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Uvaženi i dragi čitaoci,

Pripremajući ovo izdanje našeg časopisa koje je pred Vama, hronološki poslednje u 2025. godini, tok (stručnih) misli prirodno biva inspirisan osvrtom na godinu koja je na izmaku. Srbija je u 2025. godinu ušla sa stabilnim bankarskim sistemom, visokim nivoom kapitalizacije i likvidnosti, kao i nastavkom procesa digitalizacije, veće upotrebe veštačke inteligencije u poslovanju i postepenog širenja ponude fintek rešenja – često u partnerstvu sa bankama. To je godina u kojoj je postalo jasno da **digitalna transformacija više nije projekat, već trajno stanje**, i da bankarstvo budućnosti neće biti definisano brojem filijala, već kvalitetom algoritama, bezbednosnim protokolima i sposobnošću da se čitaju podaci, rizici i potrebe klijenata.

Sa druge strane, Evropsko bankarstvo, sa kojim se sve više usaglašavamo i po regulativi i po strategijskom usmerenju, tokom prethodne godine nastavilo je da korača ka modelu integrisanijeg i konkurentnijeg finansijskog prostora. Pažnja je usmerena na razvoj Savings & Investment unije, jačanje tržišta kapitala i uravnotežavanje kompleksnih regulatornih okvira koji, iako štite stabilnost, sve više moraju da uzimaju u obzir dinamiku inovacija i geopolitičke rizike. Ove promene, ma koliko se činile udaljenim, realno oblikuju okvir u kojem se naš sektor kretao do sada, i naročito vidljiv uticaj imaće i u budućem periodu.

2025. godina nam je pokazala da naš bankarski sistem može da odgovori na brze promene sa međunarodnih tržišta, da podrži privredu na održiv način i da, uprkos globalnim neizvesnostima, zadrži svoju stabilnost. Istovremeno, izazovi ostaju: jačanje poverenja u digitalne kanale, neophodnost unapređenja finansijske pismenosti, snažni zahtevi u oblasti usklađivanja sa evropskim standardima u nadzoru, upravljanju rizicima i međunarodnoj borbi protiv finansijskog kriminala.

I baš na samom izmaku 2025. godine, u trenutku dok radimo na završnoj fazi pripreme izdanja koji je pred Vama stigla nam je vest koja nas je veoma obradovala: Ministarstvo nauke, tehnološkog razvoja i inovacija Republike Srbije, nakon zvanične i redovne evaluacije, donelo je odluku o unapređenju ranga relevantnosti i kvaliteta časopisa svrstavajući ga u kategoriju časopisa od nacionalnog značaja (M51). Ovo priznanje nije samo rezultat našeg rada na nivou uredništva, izdavača i suizdavača – priznanje je zajedničko i pripada svim saradnicima koji su doprineli radu časopisa u 2025. godini. Shodno tome, hvala autorima koji su nam *verovali i poverili svoja istraživanja, hvala recenzentima koji su svojom ekspertizom postavljali i štitili visoke standarde, hvala institucijama koje podržavaju naučnu misao, i hvala dragoj čitalačkoj publici koja je pokazala da u Srbiji, regionu i međunarodnim okvirima postoji duboka potreba za stručnom analizom, naučnom utemeljenošću i kritičkim promišljanjem finansijskih fenomena današnjice.*

M51 rang za 2025. godinu za nas je više od radosne vesti — to je podstrek da nastavimo da otvaramo i podržavamo teme koje grade most između akademske zajednice i savremenih tendencija tržišta, ekonomije i regulatornog okruženja, to je motivacija da nastavimo da gradimo most između domaće prakse i svetskih okvira i iznad svega – to je obaveza da nastavimo dalje unapređenje sopstvenog rada u korist drugih i društva u celini.

Sa ponosom završavamo ovu godinu, a sa odgovornošću, podstrekom i ambicijom ulazimo u novu. U ime Redakcije i Uredništva, želim vam prosperitetnu, stabilnu i profesionalno ispunjenu 2026. godinu.

GLAVNA I ODGOVORNA UREDNICA

Слађана Андриан Средојевић

Dr Slađana Andrian Sredojević

EDITORIAL

Slađana Andrian Sredojević, PhD, International Cooperation and Education Specialist, Head of the Bank Training Centre, Association of Serbian Banks
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Respected Readers,

While preparing this issue of our Journal, which is in front of you now, at the end of 2025, the flow of (professional) thoughts was naturally inspired by an overview of the year that is coming to an end. Serbia entered 2025 with a stable banking system, a high level of capitalisation and liquidity, as well as the continuation of the digitalisation process, greater use of artificial intelligence in business, and the gradual expansion of the offer of fintech solutions – often in partnership with banks. This year it became clear that **digital transformation is no longer a project, but a permanent condition**, and that the banking of the future will not be defined by the number of branch offices, but by the quality of algorithms, security protocols and the ability to read data, risks and customer needs.

On the other hand, European banking, with which we are increasingly aligning both in terms of regulations and strategic direction, has continued to move towards a more integrated and competitive financial space over the past year. Attention is focused on developing the Savings & Investment Union, strengthening capital markets and balancing complex regulatory frameworks that, while safeguarding stability, increasingly need to take into account innovation dynamics and geopolitical risks. These changes, no matter how distant they may seem, realistically shape the framework in which our sector has been moving so far, and will have a particularly visible impact in the future.

The year 2025 has shown us that our banking system can respond to rapid changes from international markets, support the economy in a sustainable way and, despite global uncertainties, still maintain its stability. At the same time, challenges remain: strengthening trust in digital channels, the need to improve financial literacy, strong requirements in the field of compliance with European standards in supervision, risk management, and the international fight against financial crime.

And just at the very end of 2025, at the moment when we are working on the final phase of the preparation of the issue in front of you, we received news that motivated us greatly: the Ministry of Science, Technological Development and Innovation of the Republic of Serbia, after an official annual evaluation, has made a decision to improve the rank of relevance and quality of our Journal by placing it in the category of journals of national importance (M51). This recognition is not only the result of our work at the editorial, publisher and co-publisher level – the recognition is shared and belongs to all associates who contributed to the work of

Bankarstvo Journal in 2025. Accordingly, we thank the authors who entrusted us with their research, the reviewers who set and maintained their high standards with their expertise, the institutions that support scientific thought, and our dear readership who have shown that in Serbia, the region and internationally, there is a deep need for expert analysis, scientific grounding and critical reflection on today's financial phenomena.

The M51 ranking for 2025 is more than just good news for us, it is an incentive to continue to open and support topics that build a bridge between academia and contemporary trends in the market, the economy and regulatory environment, as well as a source of motivation to continue building a bridge between domestic practice and global frameworks, and above all it is an obligation to continue to further improve our own work for the benefit of others and society as a whole.

We are proud of how are ending this year, and we are entering the new year with responsibility, encouragement and ambition. On behalf of the Technical Team and the Editorial Board, I wish you a prosperous, stable and professionally fulfilled 2026.

EDITOR-IN-CHIEF

Слађана Андриан Средојевић

Slađana Andrian Sredojević, PhD

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UTICAJ DEMOGRAFSKIH FAKTORA NA PERCEPCIJU KORISNIKA O ONLAJN BANKARSKIM

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Rezime: *Rad istražuje uticaj demografskih faktora na percepciju korisnika onlajn bankarskih aplikacija, sa posebnim fokusom na efikasnost, dostupnost i lakoću ostvarivanja kontakta sa bankom. Istraživanje je sprovedeno primenom posebno koncipiranog upitnika koji je realizovan putem platforme Google Forms u elektronskoj formi. Upitnik je distribuiran korisnicima onlajn bankarstva u Srbiji u periodu od avgusta 2024. do februara 2025. godine. U istraživanju je učestvovalo 198 ispitanika, a prikupljeni podaci su obrađeni primenom neparametarskih statističkih testova (Mann-Whitney i Kruskal-Wallis). Rezultati statističkih testova su pokazali da ne postoje značajne razlike u percepciji posmatranih aspekata u odnosu na pol, starosnu dob i nivo obrazovanja ispitanika. Dobijeni rezultati ukazuju da demografske karakteristike ne utiču značajno na zadovoljstvo korisnika, što pruža smernice za univerzalni pristup u koncipiranju i optimizaciji onlajn bankarskih usluga.*

Ključne reči: onlajn bankarstvo, kvalitet usluge, percepcija korisnika, efikasnost, kontakt sa korisnicima, korisničko iskustvo

JEL klasifikacija: D12, O33, G21.

Uvod

Uspon informacionih i komunikacionih tehnologija transformisao je bankarstvo podstičući prelazak sa tradicionalnih usluga koje su se odvijale uz fizičko prisustvo klijenata na različite onlajn formate (Chaimaa et al., 2021). Kvalitet usluge u kontekstu onlajn bankarstva odnosi se na percepciju korisnika o tome u kojoj meri pružena usluga zadovoljava njihova očekivanja (Mujinga, 2020). Parasuraman i saradnici (2005) definišu kvalitet usluge kao poređenje između stvarne i očekivane usluge. Oni ističu da kvalitet usluge ima ključnu ulogu u održavanju konkurentske prednosti organizacija, ostvarujući značajan pozitivan uticaj na njihove finansijske rezultate. Poboljšanje kvaliteta usluge podstiče lojalnost korisnika i doprinosi povećanju tržišnog učešća. Rezultati prethodnih istraživanja ukazuju da su intuitivni interfejsi, stalna dostupnost i nesmetane transakcije ključni faktori koji doprinose zadovoljstvu i lojalnosti korisnika onlajn usluga (Faisal et al., 2024). Kako se sve više korisnika oslanja na bankarske aplikacije za upravljanje svojim finansijama, došlo je do sve većih zahteva za intuitivnim dizajnom, ažuriranjima u realnom vremenu i personalizovanim iskustvima.

Da bi ostale konkurentne, banke su prinuđene da se orijentišu na usavršavanje korisničkog iskustva prilikom korišćenja usluga onlajn bankarstva kako bi ispunile stalno rastuća očekivanja klijenata. Ključni trendovi za 2025. godinu uključuju pojednostavljenje navigacije i dizajna interfejsa, ponudu personalizovanih obaveštenja u realnom vremenu i uključivanje personalizovanih notifikacija za poboljšanje korisničkog iskustva (Cantero, 2025). Takođe se nagoveštava prelazak sa tradicionalnih bankarskih aplikacija na „super-aplikacije" koje će transformisati očekivanja korisnika, jer korisnici traže jedinstvenu platformu koja ne samo da im omogućava upravljanje finansijskim transakcijama već i integriše dodatne usluge kao što su plaćanje računa, budžetiranje i razne nefinansijske usluge (Cheqly team, 2025). Evidentno je da će budućnost aplikacija za onlajn bankarstvo biti oblikovana aktuelnom digitalnom transformacijom, sa inovacijama kao što su veštačka inteligencija, blokčejn i računarstvo u oblaku koji pokreću intuitivnija bankarska iskustva koja su usmerena na korisnike. Kako digitalne neobanke postaju sve popularnije, tradicionalne bankarske aplikacije moraju da evoluiraju i da primenjuju napredne tehnologije kao što su veštačka inteligencija i analitika podataka da bi ostale konkurentne i zadovoljile potrebe korisnika koji su navikli da rade sa savremenom tehnologijom (Funcas, 2021; Boustani, 2022; Nowakowski, 2024; Lukić Nikolić, 2024).

