooperation and common interests, since new challenges - the "greenhouse" effect, the expansion of communications, the migration of people, capital and goods on a huge scale, cross national borders (Kostadinović, Ilievska Kostadinović, 2025). However, this time is also a time of great political, economic and other difficulties, a "time of crisis". This means that globalization of markets, globalization of business operations, globalization of competition or processes called "paradigm shift" or changed paradigms, but also their effects - or the absence thereof, are patterns of behavior that bring overall development (Dašić, 2016; Dašić, 2021). It is interesting to note

that these days we are witnessing attempts to solve or alleviate the world economic crisis - precisely in the field of education. Furthermore, the expected dimensioning of the new economic environment revitalizes existing understandings in a completely new light. This opens the process of accelerated homogenization of users' needs for education and lifelong learning services, shifting the boundaries for decision-makers from the level of national economies to the global level, which requires a systemic approach and wider coverage of the spatial and temporal horizon in its understanding. At the same time, the process of directing the marketing program is directed towards the identified segments that fit into the organization's strategy and policy, especially of the educational type, until positioning on the selected target segments in the international environment, which is an extremely complex, dynamic and risky job (Stanković, et al., 2024; Stanković, 2025).

Literature review

The topicality and importance of the topic is and will continue to grow with the tendency to abandon the mass in management and economics and move towards an increasingly

pronounced practice of the concentrated, which should be applied by the management of educational organizations. In such developed settings, we would especially emphasize the possible general development of events, especially those concerning education and which leading futurists already emphasize in the following way, provocative and not at all bright: ...more young people in prison than in university (75%), or ...many universities are closing their doors to students and dedicating themselves to research (50%). For comparison, it is interesting to note the probability in some other areas that are almost certain or represent the near future ...the average home will have more computing power than a nuclear power plant (100%), ...the health service warns the population not to spend more than five hours in the sun, because the ozone layer is getting thinner (100%), ...English becomes the official language of the entire planet (98%), ...thousands of people die of heat exhaustion in traffic jams during the weekend in big cities (85%),...more shopping is done online than in stores (80%), ...the USA elects a black woman as president (1%)... In order to keep up with changes and adapt to leading trends in the environment based on our own vision of inclusion, it is

necessary to solve major problems first. However, we are all sometimes victims of certain paradigms, individual attitudes and traditions, so it is already clear that the global market in this millennium will not bring success to every organization, on the contrary. However, we should not fall into pessimism inherent in our reality almost as a habit, nor accept exaggerations regarding the period of "good will" that will bring ready-made solutions to old problems. In other words, by accepting the new logic of the market in its full sense as a concept that has no alternative option, we believe that we are making an innovative leap into the future, confirming the thought that Joseph Campbell expressed more than ten years ago in the following way "I believe that young people will learn visual literacy in the same way that I was taught to write letters" (Mladenović, 2024). Therefore, it proves to be a necessary and visual authority, which is why research in this direction has a special value, as a contribution to the foundation of a new theoretical approach and an original view of topics from a specific and sensitive domain. A more detailed analysis was made possible and still represents an impressive potential with its foundations through the works Dašić, D. (2020) Entrepreneurial

State, Dašić, D. Ratković M. (2016) Lobbying and/or corruption as well as Stanković, M (2023) Competition Protection Policy and Economic Efficiency.

Social conditioning of the economic system

Modern organizations and companies function today in a time of great and rapid changes. Rapid and major changes in the environment occur primarily under the influence of modern scientific and technological progress. The results of this are visible in informatics, energy, materials, new technologies, communications and other areas. They bring about changes that directly affect every company, as well as entire economic systems. The process of transition, especially in the countries of Southeast Europe, is very demanding in terms of transformation and transition from the old to the new, both in terms of the economy and the economic system, as well as in terms of the new organization of state institutions (Vuković, et al., 2023; Vuković, et al., 2025). Globally, everything is subject to change and everything changes in order to survive. All social and business systems are subject to change and adaptation to a changing environment. So nothing is eternal ex-

cept change. The continuity of the life and work of man and the various organizations in which he exists takes place through constant changes. Changes are the basis of survival and development of all social and business systems. That's why just managing changes is a very important discipline and requires a complete and adequate management approach to it. To a universal question, which can concern both a person as an individual and a person in a group:

"Are we really "witnesses of a symptomatic return to metaphysics (philosophy of being) through integral anthropology" and is it true that "all great things have an imperceptible beginning" (Poggioli, 1962).

Methodological approach to work - structural analysis of the avant-garde

And while many authors (Stanković, Dašić, 2023) start with the foundation of Symbolism of Materials and Matter On the other hand, Dašić and Vuković (Dašić, Vuković, 2025) insist on combinations of Machine Learning as a Methodological framework in certain sciences, so that the approach of structural analysis of the avant-garde can be recommended, introducing the following

elements: Activism, (lat.) – activus, agēre, to act, to work. Understanding that for the progress of humanity, the reasonable and constant influence of human knowledge and will on culture and life in general is of particular importance; practically, activism is an ethical demand that man must not rest until the nature of man, through his constant effort, reaches complete self-knowledge and independence; Antagonism, (Gr.) - ἀντάγωνισμός, opposition, opposition, rivalry, opposite striving, acting in the opposite sense, opposition, opposition, enmity, struggle, friction; Nihilism, (lat.) - nihil, nothing, the point of view of complete renunciation of values in general; theoretical nihilism denies the possibility of knowing the truth, and ethical nihilism the value of moral laws; in the political-social aspect, it represents the understanding that today's society and its entire order is worthless, which is why it should be completely destroyed, and only on those ruins should a completely new society be built; the expression was created based on the ideas of the Russian writer I. S. Turgenev expressed through Bazarov, the main character of his novel *Fathers and Children*, in 1862. and who resolutely renounced all principles and traditions of Russian noble culture; Agonism, (Gr.)

– ἀγών, fight, match; Futurism, (lat.) - futuris, future, modern artistic and literary direction that hopes to find full understanding for its unusual creations only in future, new generations. The program was created by the Italian poet Marinetti (1909), according to which art should glorify mechanics and small steamboats in the canals of Venice instead of "Gondolas"; demands, therefore, that art and literature completely reject everything that has come before, as a lie and weakness, to glorify masculinity, warrior virtues and one's Self; and Decadence, (lat., it.) - decadere, decadenza, decline, decline, decay, deterioration, ruin; a literary direction in modern literature that consists in the extinction of healthy sensibility, due to the overexcitement of life and in the search for artificial charms.

Analysis of emerging forms of paradigms in Serbia that can become a myth

So, in the previous paragraphs, some specific directions were given in terms of the positions of the existence of misconceptions in the economic system in our country, and in the function of recommendations for further research, we will refer to the same so that the character of the public function of education in the

future would be a generally accepted category:

Data from the world's most respected database on per capita income levels expressed in purchasing power indicate that the average GDP in Serbia is currently higher than the best years, such as 1979, 1989 or 1990. At least that is what Madison's database shows (Bolt & van Zanden, 2023).

Could the economic results of the last 15 years be better? If we start from the key indicators: the growth rate of GDP per inhabitant – in the first decade of this century, this indicator grew on average around 3.5%, which is equal to the average of Central and Southeastern Europe (World Bank, 2021). This indicates that Serbia was neither better nor worse in its economic performance. Nevertheless, the question arises why our GDP in terms of purchasing power is one of the worst ranked countries in Europe, and the answer lies in the economic collapse of the nineties of the last century, which left our country lagging behind at the same level in relation to the monitored parameters (World Bank, 2021).

The gray economy in every country is a big problem, but studies show that Bulgaria and Romania, for example, have a higher level of esti-

mated gray economy, and both are EU members (Schneider, 2016). What is most important to underline is that corruption is not related to our mentality or code, but is practically a consequence of the general level of economic and social development (OECD, 2018).

Many studies try to present data and relationships very plastically when it comes to this phenomenon. Nevertheless, the common indicators can be represented by the following attitude: in 1930, we were a century behind the developed countries, after 2010, this trend was reduced to 50 years (Pamuk & van Zanden, 2014; Bolt & van Zanden, 2023). It may sound ironic, but we are making progress.

Contrary to popular opinion, everything is cheaper in Serbia than in the EU. According to official EUROSTAT data, the average prices of consumer goods in 2014 were at 53% of the European average (Eurostat, 2015).

This is a subjective feeling that generally does not have strong foundations in research. Except in extreme cases of mass events, which unfortunately happened, in terms of the number of murders, crime statistics say that in 2014 per hundred thousand inhabitants was 1.6, which is close to the European ave-

rage (UNODC, 2019). The data about the low education rate is simply not true. They are the consequences of earlier censuses in the SFRY, and in the meantime things have changed drastically. What is a problem is the non-uniformity of the enrollment distribution. For example in cases of decline in the construction sector, the number of people enrolled in architecture and construction increases, and a similar problem exists in economics and law (UNESCO, 2022; RZS, 2023).

It is estimated that the diaspora since 2000 invested about half a billion euros and employed about 25,000 people. So, four million Serbs abroad and five billion dollars in remittances is simply not sustainable. According to data from the National Bank of Serbia, gross remittances for 2015 are estimated at two and a half billion euros. About 600 million euros in pensions and other gifts should be added to this (NBS, 2016).

If we analyze the role of the state in innovative processes, we come to the data that even, for example, three quarters of new molecular entities are the result of government investments in patents (Mazzucato, 2015). Even more significant are the data that the leading market names find their funds with the state. Big Apple was the first to receive funds from

the state. All the most important technologies are financed by the state. In the USA, government funds for research and development make up to three-fifths of the total funds for these purposes (NSF, 2022). And such a policy has been valid for two centuries (by Alexander Hamilton).

NBS data show that grants, that is, official aid to Serbia in the last ten years, ending in 2015, amounted to around 2.3 billion euros. That's an average of two hundred and thirty million euros per year, which is only 0.7% of Serbia's GDP, with a note that a significant part of the funds goes to non-governmental organizations, foreign experts, and the governments of the countries where the donations came from (NBS, 2016). Therefore, by comparison, it is significantly less than the remittances of our emigrants and on the basis of pensions from abroad in 2015.

The number of employees in the public sector in Serbia at the beginning of 2016 is around 500,000 (those who work in education, healthcare, police, army, excluding employees in public companies). That's seven employees per 100 inhabitants, which puts Serbia below the CEE average (7.5–8%) (IMF, 2017). If the number were to decrease to

450,000, it would be the lowest share in CEE. Expenditure on employees in the government sector in the countries of Central and Eastern Europe (CEE) is on average 9.8% of GDP. In Serbia, the same expenditures are planned at 10.4% of GDP in 2016, and with the Government Plan (Fiscal Strategy) they would in 2018 fall to 8.3%, which would be significantly lower than the CEE average (Ministry of Finance, 2016).

Nor does the thesis that work in the public sector is more remunerated here than in the private sector hold up. Practically all Western countries have the same situation: the public sector has on average higher earnings, but this is explained by the higher average qualifications of employees, which is also the case in Serbia (OECD, 2018).

Instead of a conclusion

Be success of a business entity is, among other things, the effect of current knowledge, skill, flexibility and creativity of management, which is a key element for gaining a competitive advantage of a business entity (Franjić, 2022). This is precisely why intellectual resources create their own knowledge, contribute to the creation of value, and represent the basis for future growth and development

(Mladenović, 2025). Intellectual capital is the hidden value of a business entity and an internal management instrument aimed at knowledge management and external communication in order to determine a strategy for an adequate way of using the intellectual resources of a business entity. They must be developed systematically, as part of a comprehensive strategy of education and not as part of random and current relations in certain segments. Competitiveness is based on the education of the human factor, on his skills, abilities and knowledge. Appropriate motivation of employees is also important, in order to put their skills and knowledge into the function of introducing changes. The main generators of intellectual capital are precisely knowledge, skill, creativity and innovation, and they are becoming more important factors in the modern reproduction process, more so than physical and financial capital was before. The new economy, the so-called the knowledge economy imposes different business rules and requires thinking about values in a new way. A large part of knowledge is lost, and modern high-performance business entities cannot bear that loss (so-called tacit or hidden knowledge). Business entities must know how to find the knowledge they possess and how to turn it into intellectual capital. The most important

thing to achieve in a business entity is the synergy of possibilities, especially of information technologies and the creative and innovative abilities of employees who create value.

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DRUŠTVENO-EKONOMSKI INICIJATORI FUNKCIJE OBRAZOVANJA

Sažetak: Pozicioniranje fenomena obrazovanja kao usluge u celini, a u ekonomskom sistemu u "organizacijama koje uče", dakle između zemalja i tržišta, u savremenim okolnostima polje je još uvek opterećeno mnogim problemima, zabludama, nerešenim pitanjima, brojnim dilemama i alternativama. To je pre svega posledica tradicionalnih shvatanja koja kvalifikuju ove fenomene kao podržavajuće i pasivne, a ne kao osnovne funkcije koje mogu da podstaknu osnovne instrumente rasta i razvoja, dok tretiraju "organizaciju koja uči" kao modernu, umesto naučno zasnovanu disciplinu. Moderni oblici nadgledanja ekonomske stvarnosti ističu se novim idejama, obrocima i zaključcima. Jedan od saje da produktivnost u javnom sektoru zemalja u razvoju ne može biti niža od produktivnosti u drugim zemljama Evrope. Poznato je da u uslužnim aktivnostima postoji mala razlika u produktivnosti između zemalja sa sličnom kulturnom matricom. Na taj način, lekar opšte prakse ili većina poslova u administraciji i obrazovanju ne može imati veću produktivnost u javnom sektoru. Stav da javni sektor ima veće zarade u proseku samo opstaje kao opšta teza zbog veće kvalifikacije zaposlenih.

Ključne reči: socioekonomski odnosi, razvoj, obrazovanje

Stanković, M., Kostadinović, G., Ilievska Kostadinović, M., Socio-economic initiators of the function of education

IMPROVING THE INSURANCE INDUSTRY: A CONCEPTUAL FRAMEWORK FOR APPLYING MACHINE LEARNING BASED ON A SYSTEMATIC LITERATURE REVIEW

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Review Article

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Abstract: The insurance industry is undergoing a significant transformation driven by advancements in technology, particularly machine learning. As insurers seek to enhance operational efficiency, risk assessment, and customer experience, machine learning offers promising applications across various domains, such as underwriting, claims processing, and fraud detection. Despite the potential of machine learning, its integration into traditional insurance practices faces numerous challenges, including data quality, regulatory concerns, and organizational readiness. The aim of this paper is to examine the possibilities and characteristics of the application of machine learning in insurance, in order to determine the machine learning approach that is most often used and that provides the best results. Drawing on insights from systematic literature reviews, the framework will provide a comprehensive understanding of how machine learning can reshape insurance practices. By exploring these aspects, this paper contributes to a more structured and informed approach to implementing machine learning in the insurance industry.

Keywords: machine learning, insurance, learning algorithms

Introduction

Today, the insurance sector is highly developed and complex, not only because it provides risk coverage and protection for various forms of property and life. In fact, insurance plays a crucial role in socio-economic development, as well-developed insurance markets contribute to financial stability, foster business innovation, and support social progress.¹ Insurance serves as a cornerstone of modern society and economic systems, allowing individuals and organizations worldwide to rely on healthcare programs to protect their lives and assets. For instance, car insurance is legally required in most countries. However, the insurance industry faces significant challenges that raise the cost of doing business. To offset financial pressure, insurers often increase premiums, which negatively impacts honest policyholders and undermines overall industry efficiency. Traditionally, insurance companies have relied on human experts to manage

these challenges. While this approach can be effective, it is inherently complex, time-consuming, and costly, requiring substantial human resources. Moreover, manual processes increase the risk of errors and often lead to delays in claim resolution. These delays reduce operational efficiency and may even result in business losses. Recent advances in digital technology - particularly in machine learning and big data - offer new opportunities to address these issues.² The insurance industry holds significant potential to harness algorithmic capabilities to enhance every stage of the value chain. In this context, machine learning and artificial intelligence offer numerous opportunities, with the potential to boost revenue generation, improve loss prediction accuracy, and develop more effective loss prevention strategies.³

"Machine learning is a process that involves learning from data and transforming it into relevant information, which can then be used to

¹ Owens, E., Sheehan, B., Mullins, M., Cunneen, M., Ressel, J., and Castignani, G.: Explainable artificial intelligence (XAI) in insurance. *Risks*, Vol. 10, 1-50. (2022)

² Guo, Y.: Application of machine learning in insurance fraud detection: achievements and future prospects. *Proceedings of the 2024 International Conference*

on Artificial Intelligence and Communication (ICAIC 2024), 619-626. (2024)

³ Owens, E., Sheehan, B., Mullins, M., Cunneen, M., Ressel, J., and Castignani, G.: Explainable artificial intelligence (XAI) in insurance. *Risks*, Vol. 10, 1-50. (2022)

generate knowledge. It is a multi-disciplinary field that draws on elements of statistics, philosophy, epistemology, psychology, and neuroscience. Machine learning approaches offer numerous application possibilities in the insurance sector, and their impact is widely recognized by industry professionals. Based on this, the aim of this paper is to explore the possibilities and characteristics of applying machine learning in insurance, with the goal of identifying the most used approaches and those that deliver the best results. In line with this objective, the following research question has been defined:

How can machine learning transform the insurance industry and what conceptual framework can be developed to enable its effective implementation in insurance companies?

Given the lack of research on this topic within the domestic academic community, the results are expected to provide valuable insight into the application of machine learning in the insurance industry and offer a practical framework for its adoption. By thoroughly categorizing how machine learning is applied in areas such as fraud detection, risk assessment, customer segmentation, claims processing, premium de-

termination, and similar fields, it will be possible to build a solid information base for better understanding the scope and depth of its integration in the insurance sector. Identifying the most used algorithms and evaluating their effectiveness in addressing specific insurance challenges will help highlight the strengths and weaknesses of each approach, enabling the selection of those that deliver optimal results. The study is also expected to uncover under-researched areas in the existing literature, laying the groundwork for future studies.

Literature review

Conceptual aspects of machine learning

Machine learning is a broad field that integrates information technology, statistics, probability, artificial intelligence, psychology, neurobiology, and several other disciplines. It facilitates problem-solving by building models that accurately represent selected data sets. Machine learning is a subfield of computer science focused on developing systems that can learn from experience and improve their performance over

time.⁴ As a research field focused on the theory, performance, and characteristics of systems and algorithms, machine learning has impacted nearly every scientific domain, significantly influencing both science and society. It is a branch of computer science aimed at enabling systems to learn without explicit programming. As a subfield of artificial intelligence, machine learning emphasizes practical applications such as prediction and optimization. Systems learn by improving their task performance through experience, which usually involves fitting models to data. Consequently, the line between machine learning and statistical methods is often blurred, with classification depending more on historical context than fundamental differences. Despite methodological similarities, machine learning prioritizes predictive accuracy over hypothesis-driven inference and typically handles large, high-dimensional datasets with numerous variables.⁵

As Lee et al point out, machine learning is usually classified into supervised and unsupervised machine learning.⁶ To this can be added semi-supervised and reinforced machine learning. *Supervised machine learning* involves teaching a system to learn a function that maps inputs to outputs using labeled training data, consisting of sample input-output pairs. The two primary supervised tasks are *classification*, which categorizes data, and *regression*, which fits data to predict continuous values. *Unsupervised learning* analyzes unlabeled data without human intervention, following a data-driven approach. It is primarily used to discover hidden patterns, trends, structures and groups within data. Typical unsupervised tasks include cluster analysis, density estimation, dimensionality reduction, anomaly detection, and association rule discovery. *Semi-supervised learning* combines both supervised and unsupervised methods, working with a mixture of labeled and unlabeled data. This approach

⁴ Surden, H.: Machine learning and law. *Washington Law Review*, Vol. 89, 87-115. (2014)

⁵ Bi, Q., Goodman, KE, Kaminsky, J., and Lessler, J.: What is Machine Learning? A Primer for the Epidemiologist. *American Journal of Epidemiology*, Vol. 188, 2222-2239. (2019)

⁶ Li, T., Johansen, K., and McCabe, MF: A machine learning approach for identifying and delineating agricultural fields and their multi-temporal dynamics using three decades of Landsat data. *ISPRS Journal of Photogrammetry and Remote Sensing*, Vol. 186, 83-101. (2022)

is useful in situations where labeled data is scarce but unlabeled data is abundant. The goal of semi-supervised learning is to achieve better predictive outcomes than using only labeled data. It is applied in areas such as machine translation, fraud detection, text classification and data annotation. *Reinforcement learning* is a type of machine learning that allows systems to determine optimal behavior in a given environment to maximize rewards or minimize penalties. This approach is determined by the environment and relies on feedback, where actions are taken either to increase reward or to decrease risk. It is widely used in applications such as robotics, autonomous driving, manufacturing and supply chain optimization, but is generally not suitable for simple problems.⁷

Multitask learning is a subfield of machine learning that aims to solve multiple tasks simultaneously by leveraging the similarities between them. This approach can enhance learning efficiency and act as a regularizer. In multitask learning, a single model is trained on several related tasks to improve perfor-

mance by sharing knowledge across all tasks. This differs from traditional deep learning methods, which typically focus on solving one task per model. Ensemble learning involves combining multiple models, such as classifiers or experts, to address a computational intelligence problem. Its primary goal is to improve overall model performance or reduce the risk of selecting a poor model. Ensemble methods are also used for assigning confidence to model decisions, feature selection, data fusion, incremental learning, non-stationary learning, and error correction. Bagging, or bootstrap aggregation, is a technique designed to increase the accuracy and stability of machine learning algorithms. It applies to both classification and regression tasks by reducing variance and preventing overfitting. Bagging creates multiple subsets of training data through random sampling and trains separate models on each subset, ultimately enhancing overall model performance.⁸

Machine learning algorithms are diverse, with artificial neural networks being one prominent type mo-

⁷ Sarker, IH: Machine learning: algorithms, real-world applications and research directions. SN Computer Science, Vol. 2, 1-21. (2021)

⁸ Mahesh, B: Machine learning algorithms - a review. International Journal of Science and Research, Vol. 9, 381-386. (2020)

deleted after the behavior of neurons in biological neural networks. Comprising interconnected neurons, these networks analyze complex relationships between measurable variables to predict outcomes. The networks consist of multiple layers of neurons connected by "axons," organized into three types: 1) an input layer, 2) one or more hidden layers, and 3) an output layer. Neurons in the input layer represent independent variables, while those in the output layer correspond to dependent variables.⁹ A decision tree is a graphical representation of choices and their outcomes arranged in a tree structure. Nodes represent decisions or events, while edges represent decision rules or conditions. Each tree consists of nodes and branches, where nodes correspond to attributes of the group being classified, and branches represent possible values for each attribute. The Naive Bayes classifier is based on Bayes' theorem and assumes independence among predictors, meaning the presence of one feature in a class is considered unrelated to the presence of others. Naive Bayes is commonly used in text classification and tasks involving clustering and

classification based on conditional probabilities. Support Vector Machines (SVM) are widely used supervised learning models for both classification and regression, capable of handling linear and nonlinear classification by mapping inputs into high-dimensional feature spaces using the "kernel trick." Linear Discriminant Analysis (LDA) is a classifier that creates a linear decision boundary by fitting class conditional densities to the data and applying Bayes' rule. It generalizes Fisher's linear discriminant by projecting data into a lower-dimensional space to reduce model complexity, typically assuming each class follows a Gaussian distribution with a shared covariance matrix. LDA is related to techniques such as ANOVA and regression analysis, aiming to express the dependent variable as a linear combination of features. Logistic regression is a probabilistic statistical model used for classification, employing the logistic (sigmoid) function to estimate probabilities. K-Nearest Neighbors (KNN) is an instance-based learning algorithm that does not build a general model but stores training instances in an n-dimensional

⁹ Bi, Q., Goodman, KE, Kaminsky, J., and Lessler, J.: What is Machine Learning? A Primer for the Epidemiologist.

American Journal of Epidemiology, Vol. 188, 2222-2239. (2019)

space. It classifies new data points based on similarity measures like Euclidean distance, with classification determined by majority vote among the nearest neighbors. The main challenge in KNN is selecting the optimal number of neighbors to consider.¹⁰

With the rapid advancements in the field, advanced learning methods have emerged as key trends in machine learning. Deep learning, in particular, has become dominant by utilizing deep architectures to automatically learn hierarchical representations that capture complex patterns in data. This allows deep learning models to outperform traditional shallow methods in areas such as speech recognition, computer vision, and natural language processing. Distributed learning addresses the challenge of processing large datasets that exceed the capacity of a single machine by distributing computations across multiple workstations, effectively scaling learning algorithms without centralizing data, thereby saving time and energy. Alongside distributed learning, parallel machine

learning techniques, supported by multi-core processors and cloud computing, are increasingly accessible for large-scale applications. Transfer learning enables the application of knowledge gained from one task or domain to different, often related, tasks or domains, helping overcome data scarcity in new tasks. Kernel-based learning techniques have become prominent for handling nonlinear problems by projecting input data into high-dimensional feature spaces using kernel functions, where linear methods can be applied efficiently. This approach empowers the solution of complex problems such as online classification and parameter estimation through implicit high-dimensional mappings.¹¹

Possibilities of applying machine learning in insurance

Machine learning has the ability to identify complex patterns within data sets, thereby enabling the discovery of relationships and structures that may not be immediately apparent. The potential of machine learning is reflected in its ability to

¹⁰ Sarker, IH: Machine learning: algorithms, real-world applications and research directions. SN Computer Science, Vol. 2, 1-21. (2021)

¹¹ Qiu, J., Wu, Q., Ding, G., Xu, Y., and Feng, S.: A survey of machine learning for big data processing. EURASIP Journal on Advances in Signal Processing, Vol. 1, 1-16. (2016)

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push the boundaries of forecasting, offering new tools and methods that could transform forecasting and analysis.¹² Hence, the effective application of machine learning in insurance can be highlighted. For example, insurance companies have widely recognized the impact of artificial intelligence in the insurance industry, particularly in claims prediction. Machine learning has been applied to almost every aspect of the insurance process, including claims processing, fraud detection, decision making, loss prediction, risk management, and the like.¹³

Grise et al. (2020) highlight the positive impact of machine learning in non-life insurance, especially in risk assessment, which improves the long-term profitability of insurance companies.¹⁴ The insurance industry holds significant potential to leverage algorithmic capabilities that can enhance various stages of the value chain. According to Pavlović (2019), the European Insurance and

Occupational Pensions Authority (EIOPA) conducted a study on big data analytics, revealing that about one-third of European insurance companies use machine learning in their operations, particularly in health and car insurance. The study involved 222 insurance companies and intermediaries from 28 jurisdictions. Machine learning methods are actively employed by 31% of these companies, while another 24% are still evaluating their potential applications.¹⁵

Previous research analyzes various applications of artificial neural networks in the insurance industry, including insolvency management, fraud detection, revenue forecasting and customer segmentation. One study developed a three-layer neural network model to provide early warnings of insolvency for insurance companies using annual financial data, with the model achieving classification accuracy above 88%.¹⁶ Another study used artificial neural

¹² Paruchuri, H.: Conceptualization of Machine Learning in Economic Forecasting. *Asian Business Review*, Vol. 11, 51-58. (2021)

¹³ Poufinas, T., Gogas, P., Papadimitriou, T., and Zaganidis, E.: Machine learning in forecasting motor insurance claims. *Risks*, Vol. 11, 1-19. (2023)

¹⁴ Grise, YL, Wolfram, F., and Christian, L.: Machine learning applications in

nonlife insurance. *Applied Stochastic Models in Business and Industry*, Vol. 36, 523-537. (2020)

¹⁵ Pavlović, B.: Challenges in application of machine learning in insurance industry. *Insurance Flows*, Vol. 35, 7-34. (2019)

¹⁶ Tian, X., Todorović, J., and Todorović, Ž.: A machine-learning-based business analytical system for insurance

networks to predict insurance company revenue growth over a 41-year period, predicting a 120% increase based on historical premium data.¹⁷ In other research, machine learning algorithms have been used to predict insurance customer types, estimate premiums, manage risk, and the like.¹⁸ Regardless of the field or methodology, machine learning offers clear advantages to insurance companies. Traditional actuarial methods, which rely on statistical techniques and historical data, often produce less accurate premium estimates, especially for complex risk profiles. In contrast, machine learning models incorporate diverse data inputs, including real-time data streams, enabling deeper analyses that uncover patterns and correlations often overlooked by conventional approaches. This flexibility allows machine learning systems to rapidly adapt to

changing risk factors and personalize premiums for individual policyholders. For instance, decision trees and neural networks can adjust to new behavioral data and evolving risks, delivering more accurate and customized risk assessments and premium calculations compared to traditional methods.¹⁹

Machine learning excels at automatically capturing non-linear relationships in data, leading to more accurate models and providing the flexibility to adopt different functional forms.²⁰ Insurance companies in developed economies are increasingly adopting machine learning to leverage its advantages. For example, State Farm in the US uses machine learning to classify drivers based on their driving behavior, enabling them to offer tailored insurance products for different driver categories. Liberty Mutual, one of America's largest insurers, estab-

customer relationship management and cross-selling. *Journal of Applied Business and Economics*, Vol. 25, 256-272. (2023)

¹⁷ Bahia, ISH: Using artificial neural network modeling in forecasting revenue: Case study in National Insurance Company/Iraq. *International Journal of Intelligence Science*, Vol. 3, 136-143. (2013)

¹⁸ Tian, X., Todorović, J., and Todorović, Ž.: A machine-learning-based business analytical system for insurance custo-

mer relationship management and cross-selling. *Journal of Applied Business and Economics*, Vol. 25, 256-272. (2023)

¹⁹ Ejjami, R.: Machine learning approaches for insurance pricing: a case study of public liability coverage in Morocco. *International Journal For Multidisciplinary Research*, Vol. 6, 1-23. (2024)

²⁰ Casualty Actuarial Society. *Machine learning in insurance*. Casualty Actuarial Society, Arlington, USA. (2022).

lished Solaria Labs to drive innovation; in 2017, Solaria Labs created an open API portal to integrate IT projects with public data, aiming to develop a traffic safety application powered by machine learning. Allstate developed ABIE (Allstate Business Insurance Expert), a virtual assistant chatbot that uses machine learning to help agents sell complex property insurance products, significantly boosting sales. Progressive, another major US insurer, applied machine learning algorithms for predictive analytics to analyze driver data, better understand market trends, and improve motor insurance products. Their telematics program, Snapshot, collected 20 billion kilometers of driving data in 2016, enabling precise decision-making in motor insurance sales.²¹

However, the application of machine learning in insurance also presents several challenges. For decisions based on machine learning to be effective, they require a set of high-quality and objective data, which is often lacking. This can lead

to biased or discriminatory outcomes for certain categories of policyholders. Additionally, implementing machine learning and interpreting its results is highly complex and demands specialized expertise, which many insurance companies may not possess.²² In addition to these issues, there are ethical challenges associated with machine learning in insurance. Collecting and analyzing personal data, including demographics and behavioral patterns, requires robust data protection measures to prevent unauthorized access. Ethical concerns also focus on the fairness of machine learning algorithms, especially regarding sensitive data, as they risk reinforcing existing biases or creating new forms of discrimination, particularly when trained on unbalanced or biased datasets. Integrating machine learning into insurance systems poses technical challenges, often requiring major updates to legacy systems that may not support large-scale data analytics or real-time processing. Furthermore, data integration is complex, invol-

²¹ Pavlović, B.: Challenges in application of machine learning in insurance industry. *Insurance Flows*, Vol. 35, 7-34. (2019)

²² Jones, KI, and Sah, S.: The implementation of machine learning in the insu-

rance industry with big data analytics. *International Journal of Data Informatics and Intelligent Computing*, Vol. 2, 21-38. (2023)

ving the merging, normalization, and standardization of diverse data sources to ensure consistency for effective model training.²³

Research on the application of machine learning in insurance companies

Methodology research

To address the research question, a study employing a qualitative methodology was conducted, which included a systematic literature review and the development of a conceptual framework to explore the application of machine learning in the insurance industry. The methodology aimed to identify the most commonly used machine learning applications in insurance and their impacts. According to the author's knowledge, such studies remain limited in the academic community, particularly regarding the Republic of Serbia. The systematic review gathered and analyzed existing knowledge from peer-reviewed journals and conference proceedings to ensure data credibility and relevance. The review process followed a structured approach:

1. Search strategy: keywords such as machine learning in insurance, AI in insurance, and machine learning were used to search academic databases including PubMed, IEEE Xplore, Scopus, and Google Scholar.
2. Inclusion and exclusion criteria: priority was given to articles published in English over the last five years, focusing on studies with empirical findings. Publications lacking detailed methodology or relevance to the insurance sector were excluded.
3. Data extraction and analysis: selected articles were reviewed to extract information on key machine learning techniques, areas of implementation in insurance, benefits, limitations, and related aspects.

Based on insights from the literature review, a conceptual framework was developed to bridge theoretical knowledge and practical application of machine learning in insurance. This framework highlights the most common forms of machine learning applications across various insurance domains, along with their impacts. Analysis

²³ Ejjami, R.: Machine learning approaches for insurance pricing: a case study of public liability coverage in Morocco.

International Journal For Multidisciplinary Research, Vol. 6, 1-23. (2024)

of published case studies and empirical research, validated through secondary data, was used to demonstrate the feasibility and effectiveness of machine learning in the insurance sector. Drawing on these findings, conclusions were made regarding the effectiveness of different types of machine learning in insurance, based on comparative evaluation.

Results and discussion

Insurance claims

Several selected studies have applied machine learning techniques to predict motor vehicle insurance claims using claim history and telematics data. For example, some models forecast accidents by analyzing driving patterns, including annual distance traveled and the percentage of time spent in urban areas. Similar approaches use machine learning to predict zeroclaim occurrences by leveraging telematics data from auto liability insurance. Money laundering detection models have also been adapted for flood insurance claims by incorporating hydrological and socio-demographic data to enhance prediction

accuracy. Research involving Brazilian and Indian auto insurance datasets focused on predicting claim occurrence and amounts, identifying factors such as weather conditions and vehicle types as key predictors. Additionally, telematics-based studies have examined driving contexts like road type and traffic conditions to evaluate risk and anticipate motor insurance needs.²⁴

Alam and Prybutok (2024) conducted a study to predict health insurance demand in the US, employing six machine learning algorithms to forecast claims. The tested algorithms included support vector machines, decision trees, random forest, linear regression, extreme gradient boosting (XGBoost), and K-Nearest Neighbors (KNN). Their performance was evaluated using various metrics, and a feature importance analysis identified key variables influencing claim predictions. Results showed that XGBoost and random forest outperformed the others, achieving the highest coefficients of determination - 79% and 77%, respectively - with the lowest prediction errors. The analysis highlighted smoking habits, body mass index (BMI), and blood pressure le-

²⁴ Poufinas, T., Gogas, P., Papadimitriou, T., and Zaganidis, E.: Machine le-

arning in forecasting motor insurance claims. *Risks*, Vol. 11, 1-19. (2023)

vels as the most influential predictors. These findings emphasize the importance of incorporating these factors into insurance policy design and pricing strategies. The study demonstrates the transformative potential of artificial intelligence, particularly the XGBoost model, in enhancing the accuracy and efficiency of health insurance claims processing. By identifying critical variables and reducing forecasting errors, the approach offers significant cost-saving opportunities and underscores the value of machine learning for process optimization and data-driven decision-making in health insurance.²⁵

A study by Ejjiyi et al. (2024) applied various machine learning algorithms to an insurance dataset from Africa to predict whether customers would file property claims. The data was preprocessed before implementation using Python. Different algorithms demonstrated specific strengths: Naive Bayes excelled in real-time predictions and multi-class problems, decision trees effec-

tively managed noisy data and prevented overfitting, while support vector machines were well-suited for sparse data. Performance was evaluated using the Gini index and SHAP values. The Gini index showed that the Kernel Support Vector Machine outperformed other models, with logistic regression closely following in prediction accuracy. SHAP analysis identified asset dimensions as the most influential factor, followed by asset type. Other algorithms designed for large or noisy datasets may perform better under specific conditions, making the choice of algorithm dependent on factors such as data-set size and quality.²⁶

The study by Pofuinas et al. (2023) aimed to predict the average cost of motor vehicle insurance claims using a dataset from Athens covering 2008 to 2020, structured quarterly due to data availability. Besides claims data, the dataset included variables such as the number of new and imported used cars in Athens and weather conditions (ma-

²⁵ Alam, A., and Prybutok, VR: Use of responsible artificial intelligence to predict health insurance claims in the USA using machine learning algorithms. *Exploration of Digital Health Technologies*, 30-45. (2024)

²⁶ Ejjiyi, CJ, Qin, Z., Salako, AA, Happy, MN, Nneji, GU, Ukwuoma, CC, Chik-

wendu, IA, and Gen, J.: Comparative analysis of building insurance prediction using some machine learning algorithms. *International Journal of Interactive Multimedia and Artificial Intelligence*, Vol. 7, 75-85. (2024)

ximum and minimum temperatures, days below zero, and rainy days) from three weather stations: Elefsina, Tatoi, and Spata. These stations were chosen based on data completeness. The research introduced two novel predictors for insurance claims: weather and car sales. Machine learning algorithms including Support Vector Machines, Decision Trees, Random Forest, and Boosting were applied to predict the average quarterly claim per insured vehicle. Key findings highlighted new car sales and minimum temperature in Elefsina as the most significant variables. Among models, a limited-depth Random Forest and XGBoost using the 15 most relevant variables showed the best predictive performance.²⁷

Customer segmentation

Machine learning plays an important role in the marketing function within the insurance sector. Owens et al. (2022) highlight that during the marketing phase of the insurance value chain, machine learning enhances the performance of various tasks. It enables more precise predictions of customer lifetime va-

lue and offers deeper insights into purchasing behavior, improving market and customer research. This allows for better identification of target segments and the creation of personalized premium strategies. Additionally, machine learning advances segmentation methods, ensuring communication and promotional efforts are effectively tailored to specific audiences.²⁸

Various studies have examined the use of machine learning and data analysis to enhance customer segmentation, retention, profitability, and satisfaction in insurance. Tian et al. (2023) review prior research, highlighting a three-level segmentation method that combines decision trees and cost-benefit analysis, with efficiency as a key outcome. Some approaches apply k-means clustering to categorize customers based on demographic attributes, followed by association rule mining to reveal hidden patterns. Dynamic segmentation using latent Dirichlet allocation is also used to identify behavioral clusters for personalized marketing strategies. For customer retention, models like logistic regre-

²⁷ Poufinas, T., Gogas, P., Papadimitriou, T., and Zaganidis, E.: Machine learning in forecasting motor insurance claims. *Risks*, Vol. 11, 1-19. (2023)

²⁸ Owens, E., Sheehan, B., Mullins, M., Cunneen, M., Ressel, J., and Castignani, G.: Explainable artificial intelligence (XAI) in insurance. *Risks*, Vol. 10, 1-50. (2022)

ssion and neural networks predict policyholder behavior and help optimize pricing. Profitability forecasting often incorporates customer demographics and purchasing habits, with random forest models applied to predict client profitability.²⁹

Machine learning enables effective customer segmentation by analyzing behavior and preferences, aiding in new product development. Jones and Sah (2023) present a method using interpretable machine learning algorithms to analyze online insurance product reviews and assess the importance of specific features. The main challenge was uncovering and interpreting nonlinear relationships between feature satisfaction and overall customer satisfaction. To address this, the researchers applied interpretable techniques that balance strong predictive performance with clear, understandable results. Validated through a case study and compared to sentiment-based segmentation, their method showed superior clus-

tering performance and uncovered new opportunities for innovative insurance product development.³⁰

Qadadeha and Abdallah (2018) analyzed a dataset of 9,822 customers from 2,000 insurance companies, provided by Sentient Machine Research, a Dutch data mining firm. Each customer record included 86 attributes covering demographics, behavior, purchasing habits, and more. While the K-Means algorithm demonstrated effective clustering abilities, the Self-Organizing Map (SOM) outperformed it by achieving superior speed, higher clustering quality, and better data visualization. This highlights SOM's advantage in handling complex insurance customer segmentation tasks.³¹

Identification of insurance fraud

Machine learning techniques play a crucial role in detecting fraudulent claims across different insurance sectors. In auto insurance, money laundering methods are applied to classify suspicious claims and uncover potential fraud by analyzing

²⁹ Tian, X., Todorović, J., and Todorović, Ž.: A machine-learning-based business analytical system for insurance customer relationship management and cross-selling. *Journal of Applied Business and Economics*, Vol. 25, 256-272. (2023)

³⁰ Jones, KI, and Sah, S.: The implementation of machine learning in the

insurance industry with big data analytics. *International Journal of Data Informatics and Intelligent Computing*, Vol. 2, 21-38. (2023)

³¹ Qadadeha, W., and Abdallah, S.: Customers segmentation in the insurance company (TIC) dataset. *INNS Conference on Big Data and Deep Learning 2018*, 277-290. (2018)

accident data gathered from insurers. In health insurance, interactive frameworks incorporating money laundering techniques help identify fraudulent claims that involve multiple parties. Moreover, these methods can automatically categorize various types of motor insurance fraud, significantly reducing the reliance on manual investigation and enhancing efficiency.³²

Fraud prevention technologies are essential for reducing fraudulent insurance claims. Both statistical methods and machine learning approaches have demonstrated effectiveness in detecting various types of fraud, including money laundering, credit card fraud, telecom fraud, and cyber attacks. Studies on Medicare data show that supervised learning techniques typically outperform unsupervised methods. However, due to challenges in obtaining high-quality annotated fraud datasets in insurance, unsupervised learning methods are often favored. According to the Casualty Actuarial Society (2022), commonly used unsupervised techniques include K-means clustering, self-orga-

nizing maps (SOM), and principal component analysis (PCA).³³

Guo (2024) synthesizes various studies and highlights several key machine learning approaches for identifying and preventing insurance fraud. Supervised learning techniques, including ensemble learning, neural networks, and natural language processing, are widely applied by training models on labeled data to distinguish false claims from legitimate ones. When labeled data is limited, unsupervised methods such as clustering and anomaly detection are used to spot unusual patterns. Additionally, graph neural networks prove valuable in complex settings like health insurance by analyzing relationships and detecting collusion among multiple parties. Hybrid models that combine supervised and unsupervised techniques enhance fraud detection by both identifying anomalies and accurately classifying them. Continuous learning and frequent model updates are crucial to keep pace with evolving fraud schemes. Integration of blockchain technology further strengthens data security and ensures claim authenticity. Overall, combining these ad-

³² Poufinas, T., Gogas, P., Papadimitriou, T., and Zaganidis, E.: Machine learning in forecasting motor insurance claims. *Risks*, Vol. 11, 1-19. (2023)

³³ Casualty Actuarial Society. Machine learning in insurance. Casualty Actuarial Society, Arlington, USA. (2022).

vanced methods forms a robust strategy to improve fraud detection effectiveness and adapt to new fraud tactics in the insurance industry.³⁴

A landmark study developed an automated fraud detection framework designed to minimize employee intervention, enhance security, and reduce financial losses in insurance. This framework incorporates a blockchain-based system that enables secure transactions and data sharing among multiple agents within the insurance network. The study applied the extreme gradient boosting algorithm (XGBoost) for fraud detection and benchmarked its performance against other advanced algorithms. Results demonstrated that XGBoost outperformed competitors, including decision tree models, achieving up to 7% higher accuracy on an auto insurance dataset. Additionally, the research introduced an online learning solution that efficiently handles real-time data updates, surpassing other online algorithms in performance.³⁵

Machine learning has become a vital tool for detecting fraud across industries, especially in auto insurance. By analyzing vast amounts of historical data, it identifies patterns, anomalies, and inconsistencies within insurance claims, strengthening fraud prevention efforts. Algorithms like neural networks, Bayesian learning, artificial immune systems, and support vector machines examine claimant details, vehicle information, accident reports, and claim histories, showing high accuracy in spotting fraudulent claims. Unsupervised techniques such as cluster analysis group similar claims to uncover suspicious patterns, allowing insurers to focus investigations effectively. Additionally, supervised models like logistic regression and decision trees are widely used for risk assessment and fraud detection. Commonly applied models in auto insurance fraud include Naive Bayes, random forest, and XGBoost.³⁶

³⁴ Guo, Y.: Application of machine learning in insurance fraud detection: achievements and future prospects. Proceedings of the 2024 International Conference on Artificial Intelligence and Communication (ICAIC 2024), 619-626. (2024)

³⁵ Jones, KI, and Sah, S.: The implementation of machine learning in the

insurance industry with big data analytics. International Journal of Data Informatics and Intelligent Computing, Vol. 2, 21-38. (2023)

³⁶ Mouna, SA, and Ilham, K.: Auto insurance fraud detection using machine learning contrasting US and Moroccan companies. Proceedings of the International

Determination of insurance premiums

Machine learning techniques are increasingly enhancing insurance premium pricing. Linear regression remains important for its simplicity and ability to model relationships between variables like age, gender, and claims history. Decision trees and ensemble methods, such as random forests, handle complex datasets where variable interactions influence premium calculations, creating decision branches for more precise risk assessments. Gradient boosting regression refines accuracy by iteratively correcting previous errors, while neural networks excel at detecting intricate patterns in high-dimensional data that simpler models might miss. A study on Moroccan vehicle insurance data compared polynomial regression, decision tree regression, random forest regression, and gradient boosting regression, evaluating their performance with metrics like mean square error (MSE), root mean square error (RMSE), and R^2 , demonstrating their effectiveness in predicting premiums and adapting to emer-

ging risks³⁷ Table 1 shows summarized results on the most commonly used machine learning methods in insurance.