U savremenom digitalnom okruženju, onlajn bankarstvo predstavlja ključni kanal komunikacije između banaka i njihovih klijenata. Brzina, dostupnost i jednostavnost korišćenja aplikacija za onlajn bankarstvo postaju sve važniji faktori korisničkog iskustva. Ovaj rad istražuje percepcije korisnika o tri ključna aspekta aplikacija za onlajn bankarstvo: efikasnost, dostupnost i lakoća uspostavljanja kontakta sa bankom. Predmet istraživanja je, dakle, način na koji korisnici doživljavaju funkcionalnost i korisničku podršku u okviru digitalnih bankarskih servisa. Konkretno, rad istražuje da li demografski faktori, uključujući pol, godine i obrazovanje, utiču na to kako korisnici procenjuju ove aspekte u aplikacijama za onlajn bankarstvo. Cilj rada je da se identifikuju statistički značajne razlike u percepcijama korisnika na osnovu njihovih demografskih karakteristika, kako bi se omogućilo preciznije prilagođavanje digitalnih servisa različitim grupama korisnika. Razumevanje ovih percepcija ima za cilj da pomogne bankama u procesu optimizacije svojih aplikacija kako bi zadovoljile potrebe različitih demografskih grupa. Prepoznavanjem i razumevanjem demografskih varijacija u percepcijama korisnika, banke mogu da postignu da se njihove onlajn usluge percipiraju pozitivno kod različitih segmenata klijenata. Ovo, zauzvrat, može da dovede do povećanog zadovoljstva, lojalnosti i zadržavanja klijenata.

Rad je strukturiran na sledeći način. Pored uvoda, dat je pregled literature u kojoj se ističu ključni elementi koji određuju kvalitet aplikacija za onlajn bankarstvo. Nakon toga sledi prikaz metodologije istraživanja, uključujući hipoteze istraživanja, primenjeni upitnik, metode prikupljanja podataka i statističke alate koji su primenjeni za analizu podataka. Sledeći deo rada posvećen je rezultatima istraživanja i diskusiji dobijenih rezultata. Na kraju, zaključak sumira ključne rezultate istraživanja, njihove implikacije, ograničenja i sugestije za buduća istraživanja na ovu temu.

Pregled literature

Istraživači i praktičari su pokazali veliko interesovanje za onlajn bankarstvo zbog njegove rastuće uloge u finansijskom sektoru. Brojna istraživanja fokusirala su se na različite faktore koji su uticali na prihvatanje i korišćenje usluga onlajn bankarstva. Ključni faktori koji su istraživani fokusirali su se na usvajanje onlajn bankarstva, pri čemu su faktori poput stavova i namera korisnika imali ključnu ulogu u određivanju razloga i načina na koji klijenti odlučuju da koriste aplikacije za onlajn bankarstvo. Pored toga, tehnološke inovacije su posebno izučavane kao dominantni pokretač razvoja onlajn bankarstva, naglašavajući važnost napretka u mobilnim tehnologijama i internet uslugama za unapređenje korisničkog iskustva (Shahid et al., 2022).

Kao disruptivna inovacija, onlajn bankarstvo pruža brojne prednosti i bankama i klijentima, uključujući mogućnost praćenja stanja na računu, prenosa sredstava, plaćanja računa i obavljanja kupovine putem interneta (Chou & Chou, 2000). Onlajn bankarstvo povećava praktičnost i dostupnost usluga omogućavanjem digitalnih transakcija, čime se smanjuje potreba za fizičkim odlaskom u ekspoziture banaka (Amin, 2016). Pored toga, onlajn bankarstvo menja sektor finansijskih usluga podstičući inovacije, podržavajući rast i razvoj, i jačajući konkurentsku prednost banaka (Ayinaddis et al., 2023; Yang et al., 2023).

Kvalitet e-usluga privlači poslednjih godina značajnu pažnju i pozicionira se kao ključni kriterijum za procenu kvaliteta onlajn usluga. Istraživanje kvaliteta e-usluga obuhvata različite faktore koji doprinose percepciji klijenata o onlajn uslugama, naglašavajući potrebu da se kompanije fokusiraju na kontinuirano poboljšanje u oblastima kao što su jednostavnost korišćenja, pouzdanost i bezbednost kako bi se povećalo zadovoljstvo i lojalnost klijenata (Lukić Nikolić, 2025). Kvalitet e-usluge odnosi se na ukupnu ocenu klijentovog iskustva sa uslugama koje se isporučuju preko digitalnih platformi, fokusirajući se na aspekte kao što su funkcionalnost, efikasnost i bezbednost. E-usluge prvenstveno omogućavaju digitalni posrednici, nudeći klijentima opcije samoposluživanja koje su dostupne bilo kada i bilo gde (Malc et al., 2023). Pet ključnih komponenti kvaliteta bankarskih usluga koje utiču na zadovoljstvo i lojalnost e-korisnika su: e-korisnička usluga, organizacija sajta, efikasnost aplikacija, prilagođenost korisnicima i bezbednost i privatnost ličnih podataka (Gautam & Sah, 2023).

U kontekstu onlajn bankarstva, Herington i Weaven (2009) razvili su posebne skale za merenje kvaliteta usluga zasnovanih na ličnim potrebama, organizaciji sajta, prilagođenosti korisnicima i efikasnosti. Amin (2016) je takođe istraživao kvalitet usluga onlajn bankarstva koristeći višedimenzionalnu skalu koja uključuje lične potrebe, organizaciju sajta, prilagođenost korisnicima i efikasnost. U skorije vreme, Ui Haq i Awan (2020) fokusirali su se na pouzdanost, privatnost i bezbednost, veb dizajn i korisničku podršku tokom pandemije COVID-19, naglašavajući važnost kvaliteta usluga u sektoru onlajn bankarstva koji se sve brže razvija.

Efikasnost predstavlja ključni aspekt kvaliteta usluga onlajn bankarstva. Obuhvata jednostavnost aplikacije za korisnika, pouzdanost i celokupnu organizaciju informacija i usluga (Tomić et al., 2023). Efikasnost se takođe može posmatrati kao jedan od ključnih faktora koji utiču na odluku o usvajanju usluga onlajn bankarstva, jer nudi praktičnu alternativu tradicionalnom bankarstvu.

Pored toga, privatnost i bezbednosne karakteristike usluga onlajn bankarstva su od presudne važnosti. Ovi atributi obezbeđuju zaštitu ličnih i finansijskih informacija klijenata, ali i olakšavaju bezbedne transakcije u onlajn bankarskom okruženju (Malc et al., 2023). Efikasnost se odnosi na to koliko dobro aplikacija odgovara potrebama korisnika, dok se ispunjenje očekivanja u pogledu efikasnosti odnosi na blagovremenost i tačnost pružanja usluga.

Studija koja je primenila model prihvatanja tehnologije u cilju ispitivanja usvajanja mobilnog bankarstva među 202 studenta univerziteta u Srbiji pokazala je da su „percipirana korisnost" i „percipirana bezbednost" najznačajniji prediktori prihvatanja mobilnog bankarstva (Lukić et al., 2019). Još jedno istraživanje, koje je takođe imalo za cilj da identifikuje ključne faktore koji utiču na usvajanje mobilnog bankarstva u Srbiji koristeći isti teorijski model, sprovedeno je putem onlajn ankete na uzorku od 167 ispitanika tokom juna i jula 2020. godine. Rezultati su pokazali da su „informisanost o mobilnom bankarstvu", „percipirana korisnost" i „percipirana bezbednost" statistički značajni faktori koji utiču na nameru korisnika da u budućnosti usvoje mobilno bankarstvo (Antonijević et al., 2021).

Grönroos (2007) naglašava važnost adresiranja ličnih karakteristika korisnika, kao što su njihove demografske karakteristike, način života i preferencije, kako bi se uvele nove funkcije koje su u skladu sa očekivanjima korisnika i poboljšalo njihovo opšte zadovoljstvo. Prethodne studije su istraživale različite faktore koji mogu da utiču na percepciju korisnika o onlajn bankarskim uslugama, posebno u pogledu efikasnosti, dostupnosti i lakoće uspostavljanja kontakta sa bankom. Jedan od istraživanih faktora je pol, a istraživanja sugerišu da korisnici različitog pola mogu drugačije da percipiraju aplikacije za onlajn bankarstvo. Neke studije su otkrile da rodne razlike u percepciji onlajn bankarstva mogu da utiču na to kako korisnici procenjuju atribute usluge kao što su efikasnost i lakoća korišćenja aplikacija (Laukkanen, 2016). Isto tako, utvrđeno je da godine utiču na komfor korisnika i stepen poznavanja tehnologije, što zauzvrat može da utiče na njihovu percepciju usluga onlajn bankarstva. Stariji korisnici, na primer, mogu da imaju različita očekivanja u pogledu efikasnosti i lakoće korišćenja aplikacija za onlajn bankarstvo u poređenju sa mlađim korisnicima koji su više upućeni u tehnologiju (Amin, 2016; Laukkanen, 2016). Stepen obrazovanja je takođe faktor koji može da oblikuje percepciju korisnika o onlajn bankarstvu. Korisnici sa višim nivoom obrazovanja imaju različita očekivanja u pogledu funkcionalnosti i bezbednosti aplikacija za onlajn bankarstvo – veća je verovatnoća da daju prioritet funkcijama kao što su privatnost i dostupnost aplikacije, kao i celokupno korisničko iskustvo (Herington & Weaven, 2009).

Metodologija istraživanja

Hipoteze postavljene u ovom radu su sledeće:

Hipoteza 1: Ne postoji statistički značajna razlika u percepciji efikasnosti, dostupnosti i lakoće uspostavljanja kontakta među muškim i ženskim korisnicima aplikacija za onlajn bankarstvo.

Hipoteza 2: Ne postoji statistički značajna razlika u percepciji efikasnosti, dostupnosti i lakoće uspostavljanja kontakta u okviru aplikacija za onlajn bankarstvo među korisnicima različitih starosnih grupa.

Hipoteza 3: Ne postoji statistički značajna razlika u percepciji efikasnosti, dostupnosti i lakoće uspostavljanja kontakta u okviru aplikacija za onlajn bankarstvo u zavisnosti od nivoa obrazovanja korisnika.

Istraživanje je sprovedeno primenom posebno koncipiranog upitnika koji su popunjavali korisnici usluga onlajn bankarstva u Srbiji. Upitnik se sastojao iz dva dela. Prvi deo upitnika obuhvatio je četiri pitanja koja se odnose na ispitanike: pol, starost, obrazovanje i stepen njihovog zadovoljstva aplikacijom za onlajn bankarstvo. Drugi deo upitnika obuhvatio je tri skale pod nazivom efikasnost, dostupnost i lakoća uspostavljanja kontakta sa bankom. Skale su se sastojale od ukupno 11 tvrdnji koje se odnose na funkcionalnost aplikacija za onlajn bankarstvo. **Skala efikasnosti** (4 tvrdnje) procenjuje jednostavnost korišćenja aplikacije za onlajn bankarstvo i korisničko iskustvo, fokusirajući se na faktore kao što su brz pristup, intuitivan dizajn, organizacija informacija i efikasnost realizacije transakcija. Cilj skale je da proceni koliko lako korisnici mogu da se kreću kroz aplikaciju i izvršavaju željene transakcije. **Skala dostupnosti** (4 tvrdnje) procenjuje pouzdanost i performanse aplikacije za onlajn bankarstvo, fokusirajući se na faktore kao što su nesmetan rad, dosledna pristupačnost i proaktivna komunikacija u vezi sa održavanjem ili ažuriranjima. **Skala lakoća uspostavljanja kontakta** (3 tvrdnje) meri dostupnost i raspoloživost korisničke podrške u okviru aplikacije za onlajn bankarstvo, fokusirajući se na prisustvo servisa za ćaskanje, lakoću pronalaženja informacija o kontaktima i lociranje najbližih ekspozitura. Ova skala procenjuje koliko efikasno aplikacija pruža pomoć korisnicima i resurse za rešavanje problema ili pružanje dodatne podrške. Tvrdnje u okviru navedenih skala su formirane po uzoru na rad Malc-a i saradnika (2023) i prikazane su u tabelama 4, 5 i 6.

Prosečno vreme popunjavanja upitnika bilo je 10 minuta. Uzorak za ovo istraživanje formiran je primenom metoda pogodnog uzorkovanja, što podrazumeva odabir ispitanika na osnovu njihove dostupnosti i spremnosti da učestvuju u istraživanju. Ciljna populacija u ovom istraživanju bili su aktivni korisnici usluga onlajn bankarstva u Srbiji. Uzorak nije unapred definisan na osnovu statističkih kriterijuma reprezentativnosti, već je formiran tako što je istraživački instrument (upitnik) učinjen dostupnim široj grupi relevantnih korisnika. Link ka upitniku distribuiran je putem više komunikacionih kanala: (1) putem društvenih mreža (Facebook, LinkedIn), (2) postavljanjem u tematske forume i specijalizovane grupe posvećene digitalnom bankarstvu, i (3) direktnim kontaktiranjem potencijalnih ispitanika putem elektronske pošte, uz kratko objašnjenje svrhe istraživanja i poziv za učešće. Na ovaj način su potencijalni ispitanici identifikovani na osnovu interesovanja i/ili prethodnog angažmana u temama vezanim za digitalno bankarstvo, a u slučaju direktne komunikacije – na osnovu poznate činjenice da koriste onlajn bankarske usluge. Na osnovu analitike sa društvenih mreža i evidencije o broju poslatih mejlova, procenjuje se da je upitnik videlo oko 500 potencijalnih ispitanika. U periodu od avgusta 2024. do februara 2025. godine na upitnik je odgovorilo ukupno 198 ispitanika, što predstavlja stopu odgovora od skoro 40% i smatra se zadovoljavajućom stopom u društvenim naukama (De Vaus, 2013). Ispitanici su dobrovoljno učestvovali u istraživanju, uz punu saglasnost za korišćenje njihovih podataka u svrhu naučnog istraživanja.

Prikupljeni odgovori su obrađeni primenom Microsoft® Excel® 2019 i Statistical Software for Social Sciences (SPSS), verzija 26. Kolmogorov-Smirnov test je korišćen za procenu normalnosti distribucije podataka. Pošto su rezultati sa značajnošću Sig.=0,000 pokazali da pretpostavka normalnosti distribucije podataka nije zadovoljena, za statističku analizu primenjene su neparametarske tehnike. Man-Whitney test je korišćen za poređenje razlika između dve grupe, dok je Kruskal-Wallis test korišćen za poređenje razlika između tri ili više grupa sa intervalom poverenja od 95%. Levenov test jednakosti varijansi primenjen je u svim testovima upoređujući razlike među grupama, zadovoljavajući pretpostavku o homogenoj varijansi u svim slučajevima ($p > 0{,}05$).

U tabeli 1 prikazani su rezultati Kronbahovog Alfa koeficijenta za sve tri korišćene skale. Sve vrednosti su iznad praga od 0,7, što ukazuje na visoku pouzdanost korišćenih skala.

Tabela 1 - Vrednosti Kronbahovog Alfa koeficijenta za merne skale

Br.	Skale	N	Kronbah Alfa
1.	Efikasnost	**4**	0,904
2.	Dostupnost	**4**	0,831
3.	Lakoća uspostavljanja kontakta	**3**	0,767

Rezultati istraživanja i diskusija

Tabela 2 prikazuje osnovne informacije o ispitanicima. Uzorak se sastoji od većeg učešća ispitanika ženskog pola (63,1%) u odnosu na muškarce (36,9%). Starosna distribucija pokazuje da je najveći broj ispitanika (40,4%) u starosnoj dobi od 35 do 44 godine. Sledeća najveća grupa je kategorija od 45 do 54 godine (24,2%). Mlađe starosne grupe (18-24 godine i 25-34 godine) predstavljaju manji udeo u uzorku (16,2% i 12,1%, respektivno). Obrazovna struktura ispitanika otkriva pretežno visoko obrazovane ispitanike, pri čemu više od polovine (51,0%) ima fakultetske diplome (završene osnovne ili master studije). Dodatno, 17,7% ispitanika je završilo doktorske studije. Manji procenat ispitanika ima završenu srednju školu (16,7%) i višu školu (14,6%).

Tabela 2 - Osnovne informacije o ispitanicima

	N	%
Pol		
Muški	73	36,9
Ženski	125	63,1
Starost		
Od 18 do 24	32	16,2
Od 25 do 34	24	12,1
Od 35 do 44	80	40,4
Od 45 do 54	48	24,2
Preko 54 godine	14	7,1
Obrazovanje		
Srednja škola	33	16,7
Viša škola	29	14,6
Fakultet (osnovne ili master studije)	101	51,0
Fakultet (doktorske studije)	35	17,7

Tabela 3 prikazuje rezultate vezane za zadovoljstvo ispitanika aplikacijama za onlajn bankarstvo, mereno na Likertovoj petostepenoj skali. Prosečna ocena zadovoljstva ispitanika je 4,41. Ovo ukazuje da su, u proseku, ispitanici relativno zadovoljni aplikacijama za onlajn bankarstvo. Standardna devijacija od 0,754 ukazuje na umeren nivo doslednosti u odgovorima. Većina ispitanika (otprilike 89%) odgovorila je da je zadovoljna ili potpuno zadovoljna aplikacijama za onlajn bankarstvo (34,3% zadovoljno i 54,6% potpuno zadovoljno). Nizak procenat ispitanika (2,5%) je nezadovoljan, dok je 8,6% ispitanika zauzelo neutralan stav.

Tabela 3 - Deskriptivna statistika stepena zadovoljstva ispitanika aplikacijama za onlajn bankarstvo

Br.	Tvrdnja	M	SD	Ocene	N	%
1.	Zadovoljan/a sam aplikacijom za onlajn bankarstvo.	4,41	0,754	1	0	0,0
				2	5	2,5
				3	17	8,6
				4	68	34,3
				5	108	54,6

Tabela 4 predstavlja rezultate deskriptivne statistike za **skalu efikasnosti.** Tvrdnja da ispitanici mogu lako i brzo pristupiti aplikaciji za onlajn bankarstvo ima srednju vrednost 4,55, što ukazuje na visok nivo slaganja sa ovom tvrdnjom. Ova visoka srednja vrednost sugeriše da, generalno, korisnici smatraju da su aplikacije za onlajn bankarstvo veoma pristupačne i efikasne za korišćenje. Standardna devijacija od 0,840 odražava izvesnu varijabilnost u odgovorima, ali relativno niska vrednost implicira da većina korisnika deli slično pozitivno iskustvo u pogledu pristupačnosti aplikacije. U pogledu distribucije odgovora, značajna većina ispitanika, 72,3% (143 ispitanika), se u potpunosti slaže sa tvrdnjom, dok se 14,6% (29 ispitanika) slaže. Samo 10,6% (21 ispitanik) je izrazilo neutralan stav, a veoma mali procenat, 2,5% (5 ispitanika) ili se ne slaže ili se u potpunosti ne slaže.

Tvrdnja o lakoći korišćenja aplikacije za onlajn bankarstvo ima srednju vrednost 4,50, što ukazuje da ispitanici uglavnom smatraju da je aplikacija laka za korišćenje. Standardna devijacija od 0,841 otkriva umeren nivo varijabilnosti u odgovorima, ali je i dalje relativno nizak, što implicira da većina ispitanika deli slično pozitivno iskustvo u pogledu lakoće korišćenja. Distribucija odgovora dalje ide u prilog tome, sa 66,7% (132 ispitanika) koji se u potpunosti slažu, a 20,7% (41 ispitanik) se slaže sa tvrdnjom. Nizak procenat ispitanika, 10,6% (21 ispitanik), izrazio je neutralan stav, dok se samo 2,0% (4 ispitanika) nije složilo. Ovi rezultati sugerišu da ispitanici percipiraju aplikacije za onlajn bankarstvo kao jednostavne za korišćenje.

Tvrdnja o organizaciji i intuitivnosti informacija u aplikaciji za onlajn bankarstvo ima srednju vrednost 4,14, što ukazuje da iako se većina ispitanika slaže da su informacije u aplikaciji dobro organizovane i intuitivne, nivo slaganja je nešto niži od prethodne tvrdnje o jednostavnosti korišćenja aplikacije. Standardna devijacija od 0,982 ukazuje na veću varijabilnost u odgovorima u poređenju sa prethodnom tvrdnjom, što ukazuje na to da neki ispitanici ne smatraju organizaciju i raspored tako intuitivnim ili dobro strukturiranim. Distribucija odgovora pokazuje da se 46,4% (92 ispitanika) u potpunosti slaže, a 29,3% (58 ispitanika) se slaže sa tvrdnjom. Međutim, 17,7% (35 ispitanika) je izrazilo neutralan stav, a mali procenat, 6,6% (13 ispitanika) se ne slaže sa tvrdnjom. Ovo ukazuje da, iako većina ispitanika smatra da su informacije u aplikaciji dobro organizovane, postoje mogućnosti za poboljšanje, posebno za manju grupu ispitanika koji su bili manje zadovoljni organizacijom i intuitivnošću aplikacije.

Tvrdnja o mogućnosti brze realizacije transakcija u aplikaciji za onlajn bankarstvo ima najveću srednju vrednost od 4,60, što ukazuje da se velika većina ispitanika slaže da aplikacija omogućava brze transakcije. Standardna devijacija od 0,798 odražava relativno nizak nivo varijabilnosti u odgovorima, što sugeriše da većina ispitanika deli slično, veoma pozitivno iskustvo kada je reč o brzini realizacije transakcija. Što se tiče distribucije odgovora, sa tvrdnjom se u potpunosti slaže 75,3% (149 ispitanika), a 13,1% (26 ispitanika) se slaže. Samo mali deo ispitanika, 9,1% (18 ispitanika) izrazio je neutralan stav, a još manji deo, 2,5% (5 ispitanika), se ne slaže. Ovi rezultati ukazuju na to da je aplikacija za onlajn bankarstvo veoma efikasna jer omogućava korisnicima da brzo i u bilo koje vreme realizuju svoje transakcije.

Tabela 4 - Deskriptivna statistika u pogledu efikasnosti aplikacija za onlajn bankarstvo

Br.	Tvrdnje	M	SD	Ocene	N	%
1.	Brzo i jednostavno mogu da pristupim aplikaciji za onlajn bankarstvo.	4,55	0,840	**1**	3	1,5
				2	2	1,0
				3	21	10,6
				4	29	14,6
				5	143	72,3
2.	Korišćenje aplikacije za onlajn bankarstvo je jednostavno..	4,50	0,841	**1**	4	2,0
				2	0	0,0
				3	21	10,6
				4	41	20,7
				5	132	66,7
3.	Informacije u aplikaciji za onlajn bankarstvo su funkcionalno i logički dobro organizovane u pogledu korisničkog iskustva.	4,14	0,982	**1**	3	1,5
				2	10	5,1
				3	35	17,7
				4	58	29,3
				5	92	46,4
4.	Aplikacija za onlajn bankarstvo mi omogućava da brzo realizujem željene transakcije u bilo koje vreme.	4,60	0,798	**1**	2	1,0
				2	3	1,5
				3	18	9,1
				4	26	13,1
				5	149	75,3

Tabela 5 predstavlja rezultate deskriptivne statistike za **skalu dostupnosti**. Tvrdnja o lakom pokretanju aplikacije za onlajn bankarstvo ima srednju vrednost 4,35, što sugeriše da se većina korisnika slaže da se aplikacija pokreće bez ikakvih problema. Ovo je pozitivan rezultat, jer ukazuje da se korisnici generalno ne suočavaju sa značajnim preprekama kada pokušavaju da pokrenu aplikaciju. Standardna devijacija od 0,882 odražava umerenu varijabilnost u odgovorima, što sugeriše da iako većina korisnika ima pozitivno iskustvo, postoje ispitanici sa različitim stepenom zadovoljstva. Distribucija odgovora pokazuje da se 57,1% (113 ispitanika) u potpunosti slaže, a 26,3% (52 ispitanika) slaže sa tvrdnjom. Nizak procenat ispitanika, 12,1% (25 ispitanika), ostao je neutralan, a 4,5% (9 ispitanika) se ne slaže, dok se 0,5% (1 ispitanik) u potpunosti ne slaže. Ovaj rezultat ukazuje da većina korisnika nema značajnih problema sa pokretanjem aplikacije, iako nekoliko korisnika prijavljuje povremene poteškoće.