Table 1. Machine learning methods in insurance

| Insurance area | Machine learning |
|-----------------------|---|
| Receivables | Decision trees, random forest, neural networks, machines with support vectors, XGBoost. |
| Customer segmentation | K-means clusters, decision trees, Latent Dirichlet allocation |
| Fraud identification | Logistic regression, decision trees, XGBoost, graph neural networks. |
| Determining premiums | Decision trees, random forest, polynomial regression, neural networks, regression with increasing gradient. |

Table 1 shows that machine learning methods such as decision trees,

of public liability coverage in Morocco. International Journal For Multidisciplinary Research, Vol. 6, 1-23. (2024)

Conference on Industrial Engineering and Operations Management, 226-235. (2024)

³⁷Ejjami, R.: Machine learning approaches for insurance pricing: a case study

random forest and neural networks are common in various aspects, which shows their flexibility in handling data of different complexity.

Conclusion

Machine learning has significantly transformed the insurance industry by enhancing efficiency and accuracy in key areas such as fraud detection, customer segmentation, and premium prediction. Its integration improves decision-making, boosts predictive precision, and enables more personalized services.

For fraud detection, supervised learning models like logistic regression, decision trees, and support vector machines are commonly employed to classify claims as fraudulent or legitimate, while unsupervised methods like clustering and anomaly detection help uncover fraud when labeled data is limited. Advanced techniques such as graph neural networks excel at detecting complex fraudulent schemes involving multiple entities. In customer segmentation, clustering algorithms like k-means and hierarchical clustering group clients based on shared traits, enabling targeted marketing and product development, with dynamic methods like Latent Dirichlet Allocation offering behavior-based segmentation. Claims management leverages decision

trees and random forests for classification, alongside neural networks and ensemble models like gradient boosting to enhance forecasting accuracy. Finally, premium forecasting still relies on linear regression for its clarity but increasingly benefits from advanced methods such as gradient boosting and random forests that better capture complex data patterns.

This study contributes significantly to both theoretical understanding and practical implementation of machine learning in the insurance sector. Theoretically, it enriches existing literature through a systematic review of cutting-edge machine learning applications in insurance, emphasizing their transformative effects on conventional insurance processes. Given the limited current research, the findings establish a solid foundation for future investigations in this field. Practically, the study offers valuable guidance for stakeholders by presenting a framework that matches specific machine learning techniques to various insurance functions. However, the research has limitations, primarily its qualitative approach and reliance on secondary data. To refine the understanding of machine learning's potential in insurance, future studies should incorporate real-world data from insurance companies and con-

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duct case studies to explore how these organizations implement machine learning in practice.

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UNAPREĐENJE INDUSTRIJE OSIGURANJA: KONCEPTUALNI OKVIR ZA PRIMENU MAŠINSKOG UČENJA ZASNOVANOG NA SISTEMATSKOM PREGLEDU LITERATURE

Sažetak: Industrija osiguranja prolazi kroz značajnu transformaciju vođenu napretkom u tehnologiji, posebno mašinsko učenje. Kako osiguravači nastoje da poboljšaju operativnu efikasnost, procenu rizika i korisničko iskustvo, mašinsko učenje nudi obećavajuće aplikacije u različitim domenima, kao što su preuzimanje, obrada potraživanja i otkrivanje prevare. Uprkos potencijalu mašinskog učenja, njegova integracija u tradicionalne prakse osiguranja suočava se sa brojnim izazovima, uključujući kvalitet podataka, regulatorne probleme i organizacionu spremnost. Cilj ovog rada je da se ispituju mogućnosti i karakteristike primene mašinskog učenja u osiguranju, kako bi se utvrdio pristup mašinskog učenja koji se najčešće koristi i koji daje najbolje rezultate. Oslanjajući se na uvide iz sistematskih pregleda literature, okvir će pružiti sveobuhvatno razumevanje kako mašinsko učenje može preoblikovati prakse osiguranja. Istražujući ove aspekte, ovaj rad doprinosi strukturiranim i informisanom pristupu implementaciji mašinskog učenja u industriji osiguranja.

Ključne reči: mašinsko učenje, osiguranje, algoritmi učenja

THE IMPACT OF PHILOSOPHY ON ECONOMICS IN THE NEW ERA

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Abstracts: This paper explores the profound and multifaceted relationship between philosophy and economics, tracing their historical convergence and examining how philosophical frameworks have shaped economic thought and policy across eras. From the metaphysical insights of Aristotle and the moral reasoning of Kant to the utilitarian ethics of Bentham and Mill, philosophical doctrines have consistently influenced economic paradigms, including classical, neoclassical, and behavioral models. The paper discusses key philosophical concepts, such as rationality, autonomy, justice, and utility, and their roles in guiding economic decision-making, policy formulation, and the evolution of global trade, sustainability, and technology. Special attention is given to how contemporary challenges like globalization, digital transformation, and environmental crises necessitate renewed philosophical inquiry within economic reasoning. Ultimately, the study argues for a reintegration of philosophical rigor into economics to foster a more ethically grounded, human-centered, and sustainable economic science for the future.

Keywords: Philosophy of Economics, Economic Thought, Rationality, Utilitarianism, Kantian Ethics, Existentialism, Economic Policy, Sustainability

Introduction

What and why of economics? The answer is very simple. The objective of economics is to discover how human beings can organize work so that its rewards are shared by the participating workers in a manner that best suits their diverse capacities and potential. The question is crucial because, from the dawn of recorded history, the vast majority of men and women have known effort and struggle but have received only a small fraction of their working hours in recompense. In prehistoric times, all men and all women had to hunt and gather, day by day, to feed and protect themselves and their children. To the daily thrift carried out by untold generations since prehistoric times, to discipline and organize work, we owe our accomplishments and the records of human history. Yet, the talented and hardworking among both the wealthy and the impoverished are little prone to revise the laws of economics that justify their acquisitive behavior (Boland, 1998; Ching, 2021; Hausman et al., 2016; Kurmanbaev and Stambakiev, 2019). Indeed, the most communicative and stimulating ideas on the philosophy of economics made by 20th-century philosophers and economists served to rationalize further existing inequalities of income

and wealth among men, rather than to offer clues on how a greater part of the enormous potential for sure and equitable human development could be harnessed.

Historical Context

The classical economies outlined by Adam Smith, David Ricardo, and Thomas Robert Malthus have been replaced by two traditions, the neo-classical school, which sees economics as the study of the allocation of resources, and the Austrian and Swedish schools, which argue that economics can only be understood in terms of individual decision-making. The focus of the philosophy of economics is on interpretations of economic theory in terms of its normative and descriptive content. A further philosophical area of development consists of the methodologies of economics, the question of how economics should evolve and what its relationship is to science. The science-philosophy interaction involves elements such as paradigm shift, structuralist account, and the concept of falsifiability. The scope for productive dialogue between philosophers and economists will grow in the future.

A more historically important relationship takes philosophers of eco-

nomics back to Adam Smith. Smith's metaphysical account is that underpinning the *Wealth of Nations*, so that the theory of moral sentiments enables him to explain why people behave as economic agents, and how natural laws encourage the fraud, corruption, and irreligiosity of economic agents. Marx and Engels come after Smith and lay down the foundations of the struggle between capital and labor (Lenin, 1916; Marx, 1867). Economic thought, like other sciences, developed through a series of stages, each built on insights from previous periods. These periods can be summarized briefly as the premodern ancient Greeks, the Scholastics of the late medieval and early modern periods, the classical economists in the eighteenth and part of the nineteenth centuries, the rise of neoclassical marginalism, and the emerging context-dependency views of scholars today. The developments have been marked by intellectual contestations, efforts to surmount incumbent approaches and frame concepts that acquire the stamp of science. Each epoch can be characterized by concepts that played the role of the 'embezzled artisans' seeking variations to stick in modern vest. What could act as wrong-track, simplistic advice for one epoch could become the necessary insight for another. With elevation in complexity

and variance of material controls or how wealth and inefficiency are generated more varied, commonly expressed sociopolitical concerns returned with enthusiasm in the mid-twentieth century. The discovery of the nexus between politics and economics was an important endpoint (Challoumis, 2024, 2023, 2019, 2018). Long-run considerations concentrated deterministically at the grassroots level. Body and soul remain constant concerns, but how they were satisfied with resources that vary over time is contingent.

Key Philosophical Concepts

Which are the key concepts of philosophy that have an impact on economics? Generally deductive methods and rational behavior are the key concepts from philosophy currently used by economists. But these are not the only ones. The greed of the Belgian Jesuit, enhancing the happiness of all individuals makes a society feel as happy as possible, from the French Marshal to the utilitarian, and utility functions from England and Austria in the year 1871, and happiness-maximizing agents from modern philosophy to economics have been accepted by all. As mainly an 18th-century discipline, societies that have advocates for free

market theories of economics have also attempted to publish inquiries.

Utilitarianism is a view about what is the rational basis for adjudicating among alternative social arrangements by focusing on the question of what is the appropriate criterion for making interpersonal comparisons in the context of collective decision-making. The view is that the good indirectly resulting from an act is the sole criterion of the rightness of the choice. More specifically, this demands that the agent should decide what specific act does the most to make society a better place, and then should perform it. In this context, the act does not only have a direct effect on the economic well-being of the agent, but aims at providing the most good or justice to the stakeholder that can be affected by the decision.

Bentham used the term 'utilitarian' to refer to moral principles or rules or types of action. He believed that the goal of all human life is to have the most pleasure and happiness. One of the founding fathers of utilitarianism, John Stuart Mill, rejected the aggregation of ties problem and suggested that pleasure and happiness are the only desirable ends in themselves. Utilitarians do not propose that in every situation the greatest sum of happiness is simply the

aggregate sum of each person's happiness (Woody and Viney, 2017). Happiness is not a black box that can be examined. As a result, happiness is a variable state of satisfaction and is diffused through all the different types of pleasantness that make our nature. Utilitarians' most controversial claim is that suffering should be reduced and should never be justified. Moreover, by reducing suffering, pleasure is maximized, indirectly leading to a greater sum of happiness. Finally, utilitarians postulate that the impact of economic decisions combined with the highest happiness over lifetime well-being will maximize the self-interest of every individual. They imply that economic decisions are not merely based on how much happiness it creates for the person who benefits from it most, but how much happiness and compensation is created in the world, which then results in the highest net positive change (Chen et al., 2005; Verdegay, 2015).

Philosophy and Economic Policy

What has been said so far, especially in the second section, makes the third level of relationship between philosophy and economics clearer: the importance of philosophy to rational economic policy. This is another classical

and old issue, as people have been discussing the problems of political philosophy for centuries, even before the appearance of political economy, but today there is much to be said on the contemporary side. For rigorous thinkers, economic policy can only be intelligently formulated using philosophical concepts such as the good, freedom, autonomy, worth, justice, security, and so on. These concepts, however, differ between philosophies, and some of the so-called social sciences involve these definitions. In this sense, the line that separates the academic division of labor is artificial and not in itself a line of separation between the disciplines or the issues involved.

One of the best and most basic examples is that, to make public policies, moral principles or values must be elucidated and identified, and to define them well, one must make use of philosophy. Among the most basic and great questions of political or moral philosophy are: to consider only interpersonal relations or also individual relations, to accommodate both preconceptions described faithfully or to reconcile the conflicting ones, to recognize the simple ones or ontologically complex, to rely on reason or on other sources of information, to prioritize the consequences or to make the focus ethical, to respect indi-

viduals' welfare or capabilities, to promote connected dimensions or disconnected aspects, to adopt a certain fundamental approach or to have a pluralist vision of the good, to stay with certain ethical reasons or on others, and to support the virtues, the rights, or something else (Coibion et al., 2020). The regulatory function of the state somewhat puts into question the concept according to which the main and often unique purpose of the existence of a modern state consists in the provision of only such public goods that allow for the individual free activity of households separate from each other and business subjects in the capitalistic market economy. From describing the market economy and specifying the state's role in its activities, it is already clear that the "state - market" ratio is not always of equal intensity (Kaldor, 1932; Kozłowska and Koziem, 2021). Its formation is influenced by existing social and value priorities, as well as process dynamics in their structure. The "market - state" balance, as shown by many events, is seriously influenced by the dominant philosophy of the era.

The Role of Rationality

The new era of global economic markets has brought important implications to the role of the economist as well

as the role of the philosophy of economics. Critics of traditional economics suggested that the philosophy of economics would contribute not only to economic development but also to a more objective and fair social philosophy. Social philosophy based on the new imperfection or political market theory not only served as a link between the abstract production and demand theory and the motivation and behavior of real-life economic codetermination systems; it suggested fundamental revisions in the classic philosophical approaches of the philosophy of economics.

Ultimately, it is the ethical task of economics to help solve the growing unemployment and monetary inflation crisis in global society. Economics will, step by step, acquire workable solutions, and the philosophy of economics will try to provide the relevant moral standards for the activities of economists that allow the return to an ethos of economic stability and social justice. Behavioral economics has received considerable attention in recent years because it provides a compelling challenge to the standard model of neoclassical economics. Recent developments in the fields of behavioral economics and macroeconomics are related and these areas of research have important implications for some central debates in the field of

the philosophy of economics that include causality, cooperation and collective rationality, strategy and rational compromise, and rationality and social conflict.

Globalization and Ethical Considerations

The ethical relativist, by opposing universal ethical principles as intrusions on the moral cultures of other societies, defends a prescriptive bottom line of moral tolerance. But this moral tolerance is itself prescriptive rather than exclusively descriptive and rests upon principles of judgment concerning the toleration of diversity and non-violent conflict resolution. Although we do not agree on substantive moral issues, the peoples of the world do agree that peace is better than war. They create normative institutions to promote peace and security; they create courts and tribunals to prosecute and punish those who violate rules of fair game. They make anarchical systems less anarchy and more rudimentary signs of world rule of law because they are receptive to the creation and enforcement of some rules. That allows translating controversial substantive values into non-substantive rules whose prima facie acceptance can be logically and impersonally proved (Andreev et al., 2022; Bruner and

Iannarelli, 2011; GVELESIANI, 2019; Munirom, 2023; Stiglitz, 2002; Valogo et al., 2023; Vidrova, 2020).

The significance of the philosophical interpretation of the categorical apparatus of sustainable development (SD) is determined by the fact that SD-related concepts are widely used in normative and regulatory documents of different levels. Each area of knowledge has its own interpretation of these concepts. First of all, the emergence of "new" meanings of the concepts of SD in the environment of an interdisciplinary approach has led to the fact that the polemic between ideas conceals the specifics of the problems that fall within the scope of questions about the core values of human life and the existence of mankind. That is why the issue of the place of philosophical knowledge in ensuring SD becomes one of the central themes of the evolutionary development of modern practices of humanity. It is in the nature of the environmental movement and other social movements that the means of reaching one's own goals should be understandable to society through dialogue and the provision of convincing evidence justified by the situation (Casey and Sieber, 2016; da Silva Junior et al., 2019; Roigé et al., 2021; Victral et al., 2020).

Impact of Artificial Intelligence on Economic Theory

The new era, marking the end of speculation on the growing technological predominance, or rather on the last stage of a long period of domination of the relation between technology and economy as physical technology dominates the economy, would only end up as transient speculation that left, as a symbol, a few firms apparently susceptible to resist the business cycle, symbolically called "electronic value." This way of looking at the economic prospects of the new era is conjoined, substantially, by an outlook adverse to the forecast of financial analysts, according to which the downturn would have been caused by the burst of the speculative bubble of the new economics. Observe, first of all, that telecommunication technologies and computers are only the visible part of ongoing changes in the techno-economic structure. According to a consolidated conception, the impact on the economy of technological innovation not only does not exhaust itself because of the 'visible' effect on the dynamics of the sectors closer to innovation, namely: industry, high tech, and information and communication, but also touches other areas of the new socio-economic context. In fact, the contribution of the technological factor to acceleration in GDP, by combi-

ning with other factors of change, is presumable in all areas of the economy, going beyond the traditional areas where progress takes place.

Philosophical Questions in Digital Economies

Currently, as we enter the era of digital transformation, the old philosophical questions and problems of economics that have matured in history expose areas of darkness that the philosophy of economics must continue to illuminate. This paper will propose and discuss the following issues. Now the global economy is undergoing a digital transformation, establishing a universal value standard that can support interoperable e-commerce transactions among multiple digital economies, unprecedented in history. How to define and clarify the connotation of the digital economy based on the idea of the philosophy of contemporary economics is also a general philosophical issue put forward by the study of the digital economy and digital income distribution. At present, basically, economic philosophy studies exist within the framework of the philosophy of modern economics, and the basic method of economic theory is based on analyzing economic actions and economic results by abstracting economic concepts and the tendency of the results of the logical

thinking system of economic rationality (Lim and Teoh, 2021; Stepura and Kuzmak, 2023; Talapina, 2019).

Case Studies

We have selected four episodes in which philosophical considerations had an impact on recent research, partly because they are illustrative: two involve the topic of knowledge; two involve the topic of rationality. Temporal network formation involves special characteristics with respect to reaching manifest equilibria. There are two topics in it that clearly illustrate several misleading recommendations that may result from placing too much emphasis on the reasonable action assumption. Those two topics, the value of information and anticipated utility, also make it clear that any economic modeling effort implicitly, if not explicitly, posits realistic players even when the reasonableness of economics should not be assumed.

This issue has two main goals. The first is to argue that economic model-building is massively speculative scientific philosophy, the philosophy of rational, self-regarding action without the benefit of cultural, psychological, historical, or archaeological research. The second goal is to show, with selected case studies, that phi-

losophical considerations have had an impact on at least this economist. This analysis has two goals. First, the reasonably long and reflective practice of an economist with a philosophical streak is a useful and underutilized source of evidence for judging how much impact philosophy might have inside the economics profession. Second, perhaps a story of how my research was affected by hopeful engagement with evolution will make even the most philosophical of theorists raise his or her estimation of philosophy's likely future content.

Future Directions

Based on the analyses developed throughout the book, there are many paths worth pursuing with respect to the future of both economics and philosophy. Here, I discuss several dimensions along which these future trajectories could unfold. First, academic institutions could adapt their incentive structures to encourage interdisciplinary initiatives that transplant insights from the humanities and the social sciences to economics. Second, both academics and policymakers could benefit from increasing levels of reflexivity regarding their role in the world. A greater awareness of the narrative, normative, and sociological dimensions of economic thought can help identify and mitigate

tropes that can undermine robust and impartial modes of reasoning. In this vein, institutional arrangements that draw upon the behavioral and social sciences can be designed to maximize pedagogical and ethical teaching moments. Third, it is important that the role corporate funding plays in both the natural and social sciences does not compromise the independence of scientific research or compromise principles of academic freedom. As large and increasingly powerful technology companies come to dominate large sectors of the global economy, they have an increasingly important responsibility to apply their technological and data-based know-how to the resolution of social challenges. Historical examples show that many of the promises of economic prosperity and technological progress laid out by self-proclaimed benefactors of humanity remain to be fulfilled (Chaloumis, 2020; Hausman et al., 2016; Thaler, 2017; Woody and Viney, 2017).

Conclusion

In conclusion, philosophy has a considerable impact on the development of economics in the new era. Philosophy, as the most general and abstract science, influences the development of any particular science. Modern philosophy has set before itself

the task of finding a scientific method that is common and equally suitable to all the sciences without exception, a method of assembling and ordering the most various and diverse material, a unifying method. So far, philosophy has depicted a picture of the world that prevails principally up to today. The crisis of the old picture of the world indicates that it does not enable it to resolve the contradictions that exist in the economic system of development, in economic policy, and thereby gives way to a new picture of the world, which is not yet completed and merely has the features of the new philosophy. The crisis of the old picture of the world has given rise to contemporary systematic philosophy, which must guide and solve the complex socio-economic and political problems of our time, unifying the innumerable developing elements into a complete and coherent system of knowledge. This is the role of the philosophy of the new era, grounded on non-contradictory principles, science, and the unity of the general theory and the particular sciences, a science of modern humanity.

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UTICAJ FILOZOFIJE NA EKONOMIJU U NOVOJ ERI

Sažetak: Ovaj rad istražuje dubok i višestruk odnos između filozofije i ekonomije, prateći njihovu istorijsku konvergenciju i ispitujući kako su filozofski okviri oblikovali ekonomsku misao i politiku u svim epohama. Od metafizičkih uvida Aristotela i moralnog rasuđivanja Kanta do utilitarne etike Bentama i Mila, filozofske doktrine su dosledno uticale na ekonomske paradigme, uključujući klasične, neoklasične i bihevioralne modele. U radu se razmatraju ključni filozofski koncepti, kao što su racionalnost, autonomija, pravda i korisnost, i njihove uloge u vođenju ekonomskog odlučivanja, formulisanje politike i evolucija globalne trgovine, održivosti i tehnologije. Posebna pažnja se posvećuje tome kako savremeni izazovi kao što su globalizacija, digitalna transformacija i ekološke krize zahtevaju obnovljeno filozofsko istraživanje u okviru ekonomskog rasuđivanja. Na kraju, studija se zalaže za reintegraciju filozofske strogosti u ekonomiju kako bi se podstakla etički utemeljena, usmerena na čoveka i održiva ekonomska nauka za budućnost.