Tvrdnja o nesmetanom radu aplikacije za onlajn bankarstvo ima srednju vrednost 3,89, što ukazuje na pozitivan, ali umereniji nivo slaganja u poređenju sa drugim tvrdnjama. Standardna devijacija od 1,034 ukazuje na veći stepen varijabilnosti u odgovorima, što sugeriše da se korisnička iskustva sa performansama aplikacije u nešto većoj meri razlikuju. Distribucija odgovora pokazuje da se 32,3% (64 ispitanika) u potpunosti slaže i 37,9% (75 ispitanika) slaže, što je pozitivan rezultat. Međutim, 19,7% (39 ispitanika) je izrazilo neutralan stav, 10,1% (20 ispitanika) se ne slaže, dok se 3,0% (6 ispitanika) u potpunosti ne slaže. Ovi rezultati sugerišu da iako aplikacija radi dobro za većinu korisnika, još uvek postoji značajan broj ispitanika koji se suočavaju sa prekidima ili zastojima, što ukazuje da na ovom polju postoji prostor za poboljšanja.

Tvrdnja o tome da je aplikacija uvek dostupna i funkcionalna ima srednju vrednost 4,30, što odražava snažnu pozitivnu percepciju njene dostupnosti i pouzdanosti. Standardna devijacija od 0,889 ukazuje na umeren nivo doslednosti u korisničkom iskustvu, pri čemu većina ispitanika deli slične stavove o pouzdanosti aplikacije. U pogledu distribucije odgovora, 52,1% (103 ispitanika) se u potpunosti slaže, a 32,3% (64 ispitanika) se slaže, što pokazuje da većina korisnika aplikaciju smatra pristupačnom i funkcionalnom. Samo 10,6% (21 ispitanik) je ostalo neutralno, a 5,0% (10 ispitanika) se ne slaže sa tvrdnjom, dok se 1,0% (2 ispitanika) u potpunosti ne slaže. Ovi rezultati sugerišu da, iako je aplikacija veoma funkcionalna za većinu korisnika, postoji mali broj onih koji su iskusili probleme sa pristupačnošću ili funkcionalnošću.

Tvrdnja o prijemu obaveštenja o zakazanim održavanjima ili ažuriranjima aplikacije ima srednju vrednost 4,19, što ukazuje na relativno visok nivo saglasnosti korisnika da su obavešteni o prekidima aplikacije usled potrebe za održavanjem ili ažuriranjem. Standardna devijacija od 1,133 sugeriše da postoji veća varijabilnost u odgovorima u poređenju sa drugim tvrdnjama u okviru ove skale, verovatno zbog različitih iskustava u sistemu obaveštavanja. Distribucija odgovora pokazuje da se 56,1% (111 ispitanika) u potpunosti slaže, a 21,7% (43 ispitanika) slaže, što sugeriše da je većina korisnika zadovoljna komunikacijom o zakazanim održavanjima ili ažuriranjima. Međutim, 12,1% (24 ispitanika) je bilo neutralno u svojim odgovorima, dok se 10,1% (20 ispitanika) ne slaže, a 4,5% (9 ispitanika) u potpunosti ne slaže. Ovi rezultati pokazuju da iako većina korisnika prima obaveštenja, postoji manja grupa koja ih ili ne prima ili nije zadovoljna komunikacijom, što sugeriše da postoji prostor za poboljšanje ovog segmenta aplikacija za onlajn bankarstvo.

Tabela 5 - Deskriptivna statistika u pogledu dostupnosti aplikacija za onlajn bankarstvo

Br.	Tvrdnje	M	SD	Ocene	N	%
1.	Aplikacija za onlajn bankarstvo se pokreće lako, bez poteškoća.	4,35	0,882	**1**	1	0,5
				2	8	4,0
				3	25	12,1
				4	52	26,3
				5	113	57,1
2.	Prilikom korišćenja aplikacije za onlajn bankarstvo ne dolazi do prekida i zastoja u radu.	3,89	1,034	**1**	6	3,0
				2	14	7,1
				3	39	19,7
				4	75	37,9
				5	64	32,3
3.	Aplikacija za onlajn bankarstvo mi je uvek dostupna i funkcionalna.	4,30	0,889	**1**	2	1,0
				2	8	4,0
				3	21	10,6
				4	64	32,3
				5	103	52,1
4.	Uredno dobijam obaveštenja o najavljenom prekidu rada aplikacije kada su planirani radovi na nadogradnji ili ažuriranju sistema.	4,19	1,133	**1**	9	4,5
				2	11	5,6
				3	24	12,1
				4	43	21,7
				5	111	56,1

Tabela 6 prikazuje rezultate deskriptivne statistike za **skalu lakoća uspostavljanja kontakta**. Tvrdnja o lako dostupnoj usluzi za onlajn ćaskanje (onlajn četbot) ima srednju vrednost 3,06, što ukazuje na relativno neutralan ili mešovit odgovor ispitanika. Standardna devijacija od 1,454 ukazuje na značajnu varijabilnost u odgovorima, ukazujući na širok spektar mišljenja ispitanika. Distribucija odgovora pokazuje da je 27,3% (54 ispitanika) bilo neutralno, 23,8% (47 ispitanika) se u potpunosti složilo, a 14,6% (29 ispitanika) se složilo sa tvrdnjom da aplikacija za onlajn bankarstvo ima lako dostupnu uslugu četa. Međutim, 22,2% (44 ispitanika) se u potpunosti ne slaže, a 12,1% (24 ispitanika) se ne slaže, što ukazuje da značajan deo korisnika u aplikacijama za onlajn bankarstvo nema lako dostupnu uslugu onlajn četa.

Tvrdnja o pronalaženju kontakt informacija za korisničku podršku u aplikaciji za onlajn bankarstvo ima srednju vrednost od 3,57, što odražava donekle pozitivan, ali ne u velikoj meri visok nivo saglasnosti. Standardna devijacija od 1,349 ukazuje na to da postoji značajna varijabilnost u odgovorima, što znači da, dok nekim korisnicima kontakt informacije bivaju lako dostupne, drugi se mogu suočiti sa izazovima u njihovom pronalaženju. U pogledu distribucije odgovora, 34,9% (69 ispitanika) se u potpunosti složilo, a 19,7% (39 ispitanika) se složilo sa tvrdnjom, što je pozitivan ishod. Međutim, 23,2% (46 ispitanika) je ostalo neutralno, a 22,2% (44 ispitanika) se ne slaže ili se u potpunosti ne slaže. Ovi rezultati sugerišu da iako većina ispitanika relativno lako može da pronađe kontakt informacije za korisničku podršku, značajan deo se i dalje suočava sa poteškoćama ili je nezadovoljan vidljivošću i dostupnošću kontakt podataka.

Tvrdnja o lakoći pronalaženja najbližih ekspozitura u aplikaciji za onlajn bankarstvo ima srednju vrednost 3,59, što je nešto pozitivnije od prethodne dve tvrdnje, ali ipak ukazuje da bi se ova funkcija mogla dodatno optimizovati. Standardna devijacija od 1,306 odražava umerenu varijabilnost u odgovorima, što znači da iako je mnogim korisnicima lako da lociraju ekspoziture, još uvek postoji prilično neslaganja ili neutralnosti u vezi sa ovom funkcijom. Distribucija odgovora pokazuje da se 33,8% (67 ispitanika) u potpunosti slaže, a 20,7% (41 ispitanik) slaže sa tvrdnjom, što ukazuje na pozitivno iskustvo za značajan deo korisnika. Međutim, 25,8% (51 ispitanik) je bilo neutralno, dok se 19,7% (39 ispitanika) ne slaže ili se u potpunosti ne slaže. Ovi rezultati sugerišu da iako mnogi korisnici mogu lako da pronađu najbliže ekspoziture, značajan deo korisnika može imati poteškoća da pristupi ovoj funkciji ili nije zadovoljan načinom na koji su informacije predstavljene.

Tabela 6 - Deskriptivna statistika u pogledu lakoće uspostavljanja kontakta u aplikacijama za onlajn bankarstvo

Br.	Tvrdnje	M	SD	Ocene	N	%
1.	Aplikacija za onlajn bankarstvo ima lako dostupnu uslugu četa (onlajn četbota).	3,06	1,454	**1**	44	22,2
				2	24	12,1
				3	54	27,3
				4	29	14,6
				5	47	23,8
2.	Na aplikaciji za onlajn bankarstvo se lako može pronaći broj telefona ili imejl kontakt službe za rešavanje problema.	3,57	1,349	**1**	21	10,6
				2	23	11,6
				3	46	23,2
				4	39	19,7
				5	69	34,9
3.	Na aplikaciji za onlajn bankarstvo se lako mogu pronaći najbliže ekspoziture.	3,59	1,306	**1**	19	9,6
				2	20	10,1
				3	51	25,8
				4	41	20,7
				5	67	33,8

Rezultati statističkih testova i diskusija

Neparametarski statistički testovi su primenjeni za istraživanje potencijalnih statistički značajnih razlika u odgovorima ispitanika u pogledu efikasnosti, dostupnosti i lakoće uspostavljanja kontakta. Korišćeni su Mann-Whitney i Kruskal-Wallis testovi s obzirom na to da podaci nisu pokazali normalnu raspodelu.

U tabeli 7 prikazani su rezultati Mann-Whitney testa u pogledu polne strukture ispitanika.

Tabela 7 - Rezultati Mann-Whitney testa (polna struktura ispitanika)

Skala	Odgovor	N	M	Md	Mann-Whitney	Z	Asymp. Sig.
Efikasnost	Muško	73	4,36	4,75	4014,500	-1,467	0,142
	Žensko	125	4,50	4,75			
Dostupnost	Muško	73	4,08	4,25	3896,500	-1,735	0,083
	Žensko	125	4,25	4,50			
Lakoća uspostavljanja kontakta	Muško	73	3,38	3,33	4486,500	-0,197	0,844
	Žensko	125	3,42	3,67			

Za **skalu efikasnosti**, rezultati Mann-Whitney testa pokazuju srednju vrednost 4,36 za muškarce i 4,50 za žene, sa medijanom 4,75 za obe grupe. Mann-Whitney Z vrednost je -1,467, a asimptotska značajnost (p-vrednost) je 0,142. Dobijena p-vrednost je veća od uobičajeno korišćenog praga od 0,05, što sugeriše da ne postoji statistički značajna razlika između ispitanika muškog i ženskog pola u smislu njihove percepcije efikasnosti korišćenja aplikacije za onlajn bankarstvo. Dok ispitanici ženskog pola imaju nešto više srednje vrednosti, razlike nisu statistički značajne, što ukazuje da i muški i ženski korisnici generalno dele slična iskustva u pogledu efikasnosti aplikacija za onlajn bankarstvo.

Za **skalu dostupnosti**, Mann-Whitney test pokazuje da muškarci imaju srednju vrednost 4,08, dok žene imaju srednju vrednost 4,25. Vrednost medijane za muškarce je 4,25, a za žene 4,50. Mann-Whitney Z vrednost je -1,735, a asimptotska značajnost (p-vrednost) je 0,083. Dobijena p-vrednost je i dalje iznad praga od 0,05, što sugeriše da ne postoji statistički značajna razlika između muških i ženskih ispitanika u pogledu dostupnosti aplikacije za onlajn bankarstvo.

Za **skalu lakoća uspostavljanja kontakta**, muškarci imaju srednju vrednost 3,38, dok žene imaju srednju vrednost 3,42, sa medijanom 3,33 za muškarce i 3,67 za žene. Mann-Whitney Z vrednost je -0,197, a asimptotska značajnost (p-vrednost) je 0,844. Dobijena p-vrednost je mnogo viša od praga od 0,05, što ukazuje da ne postoje statistički značajne razlike između ispitanika muškog i ženskog pola u pogledu njihovog iskustva sa kontakt informacijama u aplikaciji za onlajn bankarstvo. Uprkos maloj razlici u srednjim vrednostima, razlika nije statistički značajna, što implicira da oba pola imaju sličan nivo zadovoljstva ili iskustva kada je u pitanju kontaktiranje korisničke podrške ili pronalaženje kontakt informacija u aplikaciji.

Na osnovu ovih rezultata, potvrđena je **hipoteza 1** da ne postoji statistički značajna razlika između korisnika različitog pola u percepciji efikasnosti, dostupnosti i lakoće uspostavljanja kontakta u okviru aplikacije za onlajn bankarstvo.

U tabeli 8 prikazani su rezultati Kruskal-Wallis testa u pogledu starosne strukture ispitanika.

Tabela 8 - Rezultati Kruskal-Wallis testa (starosna struktura ispitanika)

Skala	Odgovor	N	M	Md	Kruskal-Wallis	df	Asymp. Sig.
Efikasnost	Od 18 do 24	32	4,67	5,00	7,919	4	0,095
	Od 25 do 34	24	4,31	4,75			
	Od 35 do 44	80	4,52	4,75			
	Od 45 do 54	48	4,37	4,75			
	Preko 54 godine	14	4,04	4,50			
Dostupnost	Od 18 do 24	32	4,39	4,63	3,654	4	0,455
	Od 25 do 34	24	4,05	4,25			
	Od 35 do 44	80	4,21	4,25			
	Od 45 do 54	48	4,11	4,50			
	Preko 54 godine	14	4,04	4,50			
Lakoća uspostavljanja kontakta	Od 18 do 24	32	3,75	3,83	5,567	4	0,234
	Od 25 do 34	24	3,54	3,33			
	Od 35 do 44	80	3,32	3,33			
	Od 45 do 54	48	3,38	3,33			
	Preko 54 godine	14	2,95	3,33			

Za **skalu efikasnosti**, statistika Kruskal-Wallis testa je 7,919, a asimptotska značajnost (p-vrednost) je 0,095. Pošto je dobijena p-vrednost veća od praga od 0,05, ne postoji statistički značajna razlika u uočenoj efikasnosti aplikacije za onlajn bankarstvo u različitim starosnim grupama. Iako su ispitanici od 18 do 24 godine zabeležili najveću srednju vrednost (4,67), ova razlika ne dostiže statistički značaj, što sugeriše da sve starosne grupe slično doživljavaju efikasnost aplikacije.

Za **skalu dostupnosti**, statistika Kruskal-Wallis testa je 3,654, a asimptotska značajnost (p-vrednost) je 0,455, što je znatno iznad praga značajnosti od 0,05. Dakle, ne postoji statistički značajna razlika između starosnih grupa u pogledu dostupnosti aplikacije za onlajn bankarstvo. Iako postoje određene varijacije u srednjim vrednostima, sa najvišom srednjom vrednošću (4,39) kod ispitanika starosti od 18 do 24 godine, ove razlike nisu statistički značajne, što sugeriše da sve starosne grupe slično doživljavaju dostupnost aplikacije.

Za **skalu lakoća uspostavljanja kontakta**, statistika Kruskal-Wallis testa je 5,567, a asimptotska značajnost (p-vrednost) je 0,234, što je takođe veće od praga od 0,05. Ovaj rezultat ukazuje da ne postoji statistički značajna razlika između starosnih grupa u pogledu karakteristika koje se odnose na kontakt prilikom korišćenja aplikacije za onlajn bankarstvo. Iako je primetan pad srednjih vrednosti za starije starosne grupe, pri čemu oni stariji od 54 godine beleže najnižu srednju vrednost (2,95), ove razlike nisu statistički značajne, što sugeriše da starosna dob nema značajan uticaj na korisničko iskustvo u pogledu lakoće uspostavljanja kontakta.

Na osnovu ovih rezultata, potvrđena je **hipoteza 2**, da ne postoji statistički značajna razlika u uočenoj efikasnosti, dostupnosti i lakoći uspostavljanja kontakta u okviru aplikacije za onlajn bankarstvo među različitim starosnim grupama.

U tabeli 9 prikazani su rezultati Kruskal-Wallis testa u pogledu nivoa obrazovanja ispitanika.

Tabela 9 - Rezultati Kruskal-Wallis testa (obrazovni nivo ispitanika)

Skala	Odgovor	N	M	Md	Kruskal-Wallis	df	Asymp. Sig.
Efikasnost	Srednja škola	33	4,16	4,50	7,358	3	0,061
	Viša škola	29	4,63	5,00			
	Fakultet (osnovne i master studije)	101	4,47	4,75			
	Fakultet (doktorske studije)	35	4,51	4,75			
Dostupnost	Srednja škola	33	3,97	4,25	1,738	3	0,629
	Viša škola	29	4,16	4,50			
	Fakultet (osnovne i master studije)	101	4,26	4,50			
	Fakultet (doktorske studije)	35	4,19	4,25			
Lakoća uspostavljanja kontakta	Srednja škola	33	3,25	3,67	4,911	3	0,178
	Viša škola	29	3,82	4,00			
	Fakultet (osnovne i master studije)	101	3,39	3,33			
	Fakultet (doktorske studije)	35	3,25	3,00			

Za **skalu efikasnosti**, statistika Kruskal-Wallis testa je 7,358, sa p-vrednošću od 0,061. Dobijena p-vrednost je nešto iznad praga značajnosti od 0,05, što sugeriše da ne postoji statistički značajna razlika u percipiranoj efikasnosti aplikacije među ispitanicima različitog nivoa obrazovanja. Iako je srednja vrednost za ispitanike sa višom školom (4,63) viša nego za druge grupe, razlika nije statistički značajna. To implicira da su percepcije efikasnosti korišćenja aplikacije za onlajn bankarstvo uglavnom slične među ispitanicima, bez obzira na njihov obrazovni nivo.

Za **skalu dostupnosti**, statistika Kruskal-Wallis testa je 1,738, sa p-vrednošću od 0,629, što je znatno iznad praga od 0,05. Ovaj rezultat ukazuje da ne postoji statistički značajna razlika u percipiranoj dostupnosti aplikacije za onlajn bankarstvo među ispitanicima različitih obrazovnih nivoa. Uprkos manjim varijacijama u srednjim vrednostima, pri čemu su ispitanici sa univerzitetskim obrazovanjem (i na osnovnim i master i na doktorskim studijama) zabeležili nešto više rezultate od onih sa srednjom školom, ali ove razlike nisu statistički značajne. Stoga se dostupnost kontakt podataka generalno doživljava slično u različitim obrazovnim grupama.

Statistika Kruskal-Wallis testa za skalu **lakoća uspostavljanja kontakta** je 4,911, sa p-vrednošću od 0,178, što je opet iznad praga značajnosti od 0,05. Ovaj rezultat ukazuje da ne postoji statistički značajna razlika između nivoa obrazovanja u vezi sa karakteristikama aplikacije za onlajn bankarstvo koje se odnose na lakoću uspostavljanja kontakta. Dok ispitanici sa fakultetskim obrazovanjem beleže najvišu srednju vrednost (3,82), razlike nisu statistički značajne, što ukazuje na to da korisnici različitog obrazovnog nivoa generalno slično percipiraju karakteristike aplikacije koje se odnose na kontakt.

Na osnovu ovih rezultata, potvrđena je **hipoteza 3** da ne postoji statistički značajna razlika u uočenoj efikasnosti, dostupnosti i lakoći uspostavljanja kontakta u okviru aplikacije za onlajn bankarstvo u odnosu na nivo obrazovanja ispitanika.

Zaključak

U radu je sprovedeno istraživanje zasnovano na podacima prikupljenim putem posebno koncipiranog onlajn upitnika, kojim je obuhvaćeno 198 korisnika onlajn bankarstva u Srbiji, sa ciljem da se ispita uticaj demografskih faktora na percepciju efikasnosti, dostupnosti i lakoće uspostavljanja kontakta sa bankom. Rezultati statističkih testova koji su primenjeni u ovom istraživanju pokazali su da demografski faktori, uključujući pol, starost i nivo obrazovanja, nemaju statistički značajan uticaj na zadovoljstvo korisnika aplikacijama za onlajn bankarstvo. Na svim testiranim skalama - efikasnost, dostupnost i lakoća uspostavljanja kontakta - ispitanici iz različitih demografskih grupa iskazali su slična mišljenja i percepcije u pogledu aplikacija za onlajn bankarstvo. Bilo da su korisnici bili muškog ili ženskog pola, iz različitih starosnih grupa ili sa različitim nivoima obrazovanja, funkcionalnost aplikacije i korisničko iskustvo su bili približno slično ocenjeni. Ispitanici su generalno izrazili visok nivo zadovoljstva sa aplikacijama za onlajn bankarstvo, pri čemu je većina korisnika ocenila svoje iskustvo pozitivno, što je potvrđeno prosečnom ocenom od 4,41 i visokim procentom korisnika koji su zadovoljni i u potpunosti zadovoljni.

Dobijeni rezultati su značajni jer ukazuju na to da su aplikacije za onlajn bankarstvo dostigle nivo upotrebljivosti i dostupnosti koji zadovoljava različite grupe korisnika. Dizajn i funkcionalnost ovih aplikacija su ocenjeni kao efikasni u pružanju usluga različitim korisnicima, nudeći doslednu i efikasnu uslugu bez obzira na demografske karakteristike korisnika. Ova uniformnost u zadovoljstvu korisnika ukazuje na to da su aplikacije za onlajn bankarstvo intuitivne, jednostavne za korišćenje i koncipirane tako da zadovolje potrebe različitih korisnika.

Štaviše, dobijeni rezultati naglašavaju rastući značaj dizajna koji treba u potpunosti da bude usmeren na korisnika prilikom razvoja aplikacija za onlajn bankarstvo. Pristup usmeren na korisnika, koji u fokusu ima dostupnost, jednostavnost korišćenja i pouzdanost, ključan je za obezbeđivanje pozitivnog iskustva za sve korisnike. U sve digitalnijem svetu, gde se od bankarskih usluga očekuje da budu dostupne 24/7, sposobnost aplikacije da zadovolji različite korisničke potrebe postaje ključni faktor u održavanju angažovanosti i zadovoljstva klijenata. Mogućnost aplikacije da pruži pouzdano i jednostavno iskustvo ukazuje da je prilikom dizajniranja aplikacije stavljen fokus na zadovoljstvo korisnika. Na kraju, rezultati sugerišu da uspeh aplikacija za onlajn bankarstvo ne podrazumeva potrebu da se zadovolje specifične demografske grupe, već da se pruži univerzalno primenljiv i jednostavan interfejs. Ovo pojačava potrebu da finansijske institucije i programeri aplikacija nastave da se fokusiraju na kreiranje aplikacija koje su efikasne i pouzdane, osiguravajući da svi korisnici, bez obzira na njihove karakteristike, mogu da ih koriste sa poverenjem i lakoćom.