Ključne reči: Filozofija ekonomije, Ekonomska misao, Racionalnost, Utilitarizam, Kantova etika, Egzistencijalizam, Ekonomska politika, Održivost

FINANCING ENVIRONMENTALLY SUSTAINABLE AGRICULTURE

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Review Article

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Abstracts: Financing ecologically sustainable agriculture is one of the basic tasks and the basis of economic growth and development of every country. Focusing on financial support from the state in the sustainability of agricultural financing, we will also look at the budget, so that we can present the degree and possibilities of meeting the basic needs related to the establishment and functioning of the agricultural fundamental ecologically sustainable component of every society.

By applying statistical methods, primarily correlational links, we will present cause-and-effect relationships between the elements of agricultural financing and their main financial support in the economic power of the state in modern conditions.

Keywords: ecologically sustainable agriculture, financing, ecology, sustainable development

Introduction

Agriculture is a very important economic activity that has economic, social and political importance. In more market-developed economies, agriculture has greater importance, whether we are talking about agriculture in a narrower sense as primary agricultural production or in a broader sense as multifunctional agriculture.

In the past loans from commercial banks to agriculture, which were financed from their own sources, were also under considerable state control. Short-term and long-term lending to agriculture in this period was under the control of the state, that is, the funds were directed administratively.

Financing is a basic factor in the survival and development of business systems, and if we present agriculture as a system, then financing is also directed towards it.

The majority of financial institutions in their business base necessarily condition profit, which is not the case for the budget as well. Therefore, the budget occupies an important place in the preservation and development of activities that are important for a country.

Taking into account the characteristics of the budget as a financial institution and agriculture as an economic branch, we can relate the dependence of agricultural development on financial allocations from the budget of the Republic of Serbia.

The budget as a financial institution

The basic instrument for financing public expenditures in all modern states is the budget. The budget represents the basic, and in some cases, the only instrument for collecting public revenues and financing public expenditures in a modern state. (Stiglic, 2008)

As a financial institution, with all the necessary elements and with respect to the prescribed procedure, the budget appeared only in the 15th century in Europe and in certain cities, i.e. in the 17th century in certain countries.

The budget is a complex document that is specific and uses elements of numerous other laws in a very specific way, whether it is about public revenues or public expenditures, it is normal for it to have numerous functions (Pušonja, 2025). The functions of the budget are related to the goals that the state wants and plans to achieve through the one-year opera-

tion of the budget. In addition to several basic functions of the budget, we will mention the economic function of the budget as the most significant for us in terms of this research (Vasić, 2022). The economic function of the budget derives from the instruments used by the state to achieve goals through expenditure and revenue policy, since it directly affects the distribution of the gross domestic product (GDP). The total public spending is linked through the budget to the economic policy and goals to be achieved in the distribution and redistribution of the social product.

The part of the economic policy that regulates the achievement of certain goals by means of public revenues and expenditures is seen as fiscal policy.

Thanks to the theory of public choice created in the USA in the sixties of the last century, contemporary economic analysis and the theory of fiscal policy are gaining an increasingly significant socio-political and social role.

A key contribution in the development of the study of fiscal policy was made by John Miner Keynes, so the budget as a financial institution that is placed in the seat of fiscal policy is gaining importance. (Đorđević, Ignjatijević, 2013)

In the modern economy, where conflicting interests of different social groups are increasingly expressed, it is not easy for economic policy holders to apply certain stabilization measures, despite the fact that information and communication technologies have significantly facilitated access to information. In this connection, the principles of public choice theories have become particularly relevant for state interventions in certain basic economic activities of importance to the state, such as agriculture.

Agriculture as an economic activity

As one of the most important economic activities, especially after the long period of transition and the collapse of industry in those years, is the agricultural activity, which could be a significant foundation for the rise of our country (Stojić, Pejović, 2024). Either as primary agriculture or as multifunctional, agriculture in all market-developed economies has a privileged position compared to other economic branches.

As a sector of the economy, agriculture has come a long way from the primitive way of production to the modern, modern stage in developed countries. During a very long historical period, the development of this activity was extremely slow, even if during all that time it represented the

basic economic activity in which the largest part of the products was created until the industrial revolution. Of course, the progress of agriculture is conditioned by natural, but even more so by socio-economic factors. The change of attitude towards agriculture with the accelerated development of industry is taken as a confirmation of that attitude. (Devetaković, Jovanović Gavrilović, 2008).

In Serbia, according to the results of the 2022 census, there are a total of 631,552 farms in Serbia, where family agricultural farms predominate and make up 99.5% of the total number of agricultural farms in Serbia. (data from the Republic Institute of Statistics). Also, 85% of the territory, where 55% of the population lives, is considered rural areas in Serbia. The reason why such a way of farming is not sustainable is the impossibility of developing competitive production and the impossibility of reducing business costs. The average size of agricultural holdings in the European Union is 20 hectares, which implies that with high productivity they can be competitive on the market, and they can also reduce business costs.

The specifics of agricultural production are: high dependence on natural conditions (land, terrain, soil

configuration, climate, etc.), which leads to larger or smaller jumps/falls in production, greater business risks, which creates certain organizational-technological and socio-economic problems; the basis of agriculture is organic production, the products of which are, as a rule, the living world, which is why procedures, organization and economy are simplified by biological conditions and properties of plants and animals, and this allows a much larger mass of agricultural products to be obtained from the initial living material (Vučić, 2024). In addition, the time of the production process usually does not coincide with the nature of human work, so many different products whose production times and working periods are different are combined in production, thus implementing a specific division of labor and complementing each other in this activity. (Devetaković, Jovanović Gavrilović, 2008).

Agriculture has biological specificities, which is why it is more demanding from the financial aspect compared to other economic activities. The most important factors are seasonal and organic production as well as high risks of the production cycle (Burda, Viploš, 2012). A big problem for farmers is the impossibility of specialization in production, the low level of capacity utilization and the slow

turnover of capital. This implies that the mentioned specificities require that in agriculture there is a need to engage large financial resources in the short term that remain tied up for a long time, and all this does not favor the producers. Due to such specificities as well as the low profitability of agriculture, additional sources of financing are necessary.

Another big problem is low productivity, which requires higher product prices, which therefore become less competitive on the market.

A very important thing that should be mentioned when we talk about agriculture as an economic activity is the production of raspberries in Serbia, which for the last decade has taken the leading place in the export of agricultural products. Serbia is the largest exporter of frozen raspberries in the world. This is information that instills optimism in potential producers, but also a turning point in their decision whether to opt for that agricultural product (Radičić, Raičević, 2011). With the appearance of more raspberry buying stations, competition emerged that is not based on a monopolistic system of price formation, but the free market dictates the formation of product prices as well as the high demand for this product. The producers are satisfied, and the cold storers who buy the product are

also satisfied. This satisfaction of the participants in the production and marketing of goods is partly preceded by the help of the state and the agricultural budget, which helped with subsidies. We believe that the state, in order to satisfy the income side of the state budget, should meet agricultural producers not only with subsidies, but also with favorable loans, with a low interest rate, without currency clauses and with a longer grace period. In that case, agricultural producers would be able to obtain high-quality machinery, equipment and working capital in time, loans would come due after several years of generating income, and the revenue side of the budget would be satisfied.

Agricultural budget and financing of agriculture

Agrarian policy is that part of the economic policy of a national economy or broader integrations that is focused on directing the development of agriculture and activities directly related to it on various grounds.

Agrarian policy consists of several interconnected elements - the goal of agrarian political activity, means, measures and methods of action, and the bearers of agrarian policy. All of them, of course, operate in a certain space and time, and as a result of them, changes are achieved in the

field of agriculture or activities directly related to it. (Devetaković, Jovanović Gavrilović, 2008).

The example of Slovenia, as a country that carried out the most successful transition, which during the transition period until 2010 (Radović, 2011).

Lending by commercial banks also plays an important role in encouraging agriculture. During the transition period, loans from commercial banks for agriculture were quite unfavorable with high interest rates, they were indexed in euros, high costs of loan insurance, no grace period for repayment and many other disadvantages (Milenković, 2023). With the arrival of a larger number of commercial banks on our premises, that bad trend has changed and now the conditions are much more favorable for farmers (Hemed, 2022). A lower interest rate and short-term loans indexed in dinars gave a great incentive to agricultural products to take out loans. In spite of that, the disadvantage of lending by commercial agricultural banks is that long-term loans are still indexed in euros. (Veselinović and Drobnjaković, 2014). We believe that agricultural entities in Serbia should be offered more adequate agricultural loans without currency clauses adapted to the seasonal character of agri-

cultural production and the financial powers of agricultural producers.

Also, we think it would be good to offer commercial banks as well as other legal entities and investors the opportunity to invest in Serbian agriculture. Investment, that part of them that is financed from accumulation, represents the material basis of the expansion of reproduction, since they increase the fixed and working capital in the activity where the investment is made. Considering that, the growth of agricultural production is a function of investments in this activity and their functions. (Devetaković, Jovanović Gavrilović, 2008).

One completely new financing model that is extremely common in our agriculture is financial leasing. This new financing system is regulated by the Law on Financial Leasing in 2013 and in the past period it played a very important role in the financing of investments in agriculture, primarily in the procurement of agricultural machinery and equipment (Bacior, Prus, 2018). According to some data, in the past year, 50% of purchases of combine harvesters and tractors were made through Serbian leasing companies.

(Association of leasing companies of Serbia). The good thing is that the

lease repayment costs do not burden the creditworthiness, that is, the costs of bank guarantees of agricultural entities. Financing through leasing enables farmers to use the acquired machinery and equipment immediately in the production process, and to realize the repayment from the realized profit (Paspalj, Paspalj, & Milojević, 2024).

Methods

For research purposes, we used the $GDP=C+G+I+X-M$ model, an expenditure method for determining GDP in which C stands for personal consumption, G for public consumption, I for investments, X for exports, and M for imports.

During the research, we applied the Pearson coefficient correlation model $rx_y=C_{xy}/SD_x \cdot SD_y$, where C_{xy} denotes the covariance, and

$SD_x \cdot SD_y$, the product of standard deviations h and y (Žižić, Lovrić, Pavličić, 2007)

In order to evaluate the value in the following period depending on economic trends, we used the time linear trend method $\hat{y} = b_0 + b_1x$, where \hat{y} represents a linear function, b_0 (average) and b_1 (mean absolute increase) represent parameter ratings, and x represents time data. The least square method is used to calculate the estimate of the trend parameters.

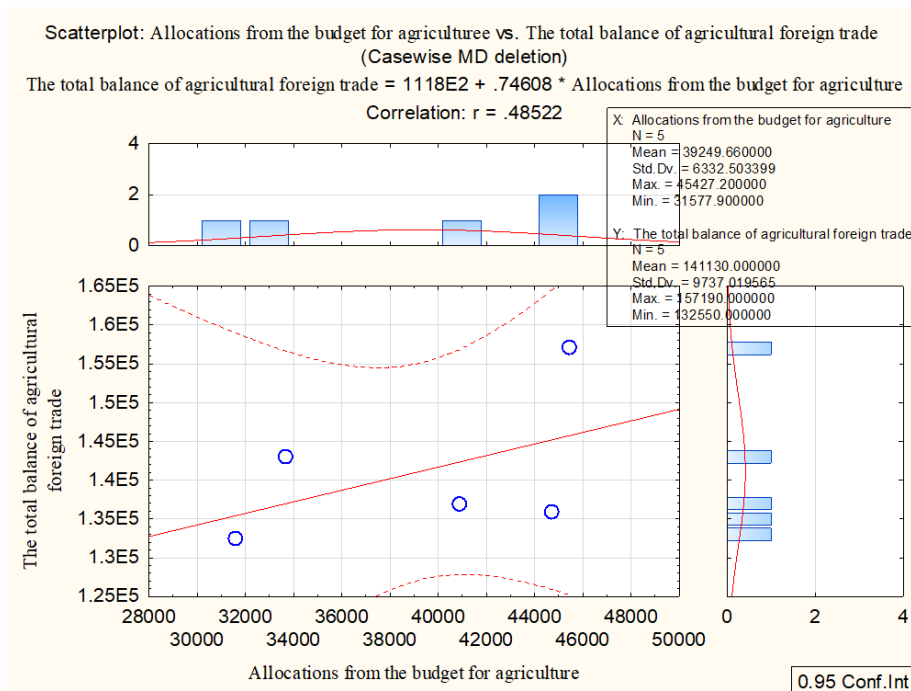
Results with discussion

In the research, starting from the data we collected and the methods we apply, we performed a statistical preparation of the data for the possibility of their processing.

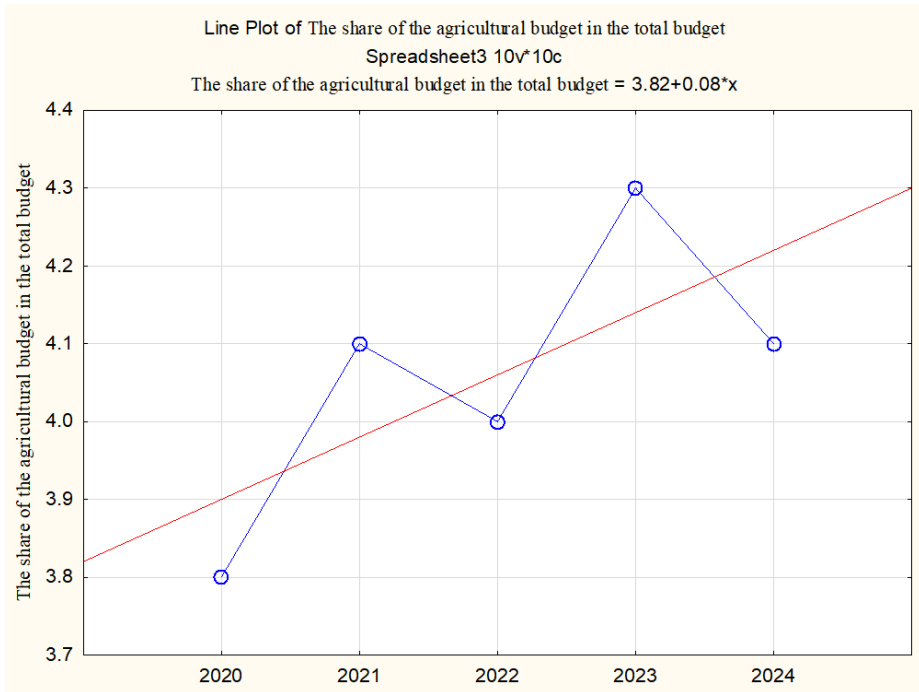
Table 1. Indicators of financing agriculture in the Republic of Serbia

| Year | Allocations from the budget for agriculture (millions of dinars) | The total balance of agricultural foreign trade (millions of dinars) | The share of the agricultural budget in the total budget of the Republic of Serbia (%) |
|------|--|--|--|
| 1 | 2 | 3 | 4 |
| 2020 | 52.710,00 | 470.463,00 | 4,0 |
| 2021 | 52.820,00 | 590.511,45 | 4,0 |
| 2022 | 62.070,00 | 783.321,50 | 4,1 |
| 2023 | 79.700,00 | 770.100,80 | 4,3 |
| 2024 | 104.750,00 | 801.766,20 | 4,8 |

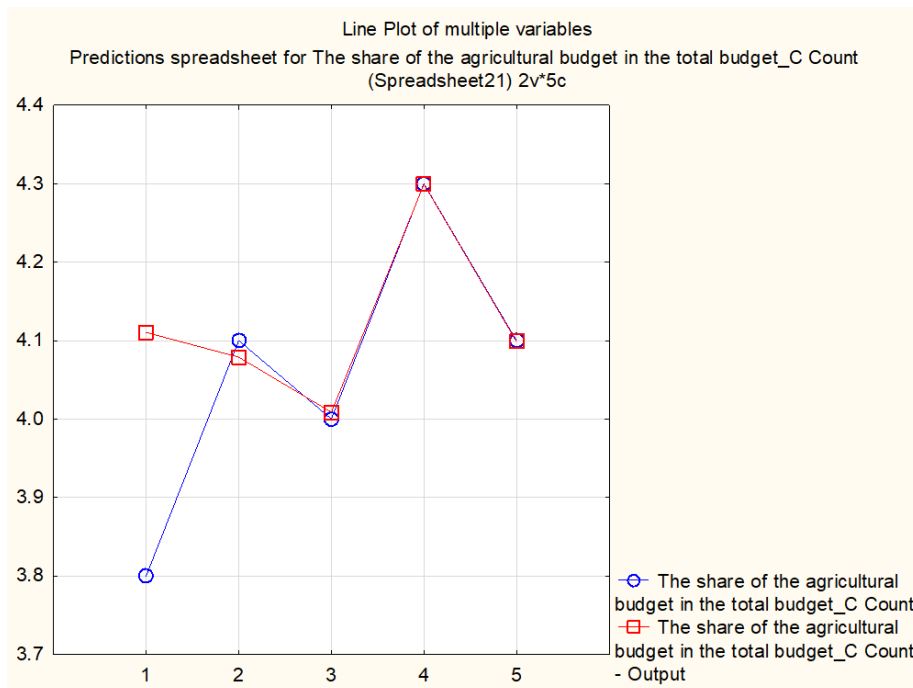
Source: <https://mfin.gov.rs/sr/or-ministarstvu-1/budzet-ministarstva1-1>, <https://www.stat.gov.rs/sr/latn/oblasti/spoljna-trgovina/spoljnnotrgovinski-robnipromet/>



Picture 1. By applying the PEARSON correlation method, we established that the value of the correlation coefficient, by analyzing (3) the allocation from the budget for agriculture of the Republic of Serbia and (6) the total balance of foreign trade agricultural and processing production, is $r_{xy}=0.48$, which means that the correlation coefficient is not high correlated.



Picture 2. By calculating the time linear trend, we arrived at the linear trend model $\hat{y} = 3.82+0.08*x$, where the mean absolute growth in the presented period. By calculating the value of the trend for the year 2030, we reached the result of 4,7%.



Picture 3. Therefore, greater allocation from the state budget for agriculture resulted in higher productivity due to the possibility of agricultural subjects to more easily obtain more efficient mechanization and equipment and the acquisition of better working capital due to greater subsidies, which will later affect the yield. With a higher yield, agricultural producers will have the opportunity to set a more favorable price for their products, which will make them more competitive, and therefore the total balance of foreign trade agricultural production will grow. With this method of correlation, we confirmed that the importance of financing from the budget of the Republic of Serbia for agricultural production is of great importance.

Conclusion

Financing is the main problem of agricultural development. The difficult period of transition for our agriculture, as well as other valuable activities, left a deep mark.

This is why we have a fairly uncompetitive agriculture, with outdated machinery that cannot achieve a sufficient level of productivity, which is why the price of the product itself is higher and with which our agricultural producers are not competitive on the market. This especially applies to rural areas and small producers or producers in the narrower sense, which make up a significant majority.

Greater incentives in the form of subsidies that would also encourage agricultural production, especially subsidizing rural areas where due to the economy due to underdevelopment there was an outflow of population, and this and similar projects would prevent that outflow.

Another thing that our agrarian sector lacks, and which could greatly improve the position of our agriculture, is a strong agrarian bank. A real agricultural bank would have to be able to finance agriculture, to place capital, both domestic and foreign, for all agricultural subsidies to go through it, to be a privileged

bank like some countries of the European Union have.

In finding a solution for financing agriculture, one must also know the way of financing agriculture in successful and developed countries, and that those systems should be a model to strive for.

Commercial banks on the territory of Serbia also play a major role in lending to agriculture. Serbia's agricultural potential led commercial banks to offer agricultural subjects favorable loans, with a lower interest rate for working capital and the purchase of fixed assets. But these are all short-term agricultural loans with a repayment period of up to 12 months, and these loans do not meet the needs of users. It is necessary to attract commercial banks to partly operate in the interests of farmers without harming their own interests. It would be a system of approving long-term agricultural loans with a lower interest rate, without a currency clause, with a longer grace period, which would greatly help agricultural subjects, because agriculture has a slow turnover of capital.

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FINANSIRANJE EKOLOŠKI ODRŽIVE POLJOPRIVREDE

Sažetak: Finansiranje ekološki održive poljoprivrede predstavlja jedan od osnovnih zadataka i temelj ekonomskog rasta i razvoja svake zemlje. Fokussirajući se na finansijsku podršku države u obezbeđivanju održivosti finansiranja poljoprivrede, u tekstu se razmatra i budžet kao polazište za sagledavanje stepena i mogućnosti zadovoljavanja osnovnih potreba koje se odnose na uspostavljanje i funkcionisanje ekološki održive poljoprivrede kao fundamentalne komponente svakog društva.

Primenom statističkih metoda, pre svega korelacionih veza, biće prikazani uzročno-posledični odnosi između elemenata finansiranja poljoprivrede i njihove glavne finansijske podrške u okviru ekonomske snage države u savremenim uslovima.

Ključne reči: ekološki održiva poljoprivreda, finansiranje, ekologija, održivi razvoj

SPECIFICITIES OF STRATEGIC MANAGEMENT IN THE PUBLIC ADMINISTRATION OF THE REPUBLIC OF SRPSKA

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Abstracts: In public administration - whether at the state level or within any unit of local self-government - positions are predominantly held by politically elected individuals whose professional and experiential foundations for such responsible work are often questionable. Being a municipal head or mayor in one of the 64 units of local self-government, or being a minister in the Government of the Republic of Srpska, or a responsible person in a state agency, directorate, or public company, means being accountable to the “owner of the capital,” that is, to the owner of budget funds - the citizens. It is the citizens, through their payment of taxes, duties, and contributions, who fill the budget and to whom results must be reported.

Citizens have the right to receive increasingly better services for their money and to know whether mechanisms for sanctioning and rewarding managers are defined, as is the case in the private sector. They closely observe indicators of misuse, political manipulation, corruption, and all other possible irregularities within the budget, which they finance primarily through work in the real sector.

The concept of “modern public administration” is a project that holds significant promise in terms of depoliticization, anti-corruption, prevention of misuse, and more responsible spending of public funds. The introduction of electronic public administration has opened the way to more transparent functioning of state institutions at all levels and has brought the model of state governance closer to the standards of the European Commission, for which the fight against abuse is a key priority.

The authors propose a much broader application of strategic management models and experiences from the real sector to public administration management, as such an approach would strengthen strategic management within public administration and bring it closer to the true owners of the capital - the citizens who fund the budget that is being spent within an excessively large public administration system at all levels: the state of Bosnia and Herzegovina, the entities, cities, and local communities.

Keywords: strategic management, real sector, public administration, entrepreneurship

Strategic management in public administration

Strategic management represents a managerial concept that refers to comprehensive planning, management, control, and adjustment of operations in accordance with an organization's goals, while continuously monitoring and adapting the strategy to a changing environment and internal circumstances (Medić, 2021, p.10). Strategic management, as a form of change management, was initially intended for the private sector; however, in modern times it has found wide application in the public sector of many countries around the world. Following the democratic changes that occurred in the states formed after the dissolution of the former Yugoslavia at the beginning of the 21st century, and with the start of the European integration process, as well as global development in terms of implementing new policies, standards, and technologies, and responding to new societal needs, the necessity of public sector reform began to be considered and increasingly accepted. Strategic planning, as an element of strategic management, has been implemented in public administration across all countries in the region - including the Republic of Srpska - in recent years,

as a way of modernizing state administration. Reform, or the modernization of public administration in transitional countries, emerged from the need for rapid adaptation to societal changes and efficient performance of duties, in order for public administration to approach the ideal of a high-quality and democratic administration that serves exclusively the interests of citizens. Inspiration for modernization and greater operational speed in state administration came from observing the organization and activities of private sector entities, along with the belief that the private sector could serve as an example of best practice in fast and efficient service delivery. The public administration reform known as "new public management" is an idea and implementation grounded in managerial principles. The reform itself requires considerable time and patience, as it involves fundamental changes in a sector traditionally perceived as rigid, closed, and resistant to change. The traditional model of public administration required minimal understanding of strategy and rarely involved detailed or serious planning, which was either not carried out or done very sparingly. Due to this structure, public administration employees often became mere task executors, without strategic

objectives and without an understanding of how to use resources efficiently to achieve goals, as it was simpler for them to follow the instructions of their superiors. Consequently, traditional public institutions frequently lacked long-term vision and often forgot about the citizens they were meant to serve, who financed their operations and elected them. The application of strategic management in public administration has many specific characteristics. The primary difference between public administration and a private enterprise lies in the type of users of their services. Since the state is oriented toward citizens (rather than a specific category of consumers as in private enterprises), it must also address questions of accountability to the public. Accordingly, citizens - as buyers of goods or consumers of services - have the right to request information from public administration regarding how budget funds are spent on actions undertaken in their name, or actions that were not taken but should have been. Strategic management represents a “continuous and dynamic process, just like the reality in which we live and work. A change in any variable in the environment can trigger a change in the entire strategy. When any variable or component changes, the entire management concept must be re-

examined or altered, because it must always correspond to the actual state of the environment. Therefore, strategic management implies a systemic approach.” Strategy is understood as a process of change because strategies develop as a result of changes in the business environment. It represents a type of “game plan” that enables the achievement of defined goals within a given time, space, and under internal and external influences. Strategy, as the backbone of strategic management, has no value if it is not implemented - that is, if it is not “brought to life” through programs, action plans, procedures, and rules. For this reason, strategic management planning is one of the primary tools that strategic leaders and sector managers must use to make high-quality and optimal decisions. It is a process that supports future activity planning, the determination of priorities, and the efficient allocation of resources - not only financial, but also human and all other resources available to an organization or institution. Monitoring progress in relation to defined strategic goals is a continuous process for public administration management. Therefore, strategic planning in public administration represents a disciplined effort aimed at making highly important decisions and determining the key activities

that shape the development strategy of the state and its institutions. Strategic management thus functions at both the macro level (state governance) and the micro level (corporate governance), coordinating processes in both directions: from the state toward enterprises and from enterprises back toward the state. Management is carried out by managers at all levels who, through others and together with them, achieve clearly defined strategic goals of public administration within a given environment and timeframe, including all the roles listed in Table 1.

(Holmberg, 2012, p. 18), as full legal regulation of administration exists only within a state governed by the rule of law. A state governed by the rule of law is typically understood as a state in which all governmental bodies, holders of political authority, and citizens are obliged to respect and apply laws and other regulations, meaning that both those who adopt such regulations and those to whom they apply are equally bound by them. This implies that laws and regulations have binding force for everyone. Since all societal actors - not only citizens but also political au-

Table 1. Roles in Which Managers May Find Themselves (Knežević, 2009, p. 63)

| No. | Interpersonal Roles / Other Roles | Description |
|----------------------------|-----------------------------------|--|
| Interpersonal Roles | | |
| 1. | Figurehead | Performs a certain number of routine duties |
| 2. | Leader | Motivates employees |
| 3. | Liaison | Maintains contacts with external organizations and individuals |
| Informational Roles | | |
| 4. | Monitor | Collects, receives, and stores external and internal information |
| 5. | Disseminator | Distributes information within the organization |
| 6. | Spokesperson | Provides information about the company to the external environment |
| Decisional Roles | | |
| 7. | Entrepreneur | Explores the environment, initiates changes, and takes risks |
| 8. | Disturbance Handler | Resolves problems in crisis and conflict situations |
| 9. | Resource Allocator | Allocates resources |
| 10. | Negotiator | Represents the company in important negotiations |

Public administration represents a complex social phenomenon and is the subject of study not only in legal sciences but also in various other academic disciplines. According to Holmberg and Rothstein, public administration reflects the institutional foundations of how a state is governed

authorities - are equally subject to legal norms, it can be said that the rule of law is achieved in such a state. The theoretical concept of public administration, from a functional perspective, is viewed by most authors in two dimensions: formal and material. When examining the external, formal cha-

racteristics of administration, the discussion refers to the functional concept of public administration in the formal sense. Conversely, when examining the internal, substantive characteristics of administration, the discussion pertains to the functional concept of public administration in the material sense. Determining the material and formal concepts of administration thus represents two aspects of the same phenomenon, encompassing both its internal content and its external form (Lilić, 2009, p. 45).

The term “public administration” is broader and includes a larger number of actors performing administrative activities, as well as a wider scope of such activities. This means that, in addition to traditional actors of administrative functions (state administrative bodies), it also includes other entities entrusted with public authority, such as non-state actors (companies and institutions delegated public powers), and administrative actors at the level of local self-government units (municipalities, cities, etc.). Therefore, public administration represents an extremely important area of contemporary political, legal, and economic thought. Strategic management in public administration is highly specific, and experiences from other sectors cannot be unconditionally transferred to this

area - particularly given that our state exists within an environment shaped by Europeanization and globalization of economic, political, legal, social, technological, and cultural contexts. On the other hand, the process of creating a modern public administration in the Republic of Srpska has been driven by the necessity of using new information and communication technologies (ICT). This modernization - from the entity administration to local government units - must constantly improve internal work processes by increasing effectiveness, efficiency, and economy, which consequently leads to more comfortable services for citizens and faster communication. According to Dimitrijević, only openness, absence of fear of change, and readiness to engage in modernization can lead to transformation and progress (Dimitrijević, 2005, p. 195). Frequently mentioned obstacles - inefficiency, multi-party decision-making structures, political legacy, enormous costs, insufficient expertise, and low technological development - clearly indicate that conditions have matured for changes in the strategic management of public administration. The quality of work in a public administration is generally assessed through the quality of public services delivered to citizens. Practice has shown that reforms implemented in European Union mem-

ber states over the past thirty years have somewhat improved cost efficiency and the functional performance of public administration. In general, public administrations have become more open and transparent, and access to public services and their quality have improved.

According to theory, modern public administration should perform the following activities:

- prepare laws and other regulations;
- adopt legal acts that may have individual or general character;
- provide public services related to the protection of state security, individuals, and property;
- provide social and cultural services;
- provide economic and financial services;
- support and prepare documents for the government, and perform administrative tasks for the parliament and courts (Kunić, 2009, p. 11).

Specificities of public administration in the republic of Srpska

The public administration of the Republic of Srpska includes ministries, administrative bodies, administrative

organizations, as well as all other entities entrusted with public authority. It is organized at the state level of Bosnia and Herzegovina - where the state is responsible for its functioning - but also at the entity and local levels, where responsibility lies with the entity authorities or local self-government units. Unlike state administration, which is characterized by a hierarchical structure, subordination of lower bodies to higher ones, and centralized functioning, the primary characteristics of local self-government are autonomy, independence, decentralization, and democratization. While the functioning of state administration is backed - at least potentially - by coercive authority, local self-government rests on voluntariness. The organizational structure of local self-government is created in the opposite direction - from the citizens themselves. Its bodies derive authority from citizens through direct elections, rather than from the state. Public administration bodies execute delegated powers in a binding manner, while local self-government relies primarily on voluntary organization and fulfilment of local needs and tasks of public importance. Even when local self-government bodies perform duties transferred to their competence - under authorization and supervision of state bodies - they still

act autonomously and may adjust the manner of exercising these powers to their concrete circumstances. Therefore, local self-government bodies should not be appointed by higher authorities; instead, they must be elected directly by the citizens of the respective entity or local government unit. Governance is exercised in municipalities and cities, and it is carried out by citizens and local self-government bodies, either directly or indirectly - through their elected representatives. Based on the criterion of citizen participation in local self-government, two forms may be distinguished: The environment in which these activities take place differs across countries; therefore, strategic management must take into account historical, traditional, and cultural elements, as well as the broader external environment in which the Republic of Srpska and Bosnia and Herzegovina operate. In addition to these factors, relevant elements include the transition process, the condition and level of development of the private sector, and the relationship between society and administration. Considering that the main characteristic of the transition process in Bosnia and Herzegovina is its slowness - not caused solely by the consequences of war or post-war institutional ambiguities, but also by the fact that it is a fourfold transition:

from war to peace, from a recipient of substantial international aid to sustainable development, from a socialist economy and political monopoly to a market economy, democracy, and civil society - it becomes clear that the condition of public administration reflects the condition of the state itself. The fourth transition process, which is only emerging in Bosnia and Herzegovina, has significant implications for public administration, reflected in the shift from the existing (traditional) model of public administration toward a new model of e-government. In the Republic of Srpska, it was necessary to implement a large number of reforms within a short period of time, some of which directly concern administration and the aspiration to professionalize it. The intention to establish a professional administration was approached empirically - through the adoption of appropriate regulations. There are certain disagreements regarding whether the defined goals are clear and transparent, which resources and means should be used to achieve them, and what personnel and efforts are required. Ultimately, it was concluded that adopting regulations should aim to achieve neutrality, stability, and efficiency within entity administration. However, everyday practice does not always align with the proclaimed spirit of such regula-

tions. European Union guidelines call for regulations to be continually updated and harmonized with those at the state level, which is particularly challenging in Bosnia and Herzegovina and the Republic of Srpska due to the complexity of the system in which public administration serves citizens. Bosnia and Herzegovina has 143 municipalities, 10 cantons, 2 entities, and the Brčko District (Ministry of Civil Affairs of BiH). (Before 1992, BiH had 109 municipalities.) The Federation of Bosnia and Herzegovina has 79 municipalities and 10 cantons, while the Republic of Srpska has 64 municipalities. Bosnia and Herzegovina is a state union composed of the Federation of Bosnia and Herzegovina, the Republic of Srpska, and the Brčko District. In the Republic of Srpska, there are two levels of governance (municipality/city and entity level), while in the Federation of BiH there are three levels, as shown in the Picture 1.

What is particularly alarming, based on the World Development Indicators research (April 2003), is that Bosnia and Herzegovina ranked last among 60 observed countries in terms of the quality of administrative regulations, and this situation has not significantly changed to this day. One of the limiting factors is the structural complexity of the state established by the Dayton Agreement, as each entity and each canton has its own ministries, resulting in Bosnia and Herzegovina - with a population of 3-4 million - having 176 ministries, with the same number of ministers. The extent of how large and dysfunctional this administrative apparatus is becomes evident when compared to certain European countries, particularly those with a similar number of inhabitants, that is, a similar number of taxpayers who finance and sustain their state administration.

Picture1: Levels of Government in the Republic of Srpska and Bosnia and Herzegovina

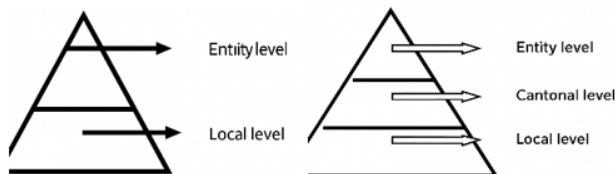


Table 2. Number of Ministries and Population in Selected European Countries

| Country | Population (millions) | Ministries |
|----------|-----------------------|------------|
| Croatia | 4.2 | 19 |
| Bulgaria | 7.2 | 18 |
| Denmark | 5.6 | 17 |
| Ireland | 4.6 | 16 |
| Romania | 19.8 | 16 |
| Malta | 0.4 | 15 |
| Estonia | 1.3 | 14 |
| Latvia | 3.0 | 14 |
| Germany | 81.0 | 14 |
| Slovakia | 5.4 | 14 |
| Slovenia | 2.0 | 14 |

Source: Data collected by the authors

How do public administration institutions in the Republic of Srpska, as well as in Bosnia and Herzegovina, function? As follows:

- Public bodies (services and organizations) operate separately, with weak network connections, and without a steady flow of information, data, and feedback, which results in multiple repetition of the same data;
- They do not have unified databases or registers of anything: the number of citizens and taxpayers, the number and types of unresolved issues, nor the ways in which these issues are resolved;
- Existing applications are unintegrated and often more harmful than useful, as they do not provide quality information on the basis of which opportunities could be identified and solutions found;
- There are no clear objectives for the development of the information system, nor clear general development goals;
- The treatment of automated data processing is inadequate - it serves itself more than citizens, even though public administration is supposed to serve citizens;
- There is no unified development strategy across levels: the state of BiH, entities, and local governments, nor is one considered necessary, since no one is actually obligated to implement any stra-

tegy, nor does anyone bear responsibility for inaction, obstruction of assembly work, absence from meetings, corruption, crime, and similar issues;

- The work of institutions at all levels often resembles a “reality show” of multi-party systems, where regular assemblies sometimes cannot be held even a few times a year, and budgets are adopted at the end of the year for the current year - retroactively - so everyone spends according to their own (party or political) conscience, which is not perceived as a problem, because there are no sanctions or accountability to anyone, least of all to the citizens who fund and elect them.

Citizens endure, remain silent, work, and vote for the same people again, most often explaining it by saying “we have no better option.”

How to improve strategic management of public administration in the Republic of Srpska

The identified problems may be grouped as follows:

1. **General problems**, which are addressed through overall public policy and whose resolution cannot be directly supported solely by the

development of the information system, but instead requires a systemic approach at all levels of public administration;

2. **Insufficiently developed, undefined, and non-standardized business procedures and related documentation**, which must be addressed through the development of individual subsystems, and whose development must be preceded by appropriate formalization of procedures and standardization of documents - from the local to the highest levels of authority;
3. **The public administration of the Republic of Srpska**, as a service to citizens, does not meet the basic preconditions arising from the common legal heritage of EU member states, that is, from the European principle of good governance, which is one of the key requirements for states in the process of EU accession. Therefore, the apparatus must be restructured;
4. In practice, when it comes to imposing rules, regulations, obligations, and recommendations by the EU and its various representatives, Bosnia and Herzegovina has no difficulty formally adopting them; however, when it comes to implementation, no one

can truly commit to enforcement, precisely because of the already mentioned oversized and complex administrative structure.

There is a so-called SIGMA programme, which has developed the Principles of Public Administration that today form the basis of good governance and, consequently, represent requirements that candidate countries must meet in the process of EU accession. The Principles of Public Administration are based on EU legislation, such as the Charter of Fundamental Rights, as well as on good practice standards of OECD member states. These Principles represent benchmarks in various aspects of public administration management and can now be considered part of the Union's informal acquis. However, they are not applied in Bosnia and Herzegovina, because there is no consensus among the political actors in power. The three constituent peoples are organized along national lines, and every significant decision is evaluated from the perspective of "protection of vital national interests," and it is very easy to link almost any decision to a potential threat to such interests.

In Bosnia and Herzegovina, as well as in the Republic of Srpska, the situation is such that the private sector strives to operate according to

new, market-oriented rules, while at the same time state bodies, institutions, and public administration continue to function as if the environment has not changed. Aside from "cosmetic" changes in the names of bodies or individual job positions, everything has largely remained as it was in the previous century. Old systemic layers and methods of operation have proven very resilient and resistant to change, causing serious problems precisely for those they are supposed to serve - enterprises, entrepreneurs, other administrative bodies, and citizens.

One of the many reasons for such a situation is that every bureaucracy tends to preserve the status quo at the expense of change and improvement. Public administration will, if allowed, continue maintaining a traditional system of work and operations in its institutions, regardless of new and better methods. A more detailed analysis shows that, in certain segments, the state apparatus still functions according to an authoritarian work system typical of the 19th century, even though its "users" have embraced new and more efficient business practices. Entrepreneurs struggle with this system, which significantly undermines entrepreneurship and the entire entrepreneurial economy; it neither de-

velops nor supports the entrepreneurial spirit, either in society at large or within the education system, which is a major obstacle to economic development - especially given that over 80% of the economy in BiH and RS is entrepreneurial (Kojić et al., 2011).

Politics at all levels is responsible for such a business environment and for an education system that does not foster entrepreneurial spirit, thereby acting as a brake on positive change. Political winners generally do not accept the programmes of those who lost elections, even when those programmes are good. With each change of government, the manner of functioning of public administration also typically changes, which means that everything often starts again from scratch, as if previous efforts had never existed. Instead of ensuring continuity of well-chosen and well-implemented solutions, new ones are constantly devised. Under such conditions, where every few years everything starts over, there can be no real progress. Today, the opposite extreme is also present - any attempt to improve the poor performance of public administration is paralysed by a false notion of "continuity," preserving a fictitious political "peace" and status (Vukša, et al., 2024; Pušonja, et al. 2025).

In transitional countries, there is an additional, very serious problem. The administration is large, slow, expensive, poorly organized, and significantly corrupt. The fight against corruption in Bosnia and Herzegovina has begun, particularly in the legislative sense, but without a change in the structure and functioning of public administration, it cannot and will not be effective. There is pronounced rivalry between ministries at all levels, which significantly undermines the process of making sound decisions - both political and technical. Any public administration reform that aims to better define roles within the ruling structure will inevitably face this harsh reality. Resistance from powerful bureaucratic structures that have survived political changes is typical of reform processes. Bureaucracy usually opposes initiatives aimed at promoting accountability and openness in governance. From the described state of reality, the authors pose the key question:

*What next? What should be done?
What and how should be changed?*

Quality, of course, is not an absolute reference point for all management problems, but international experience shows that the introduction and application of key quality principles is a very effective instrument

for increasing the efficiency of public administration and reducing bribery at all levels. However, two preconditions are necessary for the successful application of quality principles:

- determination of the leadership - namely, the government, line ministers, and municipal leadership;
- problem mapping and an appropriately chosen method for solving those problems.

Here is an example from business digitalization, which generates the greatest dissatisfaction among citizens regarding public administration performance. Citizens mainly complain about: complex procedures, bureaucracy, crowds, waiting in lines, the behaviour of clerks, unfriendliness, poor organization, outdated technology, the absence of written instructions and maps, complicated forms, and high fees. Employees in public administration, on the other hand, are dissatisfied with: working conditions, the information system, their financial situation, the perception that they “work too much,” incompetent leadership, aggressive clients, and poor or inappropriate regulations.

Public administration in Bosnia and Herzegovina is additionally subjected to constant pressure to deliver

more with fewer resources. Further digitalization and continuous informatization should, primarily through web portals, bring administration closer to citizens, since this is a strategic commitment of every administration, aimed at increasing and gaining user trust. In that way, public administration fulfils its fundamental purpose - citizen satisfaction with public services. However, in this area, numerous obstacles arise from political parties and managers who wish to maintain the status quo, whether due to distrust in technological advancements or due to ignorance of the advantages offered by e-government and modern information and communication technologies. Sometimes they simply do not want to learn or adapt. These are obstacles of a subjective nature. The second, somewhat less frequent group consists of objective obstacles, which include lack of financial resources and personnel, social pressures, and so forth. When it comes to e-government, the situation in the Republic of Srpska is such that it is still in its initial, although in the largest local communities already in a developmental, phase. A considerable amount has been done at the state level (CIPS, information systems of the state border service, police reporting systems, tax systems, etc.), and the websites of the Republic of Srpska,

entities, and municipalities are functioning. Citizens mostly complain about poor maintenance, frequent system crashes or shutdowns, power outages, and the like, while there is no real alternative. Our research has shown that, particularly in business circles, there are concerns that e-government will require additional financial resources, especially in the area of raising user awareness regarding computer use, given the low level of IT, financial, and general literacy among citizens. Future designers of public administration management processes must take such objections into account, because the modernization and improvement of public administration require the alignment of administrative processes with end users - that is, with citizens, whether they are business entities or individuals. On the other hand, service users must be encouraged to use electronic online services, which can attract them only if they provide high quality - meaning fast service delivery, ease of use, and availability through many channels: personal computers, mobile phones, digital television, etc. - and, very importantly for citizens, they must convey reliability and security.