Ovo istraživanje ima nekoliko ograničenja koja treba uzeti u obzir. Prvo, iako veličina uzorka od 198 ispitanika pruža razumnu osnovu za analizu, uzorak je obuhvatio samo korisnike usluga onlajn bankarstva u Srbiji. Kao takvi, rezultati nisu direktno primenljivi na druge regione ili zemlje sa različitim bankarskim praksama, kulturnim kontekstima ili tehnološkom infrastrukturom. Drugi ograničavajući faktor je što su podaci prikupljeni putem upitnika koji generalno podrazumevaju da ispitanici samostalno upisuju svoje odgovore što može da dovede do pristrasnosti i odgovora za koje ispitanici veruju da su društveno prihvatljiviji ili očekivani. Treće, iako istraživanje ispituje uticaj pola, starosti i obrazovanja na percepciju korisnika, drugi važni demografski faktori (kao što su prihod, profesija ili geografska lokacija unutar Srbije) nisu uzeti u obzir. Ovi faktori bi mogli da utiču na iskustva korisnika kada je reč o onlajn bankarskim aplikacijama, a njihovo izostavljanje ograničava mogućnost generalizacije dobijenih rezultata.

S obzirom na gore navedena ograničenja, preporuka je da buduća istraživanja na ovu temu obuhvate više zemalja. Veći i raznovrsniji uzorak koji bi uključio korisnike iz različitih regiona ili zemalja pomogao bi u analiziranju da li su rezultati isti ili ne u različitim kulturnim kontekstima, bankarskim sistemima i tehnološkim infrastrukturnim okvirima. Takođe, buduća istraživanja mogla bi da primene i alternativne metode prikupljanja podataka kako bi se minimizirale pristrasnosti do kojih mogu da dovedu upitnici. Na kraju, buduća istraživanja bi mogla da obuhvate širi skup demografskih faktora koji bi mogli da utiču na percepciju korisnika o aplikacijama za onlajn bankarstvo. Faktori kao što su prihod, zanimanje i geografska lokacija unutar određene zemlje (ili između više regiona) mogli bi da daju korisne zaključke o tome kako različiti segmenti populacije reaguju na aplikacije za onlajn bankarstvo. Razmatranjem ovih dodatnih varijabli, buduća istraživanja mogu da doprinesu dubljem razumevanju različitih faktora koji oblikuju korisničko iskustvo i zadovoljstvo sa onlajn bankarstvom.

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THE IMPACT OF DEMOGRAPHIC FACTORS ON USER PERCEPTIONS OF ONLINE BANKING APPLICATIONS: A STUDY OF EFFICIENCY, AVAILABILITY, AND EASE OF CONTACT

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Abstract: *This paper examines how demographic factors influence user perceptions of online banking ap-plications, focusing on key aspects such as efficiency, availability, and ease of contact within banking ap-plications. The research was conducted using a specially designed questionnaire that was implemented via the Google Forms platform in electronic form. The questionnaire was distributed to users of online banking in Serbia in the period from August 2024 to February 2025. A total of 198 respondents participated in re-search, with the data analyzed through non-parametric statistical methods, including the Mann-Whitney and Kruskal-Wallis tests. The results indicate no significant differences in users' perceptions of efficiency, availability, or ease of contact in online banking applications based on gender, age, and education. These findings provide valuable insights into the design and optimization of online banking services, highlighting that demographic factors do not significantly affect user satisfaction in these areas.*

Keywords: online banking, service quality, user perception, efficiency, customer contact, customer experience

JEL classification: D12, O33, G21

Introduction

The rise of information and communication technology has transformed banking, shifting from traditional, in-person services to various online formats (Chaimaa et al., 2021). Service quality in the context of online banking refers to the customer's perception of how well the service delivered meets their expectations (Mujinga, 2020). Parasuraman et al. (2005) defined service quality as the comparison between the actual service and the expected service. They argue that service quality plays a critical role in maintaining a competitive advantage for organizations, positively impacting their financial performance. As service quality improves, it fosters customer loyalty and contributes to increased market share. The results of previously conducted research indicate that intuitive interfaces, round-the-clock accessibility, and smooth transaction processes are key factors contributing to customer satisfaction and loyalty (Faisal et al., 2024). As more users rely on banking applications to manage their finances, the demand for intuitive design, real-time updates, and personalized experiences has grown significantly.

To stay competitive, banks need to focus on refining their mobile banking user experience to meet these evolving expectations. Key trends for 2025 include simplifying navigation and interface design, offering personalized real-time notifications, and incorporating personalized insights to enhance user engagement (Cantero, 2025). There are also signs of the transition from traditional banking applications to "super-applications" which will transform user expectations, as users now seek a unified platform that not only handles financial transactions but also integrates additional services such as bill payments, budgeting, and various non-financial services (Cheqly team, 2025). It is evident that the future of online banking applications is being shaped by the ongoing digital transformation, with innovations such as artificial intelligence, blockchain, and cloud computing driving more intuitive and user-centric banking experiences. As digital-only neo-banks gain popularity, traditional banking applications must evolve by incorporating advanced technologies like artificial intelligence and data analytics to stay competitive and meet the needs of tech-savvy users (Funcas, 2021; Boustani, 2022; Nowakowski, 2024; Lukić Nikolić, 2024).

In today's digital landscape, online banking serves as a crucial communication channel between banks and their clients. The speed, accessibility, and user-friendliness of online banking applications are increasingly significant in shaping overall user experience. This paper examines users' perceptions regarding three key aspects of online banking applications: efficiency, availability, and ease of contact with banks. The focus of the research is on how users perceive the functionality and customer support aspects of digital banking services. Specifically, it investigates whether demographic factors, including gender, age, and educational background, affect how users evaluate these aspects within online banking applications. The aim of this study is to identify statistically significant differences in users' perceptions based on their demographic characteristics, with the goal of enabling a more tailored adaptation of digital services to various user groups. Understanding these perceptions helps banks optimize their platforms to cater to the needs of various demographic groups. By recognizing and addressing demographic variations in user perceptions, banks can ensure that their online services are perceived positively across diverse clients' segments. This, in turn, can lead to increased client satisfaction, loyalty, and retention.

The paper is structured as follows. In addition to the introduction, a review of literature is provided, highlighting the key elements that determine the quality of online banking applications. This is followed by a presentation of the methodology used in the research, including the research hypotheses, the applied questionnaire, data collection methods, and the statistical tools used for data analysis. The next section of the paper is dedicated to the research findings and a discussion of the results obtained. Finally, the conclusion presents the key results of the study, its implications, limitations, and suggestions for future research on this topic.

Literature Review

Researchers and practitioners have shown significant interest in online banking due to its growing relevance in the financial sector. Studies have focused on various factors that influence the acceptance and usage of online banking. Key variables include online banking adoption, where factors like user attitudes and intentions play a critical role in determining how and why clients choose to engage with online banking platforms. Additionally, technological innovation has been explored as a driving force in online banking's evolution, highlighting the role of advancements in mobile technology and internet services in enhancing customer experience (Shahid et al., 2022).

As a disruptive innovation, online banking brings numerous benefits to both banks and customers, including the ability to track account balances, transfer money, pay bills, and shop online (Chou & Chou, 2000). By enabling digital transactions, online banking enhances convenience and accessibility while reducing the need for physical branch visits (Amin, 2016). Additionally, online banking is reshaping the financial services industry by driving innovation, supporting growth and development, and strengthening the competitive edge of banks (Ayinaddis et al., 2023; Yang et al., 2023).

E-service quality has gained significant attention in recent years as an essential concept for evaluating online services. Overall, e-service quality research highlights the diverse factors that contribute to a client's perception of online services, underscoring the need for businesses to focus on continuous improvement in areas such as ease of use, reliability, and security to enhance customer satisfaction and loyalty (Lukić Nikolić, 2025). It refers to the overall evaluation of user experience with services delivered through digital platforms, focusing on aspects such as functionality, service, and security. E-services are primarily facilitated by digital intermediaries, offering clients self-service options that are accessible anytime and anywhere (Malc et al., 2023). The five key components of banking service quality that influence e-customer satisfaction and e-customer loyalty are e-customer service, site organization, application efficiency, user-friendliness, and the security and privacy of personal data (Gautam & Sah, 2023).

In the context of online banking, Herington and Weaven (2009) developed a set of service quality measurement scales based on personal needs, site organization, user-friendliness, and efficiency. Amin (2016) also explored online banking service quality using a multidimensional scale that includes personal needs, site organization, user-friendliness, and efficiency. More recently, Ui Haq and Awan (2020) focused on reliability, privacy and security, web design, and customer support during the COVID-19 pandemic, underlining the importance of service quality in the rapidly evolving e-banking sector.

Efficiency is a crucial aspect of e-banking service quality. It encompasses the user-friendliness, reliability, and overall organization of the information and services (Tomić et al., 2023). Efficiency can also be seen as a key factor influencing the decision to adopt e-banking services, as it offers a convenient alternative to traditional in-person banking. Additionally, the privacy and security features of e-banking services are of utmost importance. These attributes ensure the protection of clients' personal and financial information, as well as facilitate secure transactions in the online banking environment (Malct al., 2023). Efficiency refers to how well the application responds to customer needs, while fulfillment deals with the timeliness and accuracy of service delivery. System availability focuses on minimizing downtime, and privacy emphasizes the protection of clients' information (Mujinga, 2020).

A study utilizing the technology acceptance model to explore mobile banking adoption among 202 university students in Serbia discovered that the key factors influencing adoption are "perceived usefulness" and "perceived security" (Lukić et al., 2019). In a similar vein, another research aimed to iden-tify the primary determinants of mobile banking adoption in Serbia, also using the technology ac-ceptance model. Conducted via an online survey with 167 participants in June-July 2020, the findings indicated that "mobile banking information," "perceived usefulness," and "perceived security" were significant factors affecting users' future intentions to adopt mobile banking (Antonijević et al., 2021).

Grönroos (2007) underscores the importance of addressing users' personal needs, such as their demographics, lifestyle, and preferences, in order to introduce new features that align with user expectations and enhance overall satisfaction. Previous studies have explored various factors that may influence users' perceptions of online banking services, particularly in terms of efficiency, availability, and ease of contact. One such factor is gender, with research suggesting that male and female users may perceive and interact with online banking applications differently. Some studies have found that gender differences in online banking perceptions may impact how users evaluate service attributes such as efficiency and ease of use (Laukkanen, 2016). Age has been shown to influence users' comfort and familiarity with technology, which may, in turn, affect their perceptions of online banking services. Older users, for example, may have different expectations regarding the efficiency and ease of use of online banking applications compared to younger, more tech-savvy users (Amin, 2016; Laukkanen, 2016). Educational background is also a factor that may shape users' perceptions of online banking. Users with higher levels of education might have different expectations regarding the functionality and security of online banking applications. They may be more likely to prioritize features like privacy and system availability, as well as the overall user experience (Herington & Weaven, 2009).

Research Methods

The hypotheses posed in this paper are:

Hypothesis 1: There is no statistically significant difference between male and female users in their perceptions of the efficiency, availability, and ease of contact within the online banking application.

Hypothesis 2: There is no statistically significant difference in the perceived efficiency, availability, and ease of contact within the online banking application across different age groups.

Hypothesis 3: There is no statistically significant difference in the perceived efficiency, availability, and ease of contact within the online banking application across different educational levels.