In the literature, this is referred to as "New Public Management", which

has been used in developed countries since the crisis of the public sector in the 1980s. It encompasses various types of public sector reforms across developed countries, which should be studied and comparatively analysed in relation to the situation and level of development in our country and its surroundings. These countries differ significantly from one another when their economic, socio-political, cultural, constitutional, and institutional characteristics are taken into account, and therefore also in how their public administrations function. These differences are not unique to comparisons between developed and transitional countries; even among developed Western states, there are very significant administrative differences. Public administration reform in transitional countries aspiring to EU membership - such as Bosnia and Herzegovina and the Republic of Srpska - is usually one of the first reform requirements and measures undertaken immediately after the introduction of party pluralism and the holding of democratic elections. Although it does not constitute a separate chapter in the EU accession negotiation process, public administration reform in most candidate countries is implemented according to the recommendations of the European Commission and

typically intensifies immediately before or during the accession negotiations (Kavran, Vukašinović, 2004, pp. 9–34). According to the European Commission's recommendations for BiH, "public administration reform should lead to increased transparency, accountability, and functionality, and ensure a stronger focus on the needs of citizens and economic actors (Vučić, 2022; Stanković, et al. 2023).

Conclusion

In line with the recommendations of the European Union, the IMF, and the World Bank, over the last three decades many transitional countries - including the Republic of Srpska and Bosnia and Herzegovina - have carried out, or are still carrying out, public administration reforms aimed at its professionalization as one of the key principles of New Public Management. In transforming public administrations in transitional states, the SIGMA initiative (Support for Improvement in Governance and Management) has made a significant contribution as a support mechanism for improving public governance and management in Central and Eastern European countries. This is a joint initiative of the OECD and the European Union that supports public administration re-

form in 13 Central and Eastern European countries, including Bosnia and Herzegovina. The initiative represents a combination of traditional and managerial principles in public administration, such as: the rule of law, openness and transparency, accountability of administration to citizens, and efficiency and effectiveness in the use of public funds and in achieving the objectives of sectoral public policies (Koprić, Marčetić, 2005, p. 37). Further reform of public administration in the Republic of Srpska, consistent with New Public Management, should strengthen and accelerate the application of new technologies in public administration, as well as the implementation of quality management systems and business intelligence. This will lead to higher-quality execution of delegated tasks and more efficient use of control mechanisms within public administration. It will also strengthen the transfer of certain competences to lower administrative levels, services, and units that serve end-users (citizens and businesses), and increase the quality of legal regulation and more efficient use of employee capacities, among other benefits. Greater use of artificial intelligence in the collection and real-time processing of data and information will further accelerate these processes, especially in those

segments where our public administration lags the most, according to the latest EU reports: the education of human resources in public administration, strengthening reliability, predictability, accountability, and transparency, financial sustainability, and citizen participation in the adoption and implementation of policies and regulations. Leveraging the experience of the private sector and its strategic management can be extremely beneficial, as entrepreneurial management in the Republic of Srpska is still the closest to the entrepreneurial management model in EU countries (Kojić et al., 2016).

When it comes to human resources, public administration in the Republic of Srpska is specific in that the work of civil servants is regarded as a duty, rather than a job, as is typically the case in the private sector. The specific rights and obligations of civil servants do not stem only from labour law but also from the Law on Civil Servants. Another particularity of human resource management relates to the specific nature of public administration activities. While in the private sector the main imperatives are cost-effectiveness, capital creation, and strengthening competitiveness in the labour and capital markets (which is entirely normal), in the public administration of the

Republic of Srpska the prevailing priorities are the general interests of ruling structures and governing political parties (which is contrary to the practice in EU countries). Modern management functions, one of the most important of which is knowledge management, in line with New Public Management, are reflected in a shift toward increasing participation of creative and innovative activities, as opposed to purely operational and repetitive tasks. In this respect, there is a visible shift of emphasis toward creativity and innovation. Such an approach requires an ever-expanding knowledge base necessary for the successful performance of public administration management activities. Knowledge management has recently been regarded as a new direction in management and represents a collective term for a group of processes and practices that institutions use to increase their value by improving the effectiveness of creating and applying regulations required by the EU, with the goal of harmonizing public administration functioning and moving closer to EU integration.

A well-run and professional civil service, better policy planning and coordination, reliable administrative procedures, and improved financial management in the public sector are

crucial for the functioning of any state, as well as for its rapprochement with Europe. In line with these recommendations, Bosnia and Herzegovina should place greater emphasis on enhancing public administrations at all levels, based on national strategies, which requires a strong political commitment to coordinate and guide reform processes. The fundamental model, tool, or mechanism is negotiation, which represents one of the key business skills, rooted in an intangible resource - the abilities and skills of human capital - ultimately materialized in overall business success (Medić, 2021, p. 75). For this reason, negotiation as a specific skill can no longer be left or delegated solely to a small group of capable and experienced professionals, as was often the case until recently. Instead, it is increasingly necessary to rely on acquisitions and strategic alliances in order to achieve faster and higher-quality negotiation outcomes within the complex governance structures of the state or entity. This is achieved through a systemic approach to negotiation processes, where more time is devoted to preparing negotiation processes, lobbying and informing participants, and conducting reviews, and less to actual time spent at the negotiating table. Such an approach focuses not only on the time spent

at the negotiation table, but even more on the preparation phase and the review phase of negotiations.

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SPECIFIČNOSTI STRATEŠKOG MENADŽMENTA U JAVNOJ UPRAVI REPUBLIKE SRPSKE

Sažetak: U javnoj upravi, bilo na državnom nivou ili u okviru bilo koje jedinice lokalne samouprave, funkcije pretežno zauzimaju politički izabrani pojedinci čiji su profesionalni i iskustveni temelji za takav odgovoran rad često upitni. Biti načelnik opštine ili načelnik u jednoj od 64 jedinice lokalne samouprave, ili biti ministar u Vladi Republike Srpske, ili odgovorno lice u državnoj agenciji, direkciji ili javnom preduzeću, znači biti odgovoran "vlasniku kapitala", odnosno vlasniku budžetskih sredstava građanima. Građani su, kroz plaćanje poreza, dažbina i doprinosa, ti koji popunjavaju budžet i kojima se moraju prijaviti rezultati.

Građani imaju pravo da dobiju sve bolje usluge za svoj novac i da znaju da li su definisani mehanizmi za sankcionisanje i nagrađivanje menadžera, kao što je slučaj u privatnom sektoru. Oni pažljivo prate pokazatelje zloupotrebe, političke manipulacije, korupcije i svih drugih mogućih nepravilnosti u budžetu, koji finansiraju prvenstveno radom u realnom sektoru.

Koncept "moderne javne uprave" je projekat koji ima značajno obećanje u smislu depolitizacije, borbe protiv korupcije, sprečavanja zloupotrebe i odgovornijeg trošenja javnih sredstava. Uvođenjem elektronske javne komunikacije otvoren je put transparentnijem funkcionisanju državnih institucija na svim nivoima i model državnog upravljanja približen standardima Evropske komisije, za koju je borba protiv zloupotrebe ključni prioritet.

Autori predlažu mnogo širu primenu modela strateškog upravljanja i iskustava iz realnog sektora na upravljanje javnom upravom, jer bi takav pristup ojačao strateški menadžment u okviru javne uprave i približio ga stvarnim vlasnicima kapitala građanima koji finansiraju budžet koji se troši u okviru prevelikog sistema javne uprave na svim nivoima: država Bosna i Hercegovina, entiteti, gradovi i lokalne zajednice.

Ključne reči: strateški menadžment, realni sektor, javna uprava, preduzetništvo

Kojić, V., Spasojević, B., Medić, J. Specificities of strategic management in the republic administration of the Republic of Srpska

PAYMENT DIGITALIZATION IN RESPONSE TO THE CHALLENGES OF A CASHLESS SOCIETY

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Abstracts: Payment digitalization, as reflected in the topic of this paper, represents one of the key transformations with significant implications for improving the financial system and fostering economic growth, while responding to contemporary trends. The paper focuses on the process of payment digitalization through three sections, which directly affect complementarity and practical developments in the economies of Serbia and the Western Balkans. The findings indicate that Serbia and the Western Balkans lag behind developed European economies, and that cash still dominates as a method of payment in our region. This is corroborated by our field surveys conducted in Serbia and Montenegro (Kraljevo, Plav and Rožaje). These results are further complemented by a comparison with the prevalence of digital payments globally and within the EU. The study suggests that, without coordinated actions at all levels - from financial institutions to citizen education - the transition toward a cashless society will remain constrained, despite its potential to deliver innovations in security, privacy and inclusiveness.

Keywords: payment digitalization, contemporary trends, EU, Serbia, security, inclusiveness

Introduction

Cashless services point toward a future in which contactless payments will become the dominant form of monetary transactions. Our research focuses on the extent to which banks and card-based payments are becoming predominant. It is increasingly likely that cash will soon become a relic of the past, fundamentally changing the way people use money in everyday life. During 2025, based on available research, more than two thirds of Serbia's population used some form of digital payment. This provides a clear starting point for our analysis: such developments generate benefits not only for consumers - primarily through faster transactions and time savings - but also for businesses and the state, which have direct incentives to support them. In particular, the use of digital payments can reduce tax evasion (avoidance) and directly stimulate economic growth.

The next stage of our research examines the scope and frequency of using banking applications on mobile phones and smartwatches. This technological infrastructure forms the basis for implementing modern payment solutions, including Click to Pay, Google Pay and other online payment systems integrated within digital wallets.

Instant payments are increasingly used in online transactions and represent an additional payment channel that is expected to grow further in Serbia. This is a concrete contribution of the present paper. One key advantage is the use of Google Pay and Apple Pay, which facilitates simple and convenient payments and supports payment digitalization without the need to use a physical payment card. Traditional purchasing models are inevitably being disrupted by new technologies - an evolution we support with our own survey-based research conducted in Krajevo, Zubin Potok and Leposavić. The results indicate that payment digitalization is creating a new reality in which speed, convenience and interactivity play a central role, particularly through contactless payments that are still in an early stage of adoption in these locations. We recommend that app-based payments should become a dominant category, with the primary benefits being time savings and increased efficiency for firms through faster revenue generation. In our view, this also contributes to higher tax revenues through improved transaction recording, which represents a direct contribution of this research.

Payment Digitalization and Practical Trends in the Economies of the Region and Serbia

The introductory segment of this section addresses the growing shift away from cash and the development of various models of digital payments. The role of the internet in the development of electronic business is dominant, as e-commerce entails conducting business transactions online. Electronic payment systems facilitate the completion of purchases once consumers decide to buy a product or service, enabling payments between buyers and sellers in the most efficient, fastest and safest way (Savić et al., 2024). The evolution of money management - from mobile banking to new online platforms - means that contemporary payment trends shape daily life for both businesses and citizens, thereby fostering more efficient operations. QR codes, mobile applications and e-wallets are becoming ubiquitous in everyday transactions between individuals and companies. The overall result is lower costs, reduced risk of errors and a tangible contribution to curbing the shadow economy, which in turn supports economic growth and the advancement of the green economy. In this way, payment digitalization opens access to new regi-

onal markets, allowing Serbian firms to place products and services more easily, while offering consumers a wider choice and simpler shopping across the Western Balkans.

As a concrete contribution, we present evidence that clearly demonstrates the rapid expansion of mobile banking and the number of registered users of digital services in Serbia, based on the latest data from the National Bank of Serbia.

Table 1. Number of mobile and electronic banking users and volume of payment transactions in Serbia (2023 and 2024).

| | | |
|--|---------------|---------------|
| Number of mobile banking users | 2023 | 2024 |
| | 4 million | 4.6 million |
| Number of registered users of electronic banking | 2023 | 2024 |
| | 4.1 million | 4.4 million |
| Volume of payment transactions | 2023. Year | 2024. Year |
| | 109.3 million | 251.9 million |

Source: "Mobile and electronic banking usage in Serbia continues to grow, reaching record numbers in 2024", Serbia Business, 07.03.2025. Accessed 06.12.2025. <https://serbia-business.eu/mobile-and-electronic-banking-usage-in-serbia-continues-to-grow-reaching-record-numbers-in-2024/>.

If we compare trends in the region more directly, recent analyses by the World Bank/International Bank for Reconstruction and Development show that the region is experiencing expansive infrastructure development, which contributes to faster and cheaper transactions. Looking back, in the period from 2017 to 2021, account ownership increased from 7.6 million adults to 9.3 million. Cashless transactions per capita in the participating program economies also experienced a sharp rise, with growth rates between 80% and 150%.

To further substantiate the topic, we conducted a dedicated survey in Montenegro (the municipality of Plav). Using a questionnaire on a sample of 25 respondents, we aimed to gain insight into citizens' habits in adopting contemporary digital financial tools. Respondents answered a set of questions covering the use of cash, payment cards, mobile payments, and the banks they use, with the goal of understanding the use of different payment methods (Kostadinović, 2024; Trklja, et al.2024).

Table 2. Results of the survey on the use of cashless payments in Plav.

| Question | Answer | Number of respondents | Percentage (%) |
|---|------------------------|-----------------------|----------------|
| Payment method | Cash | 25 | 100% |
| | Payment card | 21 | 84% |
| | Mobile payment | 14 | 56% |
| Types of payment cards | Debit | 12 | 48% |
| | Credit | 9 | 36% |
| | Prepaid | 4 | 16% |
| Frequency of card use | Often | 14 | 56% |
| | Occasionally | 7 | 28% |
| | Rarely | 2 | 8% |
| | Does not use | 2 | 8% |
| Places where payments are made | Shops | 25 | 100% |
| | Restaurants | 12 | 48% |
| | Gas stations | 1 | 4% |
| | Shops | 0 | 100% |
| Banks respondents use for ATMs | CKB | 12 | 48% |
| | Hipotekarna banka | 7 | 28% |
| | NLB | 6 | 24% |
| Use of contactless payments | Yes | 21 | 84% |
| | No | 4 | 16% |
| Do respondents use cryptocurrency or cheques? | Cryptocurrency account | 0 | 0% |
| | Cheques | 0 | 0% |

Source: Authors' survey, 2025.

The results show that all respondents continue to use cash when making purchases, indicating the persistence of traditional payment practices in smaller communities. However, a majority of respondents (21 out of 25) also use payment cards, with debit cards predominating (12 respondents), followed by credit cards (9) and prepaid cards (4). Mobile payments are used by 14 respondents, demonstrating a gradual acceptance of digital methods in everyday life. Most respondents have used contactless payments at least once, which indicates contemporary tendencies in citizens' financial behavior. Respondents use payment cards for different purposes - most commonly in shops, for paying bills, in restaurants, and at gas stations. The banks whose ATMs respondents most often use to withdraw cash are Crnogorska komercijalna banka (CKB), Hipotekarna banka and NLB, reflecting the infrastructure and availability of financial services in Plav.

To strengthen the originality of our research contribution, we also conducted a survey in the municipality of Rožaje. The findings indicate that cards are most frequently used in restaurants and at fuel stations. By contrast, women most often use cards at kiosks, pharmacies and

cosmetics stores. The most commonly used cards are issued by Lovćen Banka. Trends observed in this municipality suggest that people aged 35–54 often have cards because of loans and installment-based payments (e.g., furniture purchases) due to scheduled electronic deductions. To better understand the local context, we noted that larger retail chains such as Voli, Elkos Group (ETC) and Idea have card terminals, while many local shops do not. It is also noticeable that some cafés in the city center do not accept card payments; butcher shops and open markets generally do not either, which is also the case in some other towns in Montenegro. Our fieldwork further shows that furniture salons in Rožaje often do not offer card payments, whereas fuel sellers do have terminals (Eko pumpa and M-Petrol). Overall, the survey results suggest that the traditional cash-based payment method remains dominant, alongside a strong expansion of card-based digital payments, while payments via mobile applications still lag and cheque payments are disappearing as an instrument of cashless payments.

To further support our research objective, we compared these findings with survey-based analysis from Krajevo. In that municipality, bank cards are mostly used at gas stations

and cafés, while cash is still most commonly used in shops and restaurants. The use of cheques as a means of payment is very limited. Overall, a pronounced tendency can be observed toward a shift from cash to contemporary digital payment methods, alongside the general observation that cash remains in active use.

Table 3. Results of the survey on the use of contactless payments.

| Respondents' age groups (n=10) | |
|---------------------------------------|-----------------|
| Age group | Number of users |
| Under 18 | 0 |
| 18–40 | 4 |
| 40–50 | 3 |
| 50+ | 3 |
| Type of cards used | |
| Card type | Number of users |
| Visa | 5 |
| MasterCard | 4 |
| Dina | 1 |
| American Express | 0 |
| Payment method in shops | |
| Method | Number of users |
| Card | 4 |
| Cash | 6 |
| Cheque | 0 |
| Payments in restaurants | |
| Method | Number of users |
| Payment cards | 5 |
| Cash | 5 |
| Cheque | 0 |

| Payments at gas stations | |
|-------------------------------------|-----------------|
| Method | Number of users |
| Cash | 3 |
| Payment card | 7 |
| Cheque | 0 |
| Mobile m-banking application | |
| Answer | Number |
| Da | 3 |
| Ne | 7 |
| Use of cheques | |
| Answer | Number |
| Da | 1 |
| Ne | 9 |

Source: Authors' compilation, 2025.

When viewed numerically, cash remains the dominant category among 56% of respondents. Cash payments dominate in shops (60%) and restaurants (50%), and are least used at gas stations. Across these analyzed categories, the average frequency of cash usage amounts to 56%.

As a final reflection on our field research, we draw on the analytical segment of another study and reiterate the view that, given that card, phone, and even smartwatch payments have been available domestically for some time, it is timely to recognize that Serbia is likely to become part of a modern global society in which cashless payments are predominant (Siljković et al., 2025).

Overview of Cashless Payments Worldwide

The main trends in payment digitalization in 2025 include real-time payments and the widespread use of mobile wallets, where security - and the capability to implement it effectively - plays an important role in supporting global economic growth. Another development is the gradual penetration of crypto-assets into cashless payment models; based on our practical experience, we recommend continued caution, as this trend depends to a large extent on the political and economic momentum of the world's largest economy, the United States. A 2025 report on e-commerce trends indicates persistent digitalization and a consumer society accompanied by impressive technological progress. The report we consulted focuses on the complexity and opportunities defining global e-commerce in 2025. The global market trajectory is clear and rapid: economic growth is accompanied by an increasing number of internet users, expected to reach 3.6 billion by 2029, according to Statista.

The strength of the global economy is also reflected in the fact that worldwide e-commerce exceeds USD 6.86 trillion in 2025. A stable upward trend is expected to push the market to almost USD 8 trillion by 2027. Inflation in 2022 and 2023 eroded a large

share of real gains in the market. In 2025, 21% of all retail purchases globally are made online; by 2027 this share is expected to reach 22.6%. This change is not only about total consumption, but also about frequency, access, and the normalization of digital behavior. An indicator of this shift is the 2.77 billion online buyers worldwide - about 33% of the global population - and forecasts suggest that this number will continue to grow. Among the leading economies, China ranks first with 904.6 million buyers, followed by the United States with 288 million (Edwards, 2025). In our view, new markets and emerging economies will increasingly find their place and share, driven by mobile access, social commerce and fast international delivery. From this perspective, a natural direction for future research would be to examine what these developments mean for businesses in Serbia.

Research on global payment trends - particularly those of the European Union, which is geographically closest to us - shows that the share of cash has declined significantly from 68% in 2019 to only 40% in 2024. This indicates a dramatic shift in consumer payment behavior. In value terms, cash accounts for only 24%, suggesting that electronic payments are increasingly used for higher-value transactions (web source).

Figure 1: Retail e-commerce sales worldwide, 2021–2027



Source: Edwards, K. (2025). Global e-commerce overview: 2025 Insights, 16.07.2025, E-commerce Germany News, Available 07.12.2025, <https://ecommercegermany.com/blog/global-e-commerce/>

Cashless Payments in Serbia and the Western Balkans

Across all forms of cashless payments, Serbia holds a leading position in the Balkans. According to a 2024 analysis, the region's e-market (e-commerce) is expected to reach EUR 2.6 billion, with projections to grow to EUR 3.98 billion by 2029. The region faces specific challenges that constrain faster development of cashless payments - such as cash on delivery - which is also confirmed by our personal experience: during grocery delivery in the Voždovac municipality of Belgrade, the Glovo courier did not

have a POS terminal and requested cash payment. This experience is directly at odds with developed European markets, where digital payments are the behavioral norm for customers (Angelovska Stankov, 2024). A noticeable trend in our research is that users adopt mobile payment systems faster than computer-based electronic payment systems. ICT literacy among younger populations - and older populations who are learning and following contemporary digital trends - contributes to the growing number of users of mobile payment systems.

The future of payments also includes the emergence of the so-called digital euro, a digital form of the European currency. Currently, at the end of 2025, the digital euro is still in the development phase. In the near term, banks are expected to offer the digital euro through digital wallets, while public institutions will enable payments that are free of charge and available both online and offline (Elliott et al., 2025).

One increasingly common solution at all levels is the application of sophisticated software solutions aimed at improving business operations, particularly decision-making processes (Mehmedi et al., 2022). In this direction, our further research would support the view that implementing new software solutions is among the key factors for increasing profitability, competitiveness and long-term economic growth of companies in Serbia and the Western Balkan countries. Information technologies and the globalization of markets - phenomena we witness today - change consumer behavior and, in turn, push companies to create new value and improve their performance in reaching potential customers (Bakator et al., 2024).

Table 4. Business digitalization (software solutions) in Bosnia and Herzegovina.

| Reduction in operating costs | Effect on employment (increase) | Increase in turnover after implementing digital technologies |
|-------------------------------------|--|---|
| 19.4% of companies | 89.1% of companies | 46.5% of companies |

Source: (Turulja et al., 2021.)

Conclusion

The general conclusion from the preceding analysis is that the Western Balkans and Serbia lag behind developed markets; nevertheless, the potential for growth is substantial. The key to success lies in achieving the standards of digital-wallet models applied in advanced economies – models that can be followed or, where appropriate, adopted from best practice. Our position is that investment in digitalization is warranted despite the costs, because it increases profitability and revenues both at the individual and company levels. A deeper interpretation shows that the Western Balkans' lag in payment digitalization is evident, with cash still dominant. Mobile wallets, cash-less payments and instant systems are increasingly a behavioral standard that produces positive economic effects, improves tax collection and contributes to suppressing the shadow economy. Ultimately,

payment digitalization can deliver innovations in digital techniques, security, privacy and financial inclusion, ensuring that all segments of society can participate equally in the benefits of digitalization. The presented results therefore also leave room for further research.