The research was conducted using a specially designed questionnaire filled out by users of online banking services in Serbia. The questionnaire consisted of two parts. The first part of the questionnaire included four questions related to the respondents: gender, age, education and their level of satisfac-tion with the online banking application. The second part of the questionnaire related to three scales named Efficiency, Availability and Ease of Contact. Scales consisted of 11 statements related to function-alities of online banking applications. The **Efficiency** scale (4 statements) assesses the ease of use and user experience of an online banking application, focusing on factors such as quick access, intuitive design, organization of information, and efficient transaction completion.

It aims to evaluate how seamlessly users can navigate and perform tasks within the application. The **Availability** scale (4 statements) evaluates the reliability and performance of the online banking application, focusing on factors such as smooth operation, consistent accessibility, and proactive communication regarding maintenance or updates. The **Ease of Contact** scale (3 statements) measures the accessibility and availability of customer support within the online banking application, focusing on the presence of chat services, ease of finding con-tacts information, and locating nearby branches. It evaluates how effectively the application provides users with assistance and resources to resolve issues or find additional support. The statements in the scales were formed based on work of Malc et al., 2023 and presented in Tables 4, 5 and 6.

The average time of filling out the questionnaire was 10 minutes. The questionnaire was administered using Google Forms platform, ensuring easy access and a user-friendly experience. The sample for this research was obtained using the convenience sampling method, which involves the selection of participants based on their accessibility and willingness to take part in the research. The target population consisted of active users of online banking services in Serbia. The sample was not predetermined according to statistical criteria of representativeness; rather, it was constructed by making the research instrument (i.e., the questionnaire) accessible to a broader group of relevant users. The questionnaire link was distributed through multiple communication channels: (1) social media platforms (Facebook and LinkedIn), (2) thematic forums and specialized groups focused on digital banking, and (3) direct contact via e-mail, accompanied by a brief explanation of the research purpose and an invitation to participate. In this way, potential respondents were identified either based on their demonstrated interest or prior engagement with topics related to digital banking, or—when contacted directly—based on confirmed use of online banking services. Based on social network analytics and email distribution records, it is estimated that approximately 500 potential respondents viewed the questionnaire. From August 2024 to February 2025, a total of 198 individuals completed the questionnaire, yielding a response rate of nearly 40%, which is considered satisfactory in the social sciences (De Vaus, 2013). The respondents participated voluntarily and provided full consent for the use of their data for the purposes of scientific research.

The collected responses were processed using Microsoft® Excel® 2019 and Statistical Software for Social Sciences (SPSS), version 26. The Kolmogorov-Smirnov test was used to assess the normality of data distribution. Since the results with significance, Sig.=0.000 showed that the assumption of normality of data distribution was not satisfied, non-parametric techniques were applied for statistical analysis. The Mann-Whitney test was used to compare differences between two groups, while the Kruskal-Wallis test was used to compare differences between three or more groups with a 95% confidence interval. Levene's test for equality of variances was applied in all tests comparing differences between groups, satisfying the assumption of homogeneous variance in all cases ($p > 0.05$).

Table 1 presents the results of Cronbach's Alpha coefficient for all three used scales. All values are above the threshold of 0.7, indicating high reliability of used scales.

Table 1 - The Cronbach Alpha Coefficient

No	Scales	N	Cronbach's Alpha
1.	Efficiency	**4**	0.904
2.	Availability	**4**	0.831
3.	Ease of contact	**3**	0.767

Research Results and Discussion

Table 2 presents the key information about the respondents. The sample consists of a higher proportion of female respondents (63.1%) compared to males (36.9%). The age distribution indicates that the largest number of respondents (40.4%) are in the 35 to 44 years age range. The next highest group is the 45 to 54 years category (24.2%). The younger age groups (18-24 years and 25-34 years) represent a smaller proportion of the sample (16.2% and 12.1%, respectively). The educational background reveals predominantly well-educated respondents, with over half (51.0%) holding university degrees (bachelor's or master's). Additionally, 17.7% have pursued doctoral studies. The lower percentages of respondents have finished secondary school (16.7%) and college (14.6%).

Table 2 - Key Information about the Respondents

	N	%
Gender		
Male	73	36.9
Female	125	63.1
Age		
From 18 to 24 years	32	16.2
From 25 to 34 years	24	12.1
From 35 to 44 years	80	40.4
From 45 to 54 years	48	24.2
Above 54 years	14	7.1
Education		
Secondary school	33	16.7
College	29	14.6
University (bachelor and master studies)	101	51.0
University (doctoral studies)	35	17.7

Table 3 presents the respondents' satisfaction with online banking application, measured on a five-point Likert scale. The mean satisfaction score is 4.41. This indicates that, on average, respondents report being relatively satisfied with online banking applications. The standard deviation of 0.754 indicates a moderate level of consistency in responses. The majority of respondents (approximately 89%) report being satisfied or very satisfied with online banking application (34.3% satisfied and 54.6% very satisfied). Only a small percentage of respondents (2.5%) are dissatisfied, while 8.6% of respondents remain neutral.

Table 3 - Descriptive Statistics Regarding Satisfaction with Online Banking Applications

No	Satisfaction	M	SD	Marks	N	%
1.	I am satisfied with online banking application.	4.41	0.754	1	0	0.0
				2	5	2.5
				3	17	8.6
				4	68	34.3
				5	108	54.6

Table 4 presents descriptive statistics for the **Efficiency** scale. The statement that respondents can easily and quickly access the online banking application has a mean value of 4.55, indicating a strong level of agreement with this statement. This high mean suggests that, overall, users find the online banking applications highly accessible and efficient to use. The standard deviation of 0.840 reflects some variability in responses, but the relatively low value implies that most users share a similar positive experience regarding accessibility. In terms of the distribution, a significant majority of respondents, 72.3% (143 respondents), strongly agree with the statement, while 14.6% (29 respondents) agree. Only 10.6% (21 respondents) expressed neutrality, and a very small proportion, 2.5% (5 respondents), either disagreed or strongly disagreed.

The statement regarding the ease of use of the online banking application has a mean value of 4.50, which indicates that respondents generally find the application very user-friendly. The standard deviation of 0.841 reveals a moderate level of variability in responses, but it is still relatively low, implying that most respondents share a similar positive experience in terms of ease of use. The distribution of responses further supports this, with 66.7% (132 respondents) strongly agreeing, and 20.7% (41 respondents) agreeing with the statement. Only a small percentage of respondents, 10.6% (21 respondents), expressed neutrality, while just 2.0% (4 respondents) disagreed. These results suggest that the online banking application is generally perceived as easy to use.

The statement regarding the organization and intuitiveness of the information in the online banking application has a mean value of 4.14, indicating that while the majority of respondents agree that the application's information is well-organized and intuitive, the level of agreement is slightly lower than the previous statement about ease of use. The standard deviation of 0.982 suggests a greater variability in responses compared to the previous statement, indicating that some respondents may not find the organization and layout as intuitive or well-structured as others. The response distribution shows that 46.4% (92 respondents) strongly agree, and 29.3% (58 respondents) agree with the statement. However, 17.7% (35 respondents) expressed neutrality, and a small percentage, 6.6% (13 respondents), disagreed with the statement. This indicates that while the majority of respondents find the information in the application well-organized, there is possibilities for improvement, especially for the smaller group of respondents who were less satisfied with the organization and intuitiveness.

The statement about the ability to quickly complete transactions in the online banking application has the highest mean value of 4.60, indicating that the vast majority of respondents agree strongly that the application facilitates quick transactions. The standard deviation of 0.798 reflects a relatively low level of variability in responses, suggesting that most respondents share a similar, highly positive experience when it comes to completing transactions quickly. In terms of distribution, an overwhelming 75.3% (149 respondents) strongly agree with the statement, and 13.1% (26 respondents) agree. Only a small portion of respondents, 9.1% (18 respondents), expressed neutrality, and an even smaller proportion, 2.5% (5 respondents), disagreed. These results indicate that the online banking application is highly effective in enabling users to complete their transactions quickly and efficiently.

Table 4 - Descriptive Statistics Regarding the Efficiency of Online Banking Applications

No	Statements	M	SD	Marks	N	%
1.	I can easily and quickly access the online banking application.	4.55	0.840	**1**	3	1.5
				2	2	1.0
				3	21	10.6
				4	29	14.6
				5	143	72.3
2.	The online banking application is easy to use.	4.50	0.841	**1**	4	2.0
				2	0	0.0
				3	21	10.6
				4	41	20.7
					132	66.7
3.	The information in the online banking application is well-organized and intuitive, enhancing the overall user experience.	4.14	0.982	**1**	3	1.5
				2	10	5.1
				3	35	17.7
				4	58	29.3
				5	92	46.4
4.	The online banking application lets me quickly complete transactions whenever I need to.	4.60	0.798	**1**	2	1.0
				2	3	1.5
				3	18	9.1
				4	26	13.1
				5	149	75.3

Table 5 presents descriptive statistics for the **Availability** scale. The statement about the online banking application launching effortlessly has a mean value of 4.35, suggesting that most users agree that the application starts without any issues. This is a positive result, indicating that users generally do not face significant barriers when attempting to launch the application. The standard deviation of 0.882 reflects moderate variability in responses, suggesting that while most users have a smooth experience, there are some with varying degrees of satisfaction. The response distribution shows that 57.1% (113 respondents) strongly agree, and 26.3% (52 respondents) agree with the statement. Only a small percentage of respondents, 12.1% (25 respondents), remained neutral, and 4.5% (9 respondents) disagreed, while 0.5% (1 respondents) strongly disagreed. This indicates that the majority of users experience no significant issues with launching the application, although a few users report occasional difficulties.

The statement regarding the smooth operation of the online banking application has a mean value of 3.89, suggesting a positive but more moderate level of agreement compared to other statements. The standard deviation of 1.034 indicates a higher degree of variability in responses, suggesting that user experiences with application performance might differ more widely. The distribution of responses shows that 32.3% (64 respondents) strongly agree and 37.9% (75 respondents) agree, which is a positive outcome, indicating that a significant portion of users experience smooth operation. However, 19.7% (39 respondents) expressed neutrality, and 10.1% (20 respondents) disagreed, with 3.0% (6 respondents) strongly disagreeing. These results suggest that while the application performs well for most users, there is still a notable proportion of respondents who experience interruptions or downtimes, which could be areas for improvement.

The statement about the application being always accessible and functional has a mean value of 4.30, reflecting a strong positive perception of its accessibility and reliability. The standard deviation of 0.889 indicates a moderate level of consistency in user experiences, with most respondents sharing similar views about the application's reliability. In terms of distribution, 52.1% (103 respondents) strongly agree, and 32.3% (64 respondents) agree, showing that the majority of users find the application accessible and functional. Only 10.6% (21 respondents) remained neutral, and 5.0% (10 respondents) disagreed with the statement, while 1.0% (2 respondents) strongly disagreed. These results suggest that, while the application is highly functional for most users, there is a small proportion who may have experienced issues with accessibility or functionality.

The statement about receiving notifications for scheduled downtime has a mean value of 4.19, indicating a relatively high level of agreement among users that they are informed about maintenance or updates. The standard deviation of 1.133 suggests that there is more variability in the responses compared to other statements, possibly due to varying experiences in the notification system. The distribution of responses shows that 56.1% (111 respondents) strongly agree and 21.7% (43 respondents) agree, suggesting that most users are satisfied with the communication about scheduled downtime. However, 12.1% (24 respondents) were neutral, and 10.1% (20 respondents) disagreed, with 4.5% (9 respondents) strongly disagreeing. These results indicate that while a majority of users receive notifications, there is a smaller group who either do not receive them or are not satisfied with the communication, suggesting a potential area for improvement.