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DIGITALIZACIJA PLAĆANJA U SUSRET IZAZOVIMA DRUŠTVA BEZGOTOVINE

Sažetak: Digitalizacija plaćanja kroz održaj na naslov teme predstavlja jednu od ključnih transformacija koja proizvodi značajne implikacije na poboljšanje finansijskog sistema, rasta ekonomije i ide u susret savremenih trendova. Ovaj rad je koncentrisan na proces digitalizacije plaćanja kroz tri dela što ima direktan uticaj na komplementarnost, praktične trendove ekonomija Srbije i Zapadnog Balkana. Istraživanje je pokazalo da Srbija i Zapadni Balkan zaostaju za razvijenim evropskim ekonomijama, sa konstatacijom da u našem regionu gotovina i dalje dominira kao metoda plaćanja. Ovo su pokazala i naša lična istraživanja u gradovima u Srbiji i Crnoj Gori, Kraljevu, Plavu i Rožaju. Sve ovo upotpunili smo i uporedili sa prisustvom digitalnih plaćanja u svetu i EU. Rad kroz istraživanje je imao za cilj da bez akcija koje bi se sprovele na svim nivoima na relaciji od finansijskih institucija do edukacije građana bezgotovinskog društvo koje bi za rezultat imalo inovacije, kao što su bezbednost, privatnost i inkluzivnost sve u susret izazovima društva bezgotovine.

Ključne reči: digitalizacija plaćanja, savremeni trendovi, EU, Srbija, bezbednost, inkluzivnost

BUSINESS INTELLIGENCE IN THE FUNCTION OF BUSINESS IMPROVEMENT

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Abstracts: The purpose of this paper is also to present a general theoretical overview of knowledge, technologies and tools in the field of business intelligence, based on the evolution of relevant literature, with the aim of systematically describing each of the technologies with the possibilities of application in companies in Serbia. In this context, the introductory part of the research explains the concepts, terms, functions and methods of business intelligence and business intelligence systems. The orientation of the research is towards technology and sophisticated business intelligence tools, and research into which key factors and elements are important for the successful implementation of business intelligence tools, methods and techniques in organizations in Serbia, as well as the related examination of the current state of the tools market in the world and Serbia. Research indicates that if there is one key to the survival of business systems and companies in an increasingly competitive world, it is the ability to respond quickly to changing business conditions, which require lightning-fast detection, analysis and reaction. In this sense, the above-mentioned needs require: comprehensive, accurate, and timely information. For the aforementioned reasons, business intelligence in the world, including in our environment, is developing more and more rapidly every day. Based on the latest research in the world and references from the most competent authors in the field of business intelligence, the theoretical foundations of the business intelligence process and intelligent decision-support systems have been defined, through a systematic analysis of business improvement. Research indicates that the best business intelligence model in times of economic crisis and recession is one that will help organizations achieve a competitive advantage, while being inexpensive. For this purpose, there has been increasing talk recently about OSBI (Open Source Business Intelligence).

Keywords: Business intelligence, business, information systems

Introduction

When we talk about business intelligence, we mainly mean: knowledge, techniques, programs, and established processes that help to gain an easier understanding of a company's operations. From the aspect of business decision-making, business intelligence is the process of collecting significant internal and external data and transforming it into information and useful new knowledge needed by organizations when making business decisions. However, despite the above advantages, according to research, methods, techniques, and tools of intelligence are used in only 48% of companies in Serbia, while most companies have not yet integrated this technology into business processes. The concept of business intelligence implies the creation of higher-quality information, the ability to access only certain, necessary information [Denić et al. 2023]. This is followed by the opinion that with business intelligence, companies or organizations can collect, analyze and display large amounts of data in a transparent manner, enabling faster and more informed decision-making (Chaudhuri et al., 2011). Based on research in practice from the aspect of business excellence (McGonagle & Vella, 2002; Liautaud & Hammond, 2006) indi-

cate that a typical company possesses 90% of the necessary data and information, necessary for efficient business operations, but effectively uses only 10% of the available data and information. Business information can be used in various ways, for example, to create a strategy for marketing its brand based on customer purchasing habits, the latest market trends, etc. (Suhendra et al., 2020). In this context, the literature states that source systems, or internal sources of business data that collect and store transactional and operational data crucial for BI solutions in a company or organization, include ERP, CRM, SCM, files, and financial and production systems.

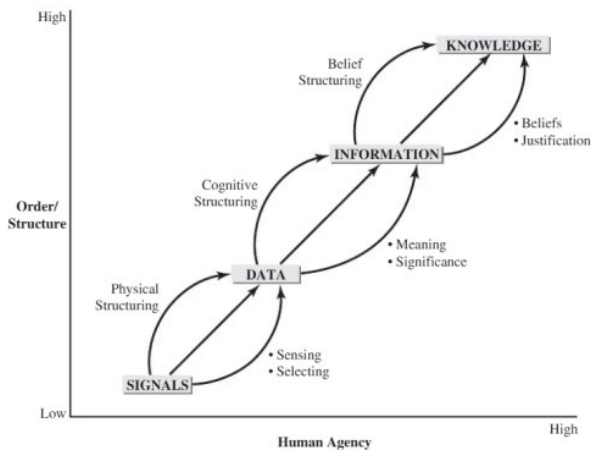
Tools, methods and techniques of business intelligence

Business intelligence methods, techniques and tools help in obtaining information about available data and their use in the development of innovative business strategies of enterprises [Denić et al. 2024]. Research shows that if business intelligence is applied qualitatively, the amount of unnecessary information will be reduced and the quality of information will be increased [Caldeira M.M., Ward J. M. 2002]. Based on the literature, it can be concluded that business intelligence includes

processes, technologies and tools that help in the transformation of data into information, information into knowledge and knowledge into plans for managing the enterprise. In this sense, research shows that today more than 42% of enterprises and organizations in Serbia are considering the possibility of launching projects to import business intelligence in the future, but without clearly defined strategies or plans. In this regard, enterprises and business systems in Serbia have a wide range of software tools available for the development of business intelligence systems, i.e., intelligent decision support systems. There are different interpretations of the structure and architecture of business intelligence systems in the literature. The wellknown authors Moss & Atre, emphasize that business intelligence includes, among other things, business information and analysis used in the context of key business processes, management and decision-making, and support activities that lead to improved business performance. According to the results of the research by the author Kielstra, the most important attributes of business information needed for decision-making

are: quality (65%), completeness (18%), timeliness (13%), and price (5%) [Kielstra, P. 2007]. In this regard, the following figure (Figure 1) presents Cho's characteristic graphic representation of the dependence of the structure of information data and knowledge, or human perception [Choo, C.W. 2006].

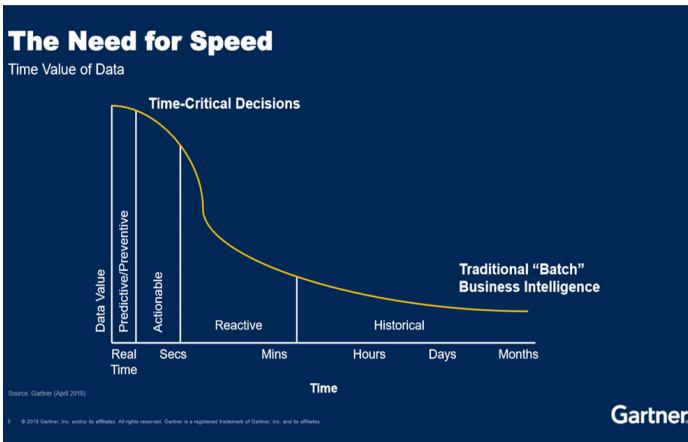
Figure 1. Cho's graphical representation of data, knowledge information [Choo C.W. 2006].



In the figure, human activity is represented on the abscissa, while the degree of structuring is represented on the ordinate. Practice indicates the importance of the quality and value of business information. In this sense, the eminent expert Eppler emphasizes that the quality of information is crucial for comp-

panies today, not the quantity of it [Eppler, M.J 2003]. This is followed by the authors Liautaud & Hammond, who emphasize that the value of information is related to the time in which it must be accepted, which is also confirmed by Gartner (Figure 2)

Figure 2. Value of information depending on time [Gartner]



The results of research in practice show that BI systems have opened a completely new chapter in the way of data analysis and business decision-making. In this context, the literature states that a properly designed BI solution for data integration enables the management of large amounts of data, adaptability to changing requirements and provides a unified view of data from different

sources, which brings valuable insights to companies or organizations (Chia, A. 2023). In practice, different types and types of business intelligence tools can be found in use. In this sense, visual tools and interactive analyzes that allow users to independently explore data and identify patterns and insights that contribute to better business efficiency are a novelty (Zheng, J.G 2018). Research indicates that company or

ned authors emphasize that regardless of location, the process includes a set of components that support different phases of the BI process - from data collection, integration and storage to their analysis and vi-

sualization using BI tools and presentation of information to users to support business decision-making (Pratt and Yasar, 2024). Another in a series of studies, which indicates the enormous growth of the amount of data, is a study conducted by Gartner, where 47% of respondents qualified data growth among the three biggest challenges of modern management. The following figure 3 pre-

sents a characteristic Gartner view for the year 2025.

Figure 3: Gartner's quadrant for analytics and business intelligence platforms



Today, business managers have access to appropriate tools based on intelligent systems, artificial intelligence - neural networks, expert systems, genetic algorithms, fuzzy systems, etc., which help management and decision-making bodies of companies in complex business processes [Loshin, D. 2019]. Some authors state that BI tools clean and integrate data to create a unified and coherent set of data that is suitable

for further analysis (Collins,A. 2023). Research indicates that there are several techniques that help solve problems with bad data. Some of them are: "data mining", ETL, data cleaning, data profiling, data management, etc.

The Extract, Transform, Load (ETL) process is a traditional integration technique that involves extracting data from multiple sources, transforming it into an appropriate format, and loading it into a data warehouse. In that context, it is stated that this process ensures accuracy and consistency of data and reduces the time required for data transfer between systems (Chia, A. 2023).

However, the Extract, Load, Transform (ELT) process is a more modern approach in which data is first loaded into a data warehouse and then filtered and transformed according to the specific requirements of analytical applications. According to the aforementioned author, this process provides greater flexibility, as the transformations are performed wit-

hin the data warehouse. ELT is often faster than ETL, but requires more specialized knowledge to set up and maintain (Chia, A. 2023).

Research methodology

To achieve the goals of this paper, a research framework is proposed that combines different research methods, thus including quantitative and qualitative research methods.

Research results

The results of research into companies and business systems in Serbia indicate that they are increasingly encountering problems in their operations that arise due to: lack of quality information for the needs of the management and decision-making process, insufficient operational support, poor analytical data processing, poor data organization, and the like. Research shows that large companies in Serbia are leaders in the application of business intelligence, with 78% of them having a formalized strategic approach to the development of these solutions. The latest research shows that 40% of major decisions are not made based on facts, but on the manager's feelings [Denic et al 2018]. However, despite the fact that the latest research in the world indicates that, for

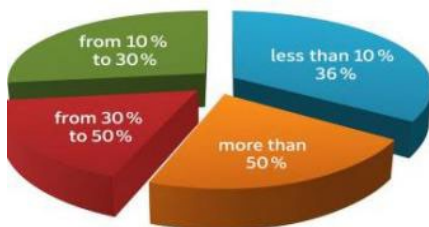
example, out of 43 American companies that participated in the research, 46% achieved 100% or less return on investment, 34% between 101% and 1000%, and 20% around 1001% and more, they are still not applied to the necessary and sufficient extent in SMEs in Serbia. The data shows that more than 70% of companies and business systems in Serbia still do not use artificial intelligence.

Discussion of results

The results show that regarding the existence of strategies for introducing business intelligence in medium-sized enterprises, the percentage is 68%, while only 25% of small enterprises have developed strategies for the implementation of AI, which indicates limited resources and a lack of expertise in smaller organizations. If the above figures are presented as a return on investment period, the situation is as follows: 49% of enterprises recovered their BIS investments in one year or less, 32% in a period of one to three years. In the EU, 25% of enterprises used artificial intelligence technologies in 2024. In our environment, the largest application was recorded in the information, communications and professional sectors, where as many as 60% of companies use AI. The

"KMPG's Business intelligence Survey" attempted to answer certain key questions related to business intelligence systems and their use. The results of this survey show that: 19% of managers still make their decisions based on intuition, i.e., more than 50% of their decisions are based on intuition. The next 19% of managers, 30% to 50% of their decisions are also made without the support of information. Less than 10% of managers base their decisions largely on data from a business intelligence system []. The development of the BI concept, according to Buchanan & O'Connell, arose from the realization that management can no longer make decisions based on intuition but on exact facts [Buchanan & O'Connell. 2006]. How many decisions made by managers are based on data is shown in the following figure (Figure 4).

Figure 4. How many decisions made by managers are based on data [Denić N. & Misic M. 2022]



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POSLOVNA INTELIGENCIJA U FUNKCIJI UNAPREĐENJA POSLOVANJA

Sažetak: Svrha ovog rada je i da se predstavi opšti teorijski pregled znanja, tehnologija i alata u oblasti poslovne integracije, zasnovan na evoluciji relevantne literature, sa ciljem sistematskog opisivanja svake od tehnologija sa mogućnostima primene u preduzećima u Srbiji. U tom kontekstu, uvodni deo istraživanja objašnjava koncepte, termine, funkcije i metode poslovnih informacija i poslovnih informacija sistema. Istraživanje je usmereno ka tehnologiji i sofisticiranim alatima poslovne inteligencije, kao i istraživanju u kojima su ključni faktori i elementi važni za uspešnu primenu alata, metoda i tehnika poslovne inteligencije u organizacijama u Srbiji, kao i u vezi sa ispitivanjem trenutnog stanja tržišta alata u svetu i Srbiji. Istraživanja pokazuju da ako postoji jedan ključ za opstanak poslovnih sistema i kompanija u sve više konkurentnom svetu, to je sposobnost da se brzo reaguje na promenljive uslove poslovanja, koji zahtevaju munjevito brzo otkrivanje, analizu i razmatranje. U tom smislu, gore navedene potrebe zahtevaju: sveobuhvatne, precizne i pravovremene informacije. Iz gore navedenih razloga, poslovna integracija u svetu, uključujući i naše okruženje, razvija se sve brže i brže svakim danom. Na osnovu najnovijih istraživanja u svetu i referenci najkompetentnijih autora iz oblasti poslovne inteligencije, definisani su teorijski temelji procesa poslovne inteligencije i inteligentni sistemi za podršku odlučivanju, kroz sistematsku analizu unapređenja poslovanja. Istraživanja pokazuju da je najbolji poslovni model inteligence u vreme ekonomske krize i recesije je onaj koji će pomoći organizacijama da postignu konkurentsku prednost, dok je jeftin. U tu svrhu, u poslednje vreme se sve više govori o OSBI (Open Source Business Intelligence).

Ključne reči: Poslovna inteligencija, biznis, informacioni sistemi

THEORETICAL AND LEGAL FOUNDATIONS OF ECONOMIC ANALYSIS OF LAW

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Abstracts: The paper analyzes the theoretical and legal positions of the school of economic analysis of law. This school of law certainly represents almost the most influential approach in modern legal theory. This can be seen both in recent theoretical and legal reflections in the field of tort, anti-cartel and commercial law, and in individual theoretical analyses dedicated to some of the most complex issues of family, criminal and constitutional law, i.e. the issues of human, civil and minority rights and freedoms. This paper aims to investigate and subject to critical analysis the theoretical foundations on which this teaching of law rests, while at the same time attempting to provide an assessment of them, bearing in mind the different value approach adopted by advocates of economic analysis of law in relation to the usual value approach to law in general.

Keywords: theory of law, economic analysis of law, utilitarianism, market, efficiency

Introduction

The notion of the theory of law may be defined in multiple ways. Over the course of the development of legal thought, the understanding of this academic discipline has undergone several changes, at times reflecting substantive transformations in its content, and at other times only partially corresponding to such changes (Dvorkin, 2001, str. 7-12). Without engaging, at this point, in an analysis of the historical genesis of this discipline or in the question of whether its concept may be equated with that of legal science in the broadest sense, it is sufficient to emphasize that the theory of law is understood here as a distinct scientific discipline, clearly differentiated from legal science or jurisprudence in its most general meaning as the totality of scientific knowledge about law. More precisely, in its basic linguistic sense, the theory of law denotes the general science of law, that is, a universal, synthesizing discipline whose subject matter is law conceived as a generic concept common to all concrete legal systems. Even at first sight, it becomes evident that such a discipline must necessarily address, among other issues, the relationship between law and other social phenomena, examine the social nature of

law, its effects on society, as well as the social factors involved in the processes of its creation and application.

With this in mind, it is evident that the importance of such a discipline in offering answers to the most complex challenges posed by the contemporary social moment to modern social and, consequently, legal theory and practice is almost immeasurable, since these answers play a decisive role in shaping concrete positive-law solutions. For that very reason, it is essential to devote full attention to a critical examination of those contemporary currents in legal theory whose influence on positive law is clearly discernible.

There can be a little doubt that the relevance of a particular theoretical approach may be assessed both by its impact on legal theory itself and by its influence on contemporary social practice, therefore it can be stated with little hesitation that, over the past several decades, the economic analysis of law has become one of the most influential approaches in modern legal thought. This influence is apparent not only in relatively recent theoretical developments in the fields of tort law, competition law, and commercial law, but also in scholarly analyses addressing some of the most complex issues in family law, criminal law, and constitutional law,

as well as in the sphere of human, civil, and minority rights and freedoms. (Bix, 2003, str. 189) Considering that some of the most prominent representatives of this intellectual movement within contemporary legal theory occupy highly significant judicial positions in the United States, thereby directly affecting legal practice, the need for a serious critical inquiry into the fundamental assumptions of the economic analysis of law becomes even more pronounced. (Bix, 2003, str. 189) For these reasons, the purpose of this paper is to examine and critically assess the conceptual foundations upon which this legal doctrine is built, while at the same time offering an axiological evaluation of those foundations, bearing in mind the value-oriented standpoint of the proponents of economic analysis of law, which differs in important respects from the conventionally accepted value-based approach to law in general.

The Origins and Foundational Principles of the Economic Analysis of Law

The economic analysis of law is often regarded as a relatively recent development in theoretical approaches to legal phenomena. However, its intellectual origins reach further back in time than is usually assumed. Early

traces of what would later become known as the economic approach to law can already be found in the late nineteenth century, particularly in the 1888 work of the Austrian jurist and economist Viktor Mataja, who addressed the issue of compensation for damages from an economic perspective. (Sakalaš & Ledak-Kabok, 2011, p.119-120) and (Holmes, 1897, p.469) As subsequent developments have confirmed, Holmes's foresight proved accurate, although it took more than seventy years for his vision to be fully realized. Regardless of where one situates the precise beginnings of this approach, there is little doubt that the economic analysis of law, understood, following Richard Posner's influential definition, as the application of economic theory and empirical methods to the fundamental institutions of the legal system, (Posner, 1975, p.759) rose to prominence within American legal thought in the 1970s and soon thereafter acquired global influence. A comprehensive examination of the views of all contemporary representatives of this school would exceed the purpose and limits of this paper. Accordingly, what follows is a brief outline of its basic positions, after which more detailed critical attention will be given to those theorists who maintain that economic methods should not be confined to legal

fields directly connected with economic phenomena, such as tort liability or litigation costs, but must also be applied to the very concept of law itself and its foundational elements.

Traditional legal reasoning, that is, decision-making in the application of legal norms, is typically based on the judicial syllogism, which involves subsuming all particular factual situation under a general legal rule and deriving a conclusion through logical and analytical reasoning. Alternatively, legal decisions may rest on moral evaluation, that is, on value judgments concerning what is fair or just. (Bix, 2003, B, Ref. p. 190-191) In the latter case, the relative and contingent nature of such reasoning is immediately apparent, since it depends on inherently relative value categories for which no objective metric of assessment exists. Economic analysis of law departs from these conventional forms of reasoning and seeks instead to ground legal decision-making on a form of consensus. Its proponents rely primarily on utilitarian ideas of maximizing overall utility and happiness while minimizing total suffering and harm. (The New Encyclopædia Britannica, 2005, p. 219-220; Мала енциклопедија Просвета, 1986, p. 693) Without entering here into the numerous strands of utilitarian the-

ory that have developed over time, the basic idea - albeit in simplified form - can be expressed as the claim that the pursuit of happiness and the avoidance of pain are universal features of human nature. Since no objective standard exists by which one could rank the preferences and needs of individuals in relation to one another, the only legitimate foundation for social decision-making must be whatever contributes to the maximization of overall well-being and the minimization of collective suffering. At first glance, however, this approach does not seem to offer a more objective decision-making criterion than moral evaluation, given the considerable difficulty of defining and measuring concepts such as happiness, satisfaction, and suffering in a generalizable manner. In this sense, one might argue that the arbitrariness of ethical judgment is merely replaced by epistemological uncertainty. (Leff, 1974, p. 453-456.) Objections of this kind, whether fully justified or not, are, at least to some extent, addressed by simplifying the axiological foundations of utilitarianism through specific definitional assumptions. Bentham's hedonistic, or felicific, calculus, intended to measure the pleasure or pain produced by an action and thereby assess its moral status, remains highly problematic, since it is impossible to predict

with certainty how individuals will respond to alternative courses of action. (Bentham, 1970, p.8-24) Economic analysis of law responds to this difficulty by introducing a particularly interesting assumption: human beings are rational maximizers of their satisfactions. Indeed, this assumption forms the cornerstone of all theoretical propositions upon which the entire economic analysis of law rests. In other words, if a subject would achieve more of what he seeks to achieve by undertaking action A rather than action B, homo economicus, that is, the subject in question, would, as a rule, always choose action A. Any other course of action would, again as a rule, constitute entirely irrational behavior. It is at this point that it is worth noting that the objective empirical difficulty of determining what individuals actually desire is addressed by economic analysis of law through the adoption of an interesting approach: namely, that what people want is, as a rule, what they are willing to pay for, whether in money or in some other resource they possess, such as time or effort. According to economic analysis of law, everything that could potentially happen to us can, in fact, be reduced to things we are willing to pay to obtain or to pay to avoid. While Bentham talks about the greatest possible happiness for the gre-

atest number of people, (Bentham, 1970) the economic analyst of law invariably speaks of an efficient solution. At this point, it should be noted that, when emphasizing the economic analysis advocacy for the absolute adoption of economic models grounded in nominal markets, it is essential to properly distinguish the objective advantages that become apparent when talking about actual, or real, markets in individual branches of law, in relation to the adoption of such a concept with respect to positive law as a whole. Advocates of a free-market economy held that the wealth of a society would increase most effectively if resources were privately owned and owners were free to trade them as they wished. Proponents of modern economic analysis of law regard this approach as indisputable, and to such an extent that this completely objective connection between the market and property has given rise to some, at the very least, rather broad definitions of the very concept of property among members of this school. Namely, according to their view, any right that a person can agree not to insist upon (regardless of its legal nature) should be regarded as a property right because its holder has control over the effects of its exercise on others. Even more characteristic of this theoretical-legal approach is

the importance attached to nominal markets. Its supporters seek to draw implications for legal “injustices” of all kinds from imagined redistributions within the aggregate wealth assumed to be fixed at a given point in time. With zero transaction costs, any right would ultimately belong to the subject that values it most, i.e., the value is determined by each party’s willingness to pay. Where transaction costs preclude such redistribution, the law should impose an efficient solution.

Nevertheless, proponents of economic analysis further refine this approach by resolving the fundamental difficulty of identifying the desires that lead to human happiness through observation of behavior and choice, relying on the core presumption that individuals rationally maximize their own satisfaction. (Pozner, 1973, p. 1) In most situations, people are guided by what they perceive to be their own interest and pursue it through rational, though not perfect, selection of means. (Pozner, 1973, p. 5) From this behavioral premise, several basic economic principles are derived, including the inverse relationship between price and demand, as well as the tendency of resources to flow toward their most highly valued uses where exchange is permitted. (Pozner, 1973,

p. 5) Efficiency is thus conceived as a fundamentally technical concept, implying the allocation of resources in a manner that maximizes human satisfaction, measured by aggregate willingness to pay for goods and services. Value, accordingly, is likewise determined by willingness to pay. (Pozner, 1973, p. 4) In this way, the market becomes both the mechanism for identifying human preferences and the means for their fulfillment, functioning simultaneously as an instrument for maximizing individual and collective well-being. Market transactions, grounded in the concordance of wills and the autonomy of contracting parties, come to symbolize fair exchange and, in a broader sense, social justice. This idea represents one of the central arguments advanced in defense of the economic analysis of law. (B, Ref. 2003, p.193) It should also be noted that a market allocation is considered Pareto superior if at least one participant’s position is improved without worsening the position of any other. Such a change constitutes a Pareto improvement. Conversely, where no reallocation can produce such an improvement, the situation is described as a Pareto optimum. (Розен, Гейер, 2009, p. 36-42.). At this point, it would be inappropriate to engage in a more detailed exposition of the concept of Pareto

optimality, since such an undertaking would go well beyond the limits set for this paper. It should, however, be emphasized that optimality, as understood in this context, does not imply a situation that is absolutely superior to all others within a given framework, given that multiple states may simultaneously satisfy the condition of Pareto optimality. In this respect, the notion of optimality employed here clearly diverges from its ordinary meaning. Setting aside, for the moment, a number of serious objections suggesting that the application of Pareto efficiency may lead to, or even require, outcomes that conflict with certain fundamental social values, such as freedom or autonomy, (Sen, 1970, p. 152-157.) it must nevertheless be noted that proponents of economic analysis of law argue, apparently with considerable justification, that virtually all voluntary market transactions, that is, transactions grounded in party autonomy, result in Pareto superior outcomes. (Posner, 1979, p. 132) Yet, it is already evident at first glance that such an approach can scarcely be extended to situations lacking the autonomy of the participating subjects, namely to contexts in which the authority that monopolizes legitimate physical coercion acts from a position of power. In other words, Pa-

reto efficiency, even when understood in a highly qualified sense, appears poorly suited to situations involving the creation and application of law. Moreover, even if this objection is temporarily set aside, it must be acknowledged that, even in transactions based on the autonomy of will, it is in practice extremely difficult - if not impossible - to identify situations in which at least one participant is better off while all others are in an equally favorable position as before. Quite to the contrary, it is clear that if the position of one participant improves while the positions of the others remain unchanged, this can in fact amount to a relative deterioration of their position.

Advocates of economic analysis of law attempt to address this potential, yet very real, difficulty by invoking the so-called Kaldor-Hicks criterion, which rests on the possibility that those who benefit from a transaction could in principle compensate those whose position has worsened or remained unchanged and has thus become relatively worse. This approach is particularly applied in cases where state authorities exert a more or less significant - direct or indirect - influence through their decisions. It should be emphasized that this does not presuppose actual compensation being

paid; were that the case, the outcome would constitute a Pareto improvement. What is relevant, rather, is that such compensation could hypothetically be paid. On this basis, it is assumed that the position of all participants may be regarded as relatively improved in comparison with the situation prior to the transaction. (Bix, B, Ref. 2003, p. 195.)

Any consideration of the economic analysis of law would be incomplete without reference to the work of the distinguished economist Ronald Coase, given the profound influence of his ideas on this school of thought. (Coase, 1960, p. 1-44) In simplified terms, his views on the interaction between the market and subjective rights can be traced through his critique of Pigou's position on the necessity of imposing state regulation to compel economic actors to compensate for the costs they impose on others, as well as through his analysis of the role played by the initial allocation of subjective rights in their subsequent distribution. (Coase, 1960, p. 1-6, 7-19) With regard to the first issue, Coase argues that it is not possible to identify in advance the party that causes harm or generates additional costs, advancing instead the concept of the reciprocity of harm, according to which such costs arise from the combined activities of

all involved parties. (Coase, 1960, p. 2) With respect to the second issue, Coase maintains that the initial assignment of rights to their holders does not affect their eventual distribution, nor the activities generated by their protection, because such rights will ultimately be transferred to those who value them most - that is, to those for whom possession of the rights is of greatest importance. (Coase, 1960, p. 31-34.) This proposition constitutes the core of what is known as the Coase theorem. Strictly speaking, however, it applies only within a highly simplified theoretical model that assumes the absence of transaction costs, an assumption that does not hold in real life and, as Coase himself explicitly acknowledged, cannot in fact hold. (Coase, 1960, p. 15.)

Value Positions of the School of Economic Analysis of Law

One should be completely fair and point out here that, truth be told, advocates of the economic analysis of law never claimed that about the economic analysis what Bentham (Bentham, J. Ref., 2003, p. 14) claimed about usefulness, namely that it is the only true test, i.e. indicator of validity or correctness of law. Yet, it is considered that, at first glance at

least, it primarily has a normative status. The fairness may require that an inefficient solution to a legal problem be adopted, but the burden lies on everyone in favor of the adoption to prove why it should be done in precisely that way. One should notice that the critics of the economic analysis challenge the advantages even of actual markets compared to certain areas of social life. Moreover, they challenge that efficiency itself, understood in a specific sense in which it depends on nominal markets, even has any normative power. Yet, despite such stances, Richard Posner claims that, regardless of normative implications and actual and nominal markets, economic analysis of law actually has considerable explanatory and predictive power. (Posner, R. 1973, p. 33) He claims that, even in those cases when, at least on the surface, the language of court opinions is not openly economic, the basic logic behind court opinions is of economic nature in its essence. So, for example, even though one could quite commonly believe that the law punishes tortious behaviors because such matters have always been considered morally wrong, he believes that the true foundation of a legal prohibition is actually quite different and that it lies in the principle of economic efficiency, and not in another normative

concept. Criminal acts represent examples of forced transactions where a certain value is transported from the victim to the perpetrator without adequate negotiations. Accordingly, the law punishes the delinquent, not because the tort is in some non-economic way wrong, but in order to persuade the delinquent to use the market. In other words, the reason for punishment is that the cost for the delinquents must be higher than a mere compensation in order to provide them with a necessary incentive to sustain themselves. (Posner, R. 1973, p. 86) Normative implications of the economic analysis of law are perhaps the most challenging precisely when it is claimed that a real (and not just nominal) market should be introduced in respect to a sensitive area of social interaction that has so far been subject to non-market research. For instance, Posner claims that there should be a market in the production of babies for adoption. Supply and demand would eventually even out. Poor adoptive parents would be in a better position because the prices charged by mothers giving birth in circumstances of open competition would be less demanding than the criterion of wealth that is currently being applied to potential adoptive parents by adoption agencies. (Posner, R. 1973, p. 94-98.) One should admit that the

given example at the very least makes one wonder why this proposition is regarded with absolute horror now, at least in the opinion of this paper's author. Still, it is first necessary to ask whether any philosophical-legal or theoretical-legal approach can be adequate to any extent without providing any answer to the basic and most significant questions, i.e. questions of essential justice, which are in the nature of things and indubitably involved as such in the problem of the allocation of social wealth.

From the foregoing, one can discern the axiological positions of economic analysis. Even if its methods can be partially applied to commercial, procedural, or tort law, their application is far more questionable in criminal or constitutional law, and in matters relating to human, civil, or minority rights. Several factors underlie this view. First, it must be acknowledged that utilitarianism can constitute a legitimate value foundation for legal theory, just as any other ethical or ideological system can, regardless of whether one personally agrees with it. The positions of the economic analysis school, it appears, are fundamentally based on this philosophical premise. While influential figures such as Posner often deny these roots, (Posner, R. 1973, p. 104-107)

the derivative nature of their positions is evident. This is not to suggest a mere adoption of utilitarian values, nor a simple inspiration from utilitarian thought, (Hart, 1977, p. 987-988) but rather a form of practical materialization of utilitarian ideas. In other words, rather than "applied utilitarianism," the economic analysis of law embodies a pragmatic, materialist interpretation of utilitarian principles. Posner himself underscores this perspective by framing wealth, and particularly the maximization of monetary wealth, expressed in dollars, as the primary principle guiding society and, by extension, the legal system. (Posner, R. 1973, p.119-120) While he admits (Posner, R. 1973, p.121) that equating utilitarian happiness with monetary wealth is highly questionable, this material concretization provides a workable proxy for otherwise abstract and difficult-to-measure values. Differences in understanding social reality, it seems, largely reflect the contrast between materialist and idealist approaches. (Mladenović, Rakić, 2024; Narančić, 2024)

Conclusion

After everything that has been said so far, it is quite clear that the economic analysis of law constitutes a

significant innovation in our understanding of legal institutions and the concept of law itself. However, it must not be overlooked that law can also be interpreted through the lens of the values it embodies. As such, law necessarily represents more than a structured system of practical rules; it also encompasses principles such as justice, equity, morality, security, order, and peace, among others. From the perspective of the economic analysis school, the evaluation of a legal system focuses primarily on the effects of legal rules on the efficient allocation of resources, without addressing moral considera-

tions or the ethical consequences of these effects. The question remains whether law, and, by extension, the society founded upon such principles, can provide a sufficient basis for the development of a flourishing democratic community that fully respects all human, civil, and minority rights. Yet, in light of the discussion thus far, it appears evident that the so-called essential ethical minimum of a society, and consequently of law, cannot, by its very nature, be grounded solely in simplified, materialistic notions of wealth accumulation. (Tošić, 2023; Đorđević, et al., 2025)

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TEORIJSKE I PRAVNE OSNOVE EKONOMSKE ANALIZE PRAVA

Sažetak: U radu se analiziraju teorijske i pravne pozicije škole ekonomske analize prava. Ova škola prava svakako predstavlja gotovo najuticajniji pristup u modernoj pravnoj teoriji. To se vidi kako u recentnim teorijskim i pravnim promišljanjima iz oblasti deliktneog, antikartelskog i privrednog prava, tako i u pojedinačnim teorijskim analizama posvećenim nekim od najsloženijih pitanja porodičnog, krivičnog i ustavnog prava, odnosno pitanjima ljudskih, građanskih i manjinskih prava i sloboda. Ovaj rad ima za cilj da istraži i podvrgne kritičkoj analizi teorijske osnove na kojima počiva ovo učenje prava, a istovremeno pokušava da pruži njihovu procenu, imajući u vidu različit vrednosni pristup usvojen od strane zagovornika ekonomske analize prava u odnosu na uobičajeni vrednosni pristup pravu uopšte.

Ključne reči: teorija prava, ekonomska analiza prava, utilitarizam, tržište, efikasnost

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UPUTSTVO AUTORIMA ZA PRIPREMU RADOVA

Redakcija časopisa „Ekonomski signali“¹

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1. Uvod

Instrukcije i odgovarajući šablon MS Word dokumenta dati u ovom radu predstavljaju formu koju autori moraju poštovati prilikom pisanja radova za časopis Ekonomski signali. Radovi predati u tehnički neodgovarajućoj formi biće vraćeni na ispravku, ili odbijeni ukoliko izmene ne budu završene na vreme.

2. Priprema rada

Redakcija časopisa „Ekonomski signali“ preporučuje da se koristi MS Word za pripremu radova, a zatim da se pošalje rezultujuća MS Word datoteka (file). Moguće je pisati rad i u LaTeX-u, pri čemu je, pored obaveznih LaTeX datoteka, neophodno poslati i PDF datoteku poslednje (odobrene) verzije rada. Mole se autori da se pridržavaju instrukcija i u ostalim stavkama, kako bi bilo moguće napraviti jedinstvenu formu za sve radove jednog broja.

Napomenimo da klasa/stil datoteka i šablon rada ne može biti promenjen. Zato je potrebno pridržavati se uputstva vezanog za format i veličinu fonta, sve u cilju da krajnji proizvod bude što je moguće više homogen.

2.1. Region za štampanje

Region za štampanje je 122 mm x 193 mm. Tekst treba biti poravnat sa obe strane kako bi se obezbedilo zauzimanje cele širine linije. Treba obezbediti da desna margina ne bude neravna, sa rečima koje su spojene crticom, kao što je uobičajeno.

2.2. Izgled, vrsta slova, veličina fonta i numerisanje

Koristiti font Century za sva formatiranja teksta. Koristiti veličinu 10 za ime (imena) autora i veličinu 9 za adresu (adrese) i rezime. Za glavni tekst koristiti veličinu fonta 10 i prored 1. Za naslove najvišeg nivoa (1., 2. itd.) koristiti veličinu 12, a za ostale nivoe koristiti veličinu 10. Italic stil može biti korišćen radi naglašavanja reči u tekstu. Podebljane i podvučene reči treba izbegavati. Sa ovim veličinama, prostor između linija trebao bi biti tako postavljen da na jednoj strani ima oko 45 linija punog teksta.

Naslovi. Naslovi treba da počinju velikim slovom i, sa izuzetkom naslova rada, trebaju biti poravnati sa leve strane. Veličine fonta date su u tabeli 1.

Leme, pretpostavke i teoreme. Brojevi koji se odnose na leme, pretpostavke, teoreme itd. treba da se pojavljuju u uzastopnom nizu, počev od broja 1, a ne, na primer, od broja 11.

Tabela 1. Veličine fonta za naslove. Naslovi tabela trebaju uvek biti pozicionirani iznad tabele. Poslednja rečenica naslova tabele treba biti završena bez tačke

| Nivo naslova | Primer | Veličina fonta i stil |
|----------------------------|---|-----------------------|
| Naslov rada (centriran) | Predavanje o ... | 16, podebljan |
| Naslov prvog nivoa | 1 Uvod | 12, podebljan |
| Naslov drugog nivoa | 2.1 Region za štampan'e | 10, podebljan |
| Naslov trećeg nivoa | Naslovi. Tekst koji sledi ... | 10, podebljan |
| Naslov četvrtog nivoa | <i>Napomena.</i> Text koji sledi... | 10, italic |

2.3. Slike i fotografije

Autori se mole da svoje slike prave u elektronskom obliku, ukoliko je moguće, i integrišu ih u svoju tekstualnu datoteku. Ukoliko se koristi MS Word, potrebno je koristiti „In Line with Text“ opciju za integrisanje slike sa tekstem.

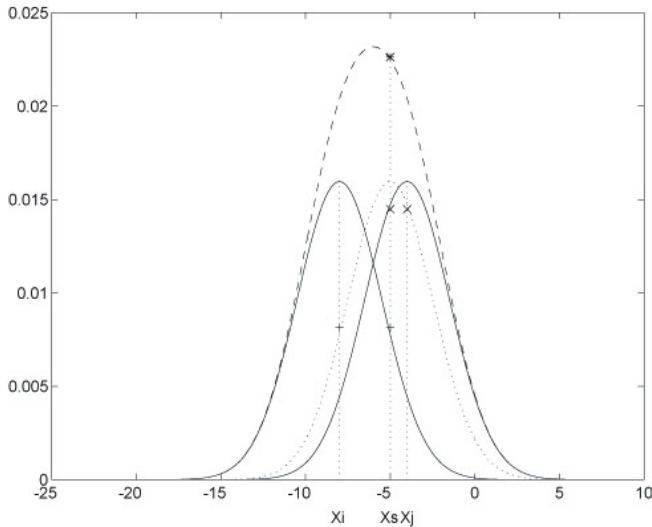
Treba proveriti da li su linije crteža prekinute, ili cele i da li imaju konstantnu širinu. Mreža i detalji unutar slike moraju biti jasno čitljivi. Linije crteža moraju imati rezoluciju najmanje 800 dpi (poželjno je 1200 dpi). Za digitalne crno-bele ilustracije (polutonove) 300 dpi je obično dovoljno. Natpis na slikama treba da ima širinu od 2 mm (veličina 10).

Slike treba da budu numerisane i da imaju naslov koji bi uvek trebao biti pozicioniran ispod slike, za razliku od naslova tabele, koji uvek treba da

bude iznad tabele. Poslednja rečenica naslova, bilo da se radi o slici, ili o tabeli ne treba da se završava tačkom. Potrebno je centrirati naslov slike između margina i koristiti veličinu fonta 9 (Slika 1. na primer). Prostor između teksta i slike treba biti oko 8 mm, a prostor između slike i naslova oko 5 mm.

Napomena 1. U štampanim brojevima, ilustracije su generalno crno-bele (polutonovi) i samo u izuzetnim slučajevima, ukoliko je autor spreman da pokrije dodatne troškove za reprodukciju slika u boji, mogu se prihvatiti slike u boji. Ukoliko su slike u boji neophodne, molimo vas da nam pošaljete odvojene datoteke u boji.

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Slika 1. Ovo je prikaz slike koja se sastoji od različitih tipova linija. Elementi slike opisani u naslovu trebali bi biti napisani u *italic* stilu. Poslednja rečenica u naslovu slike treba, generalno, da se završava bez tačke

2.4. Formule

Prikazane jednačine ili formule su centrirane i stavljene u posebnu liniju (sa dodatnom linijom prostora iznad i ispod). Prikazani izrazi trebaju biti numerisani. Bro'evi trebaju biti uzastopni unutar svake sekcije, ili unutar priloga, sa bro'evima koji su zatvoreni zagradama i koji se nalaze na desnoj margini. Na primer:

$$x + y = z . \quad (1)$$

Molimo vas da punktirate prikazane jednačine kao i originalan tekst, ali sa malim razmakom pre interpunkcijskog znaka.

2.5. Programski kod

Programski listinzi, ili programske komande u tekstu se postavljaju u tekstu u fontovima Courier, ili Courier New.

Primer kompjuterskog programa Jensen K., Wirth N. (1991) Pascal user manual and report. Springer, New Mork

```
program Inflation (Output)
  {Assuming annual inflation rates of 7%, 8%, and
  10%,... years};
  const MaxYears = 10;
  var Year: 0..MaxYears;
      Factor1, Factor2, Factor3: Real;
begin
  Year := 0;
  Factor1 := 1.0; Factor2 := 1.0; Factor3 := 1.0;
  WriteLn('Year 7% 8% 10%'); WriteLn;
  repeat
    Year := Year + 1;
    Factor1 := Factor1 * 1.07;
    Factor2 := Factor2 * 1.08;
    Factor3 := Factor3 *1.10;
    WriteLn(Year:5,Factor1:7:3,Factor2:7:3,
      Factor3:7:3)
  until Year = MaxYears
end.
```

2.6. Endnote

Endnote treba smestiti na kraju rukopisa, ispred Referenaca.

Fusnote se ne prihvataju.

2.7. Citati

Prezime autora, godina publikovanja i strana izvora: na primer: (Wang, 1997, 144);

Direktno navođenje u tekstu, na primer: „Ako su ljudi zauzeti ceo dan ...“ (Heleta, 2008, 110). Ili, na primer: Heleta (2008, 112) navodi „... kreativnost predstavlja pobedu navika sa originalnošću“.

2.8. Numerisanje strana i zaglavlja

Rad ne treba da sadrži numerisane strane: njih će postaviti izdavač. Nije potrebno stavljati ni zaglavlja (Header and Footer).

2.9. Kvalitet štampe

Očekuje se da, pored elektronske verzije u MS Word, i PDF formatu, treba priložiti i štampanu verziju (jednostrano štampanu). Molimo vas da koristite štampače visoke rezolucije, preporučljivo je laserske štampače sa najmanje 300 dpi. Tekst treba biti poravnat sa obe strane. Format papira (A4, Letter) je irelevantan.

3. Lista za proveru

Prilikom slanja radova u redakciju, potrebno je proveriti da li sadrži sledeće:

- izvornu datoteku, npr. MS Word datoteku koje integriše tekst i slike;
- datoteku u PDF formatu;
- jednostranu štampanu verziju (ne fotokopiju) finalne verzije rada;
- datoteke sa stilovima, šablonima i specijalnim fontovima koji su, možda korišćeni;

Ukoliko postoji dodatni materijal, potrebno je poslati:

- kratak opis dodatnog materijala;
- datoteke sa slikama u boji u elektronskoj verziji

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U tekstu:

- u slučaju jedne reference, izvor se navodi na sledeći način: (Keur, 2014, 423-425);
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Kod referenci sa jednim ili dva autora, navode se prezimena autora, godina izdanja, i strana. Primer dva autora: (Talbot & McLean, 2014, 115)

Kod referenci sa tri ili više autora, navodi se prvi autor i nastavak „i dr.“ (autori na engleskom nastavak „et al.“. Primer: (Trklja i dr., 2015, 125), odnosno (Keur et al., 2014, 89).

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