Table 5 - Descriptive Statistics Regarding the Availability of Online Banking Applications

No	Statements	M	SD	Marks	N	%
1.	The online banking application launches effortlessly, without any issues.	4.35	0.882	1	1	0.5
				2	8	4.0
				3	25	12.1
				4	52	26.3
				5	113	57.1
2.	The online banking application runs smoothly without any interruptions or downtime.	3.89	1.034	1	6	3.0
				2	14	7.1
				3	39	19.7
				4	75	37.9
				5	64	32.3

No.	Statements	M	SD	Marks	N	%
3.	My online banking application is always accessible and fully functional.	4.30	0.889	**1**	2	1.0
				2	8	4.0
				3	21	10.6
				4	64	32.3
				5	103	52.1
4.	I regularly receive notifications about scheduled downtime for upgrades or updates.	4.19	1.133	**1**	9	4.5
				2	11	5.6
				3	24	12.1
				4	43	21.7
				5	111	56.1

Table 6 presents descriptive statistics for the **Ease of Contact** scale. The statement regarding the availability of a chat service (online chatbot) for assistance has a mean value of 3.06, suggesting a relatively neutral or mixed response from the respondents. The standard deviation of 1.454 indicates considerable variability in responses, pointing to a wide range of opinions on this feature. The distribution of responses shows that 27.3% (54 respondents) were neutral, 23.8% (47 respondents) strongly agreed, and 14.6% (29 respondents) agreed. However, 22.2% (44 respondents) strongly disagreed, and 12.1% (24 respondents) disagreed, indicating that a significant portion of users do not have easy access to chatbot service.

The statement about finding contact information for customer support in the online banking application has a mean value of 3.57, reflecting a somewhat positive, yet not overwhelmingly strong, level of agreement. The standard deviation of 1.349 indicates that there is considerable variability in responses, meaning that while some users find the contact information easy to access, others may face challenges in locating it. In terms of response distribution, 34.9% (69 respondents) strongly agreed, and 19.7% (39 respondents) agreed with the statement, which is a positive outcome. However, 23.2% (46 respondents) remained neutral, and 22.2% (44 respondents) disagreed or strongly disagreed. These findings suggest that while the majority of respondents can find customer support contact information relatively easily, a significant portion still faces difficulty or is dissatisfied with the visibility or accessibility of contact details.

The statement about the ease of finding the nearest branches in the online banking application has a mean value of 3.59, which is slightly more positive than the previous two statements but still indicates that the feature could be further optimized. The standard deviation of 1.306 reflects moderate variability in responses, meaning that while many users find it easy to locate branches, there is still a fair amount of disagreement or neutrality regarding the feature. The distribution of responses shows that 33.8% (67 respondents) strongly agreed, and 20.7% (41 respondents) agreed with the statement, indicating a positive experience for a substantial portion of users. However, 25.8% (51 respondents) were neutral, and 19.7% (39 respondents) disagreed or strongly disagreed. These results suggest that while many users can easily find the nearest branches, a sizable portion of users may have difficulty accessing this feature or are not satisfied with how the information is presented.

Table 6 - Descriptive Statistics Regarding the Ease of Contact Via Online Banking Applications

No	Statements	M	SD	Marks	N	%
1.	The online banking application offers a chat service (online chatbot) for assistance.	3.06	1.454	1	44	22.2
				2	24	12.1
				3	54	27.3
				4	29	14.6
				5	47	23.8
2.	The online banking application makes it easy to find contact information, such as phone numbers or email, for customer support.	3.57	1.349	1	21	10.6
				2	23	11.6
				3	46	23.2
				4	39	19.7
				5	69	34.9
3.	The online banking application makes it easy to find the nearest branches.	3.59	1.306	1	19	9.6
				2	20	10.1
				3	51	25.8
				4	41	20.7
				5	67	33.8

Results of Statistical Tests and Discussions

Non-parametric statistical tests were used to investigate potential statistically significant differences in answers of respondents regarding efficiency, availability and ease of contact. The Mann-Whitney and Kruskal-Wallis tests were used since the data did not follow normal distribution.

Table 7 presents the results of the Mann-Whitney test regarding gender structure ofthe respondents.

Table 7 - Results of the Mann-Whitney Test (Gender Structure of Respondents)

Scale	Answers	N	Mean (M)	Median (Md)	Mann-Whitney	Z	Asymp. Sig.
Efficiency	Male	73	4.36	4.75	4014.500	-1.467	0.142
	Female	125	4.50	4.75			
Availability	Male	73	4.08	4.25	3896.500	-1.735	0.083
	Female	125	4.25	4.50			
Ease of contact	Male	73	3.38	3.33	4486.500	-0.197	0.844
	Female	125	3.42	3.67			

For the **Efficiency** scale, the Mann-Whitney test results show a mean value of 4.36 for males and 4.50 for females, with a median of 4.75 for both groups. The Mann-Whitney Z value is -1.467, and the asymptotic significance (p-value) is 0.142. This p-value is greater than the commonly used threshold of 0.05, suggesting that there is no statistically significant difference between male and female respondents in terms of their perceptions of efficiency in using the online banking application. While females report slightly higher mean scores, the differences are not statistically significant, indicating that both male and female users generally share similar experiences in terms of efficiency.

For the **Availability** scale, the Mann-Whitney test shows that males have a mean value of 4.08, while females have a mean of 4.25. The median value for males is 4.25 and for females 4.50. The Mann-Whitney Z value is -1.735, and the asymptotic significance (p-value) is 0.083. This p-value is still above the 0.05 threshold, suggesting that there is no statistically significant difference between male and female respondents regarding the availability of the online banking application.

For the **Ease of Contact** scale, males have a mean value of 3.38, and females have a mean value of 3.42, with a median of 3.33 for males and 3.67 for females. The Mann-Whitney Z value is -0.197, and the asymptotic significance (p-value) is 0.844. This p-value is much higher than the 0.05 threshold, indicating that there is no statistically significant difference between male and female respondents regarding their experiences with the contact features of the online banking application. Despite the slight difference in mean scores, the difference is not statistically significant, implying that both genders have similar levels of satisfaction or experience when it comes to contacting customer support or finding contact information within the application.

Based on these results, **Hypothesis 1** that there is no statistically significant difference between male and female users in their perceptions of the efficiency, availability, and ease of contact within the online banking application, is confirmed.

Table 8 presents the results of the Kruskal-Wallis test regarding the age structure ofthe respondents.

Table 8 - Results of the Kruskal-Wallis Test (Age Structure of Respondents)

Scale	Answers	N	Mean (M)	Median (Md)	Kruskal -Wallis	df	Asymp. Sig.
Efficiency	From 18 to 24 years	32	4.67	5.00	7.919	4	0.095
	From 25 to 34 years	24	4.31	4.75			
	From 35 to 44 years	80	4.52	4.75			
	From 45 to 54 years	48	4.37	4.75			
	Above 54 years	14	4.04	4.50			
Availability	From 18 to 24 years	32	4.39	4.63	3.654	4	0.455
	From 25 to 34 years	24	4.05	4.25			
	From 35 to 44 years	80	4.21	4.25			
	From 45 to 54 years	48	4.11	4.50			
	Above 54 years	14	4.04	4.50			

Ease of contact	From 18 to 24 years	32	3.75	3.83	5.567	4	0.234
	From 25 to 34 years	24	3.54	3.33			
	From 35 to 44 years	80	3.32	3.33			
	From 45 to 54 years	48	3.38	3.33			
	Above 54 years	14	2.95	3.33			

For the **Efficiency** scale, the Kruskal-Wallis test statistic is 7.919, and the asymptotic significance (p-value) is 0.095. Since this p-value is greater than the threshold of 0.05, there is no statistically significant difference in the perceived efficiency of the online banking application across the various age groups. Although the 18 to 24-year-olds report the highest mean value (4.67), this difference does not reach statistical significance, suggesting that overall, all age groups perceive the efficiency of the application similarly.

For the **Availability** scale, the Kruskal-Wallis test statistic is 3.654, and the asymptotic significance (p-value) is 0.455, which is well above the significance threshold of 0.05. Therefore, there is no sta-tistically significant difference between the age groups regarding the availability of the online bank-ing application. While there is some variation in the mean scores, with 18 to 24-year-olds reporting the highest mean value (4.39), these differences are not statistically significant, suggesting that all age groups perceive the availability of the application similarly.

For the **Ease of Contact** scale, the Kruskal-Wallis test statistic is 5.567, and the asymptotic significance (p-value) is 0.234, which is also greater than the 0.05 threshold. This result indicates that there is no statistically significant difference between age groups regarding the contact features of the online banking application. While there is a noticeable decline in the mean scores for older age groups, with those above 54 years reporting the lowest mean value (2.95), these differences are not statistically significant, suggesting that age does not have a strong effect on user experiences with contact-related features.

Based on these results, **Hypothesis 2**, that there is no statistically significant difference in the perceived efficiency, availability, and ease of contact within the online banking application across different age groups, is confirmed.

Table 9 shows the results of the Kruskal-Wallis test regarding the respondents' educational level.

Table 9 - Results of the Kruskal-Wallis Test (Educational Level of Respondents)

Scale	Answers	N	Mean (M)	Median (Md)	Kruskal -Wallis	df	Asymp. Sig.
Efficiency	Secondary school	33	4.16	4.50	7.358	3	0.061
	College	29	4.63	5.00			
	University (bachelor and master studies)	101	4.47	4.75			
	University (doctoral studies)	35	4.51	4.75			

Availability	Secondary school	33	3.97	4.25	1.738	3	0.629
	College	29	4.16	4.50			
	University (bachelor and master studies)	101	4.26	4.50			
	University (doctoral studies)	35	4.19	4.25			
Ease of contact	Secondary school	33	3.25	3.67	4.911	3	0.178
	College	29	3.82	4.00			
	University (bachelor and master studies)	101	3.39	3.33			
	University (doctoral studies)	35	3.25	3.00			

For the **Efficiency** scale, the Kruskal-Wallis test statistic is 7.358, with a p-value of 0.061. This p-value is slightly above the significance threshold of 0.05, suggesting that there is no statistically significant difference in perceived efficiency across different educational levels. Although the mean score for respondents with a college education (4.63) is higher than for other groups, the difference is not statistically significant. This implies that the perceptions of efficiency in using the online banking application are generally similar among respondents, regardless of their educational level.

For the **Availability scale**, the Kruskal-Wallis test statistic is 1.738, with a p-value of 0.629, which is well above the 0.05 threshold. This result indicates that there is no statistically significant difference in the perceived availability of the online banking application between respondents from different educational levels. Despite minor variations in mean values, with university-educated respondents (both bachelor/master and doctoral levels) reporting slightly higher scores than those with secondary school education, these differences are not statistically significant. Therefore, availability is generally perceived similarly across different educational groups.

The Kruskal-Wallis test statistic for **Ease of Contact** scale is 4.911, with a p-value of 0.178, which again is above the significance threshold of 0.05. This suggests that there is no statistically significant difference between educational levels regarding the contact-related features of the online banking application. While college-educated respondents report the highest mean score (3.82), the differences are not statistically significant, indicating that users from various educational levels generally perceive the contact features of the application similarly.

Based on these results, **Hypothesis 3** that there is no statistically significant difference in the perceived efficiency, availability, and ease of contact within the online banking application across different educational levels, is confirmed.

Conclusion

In this paper, research was conducted based on data collected through a specially designed online questionnaire, which included 198 users of online banking in Serbia, with the aim of examining the influence of demographic factors on the perception of efficiency, availability, and ease of establishing contact with the bank. The results of the statistical tests conducted in this research suggest that demographic factors, including gender, age, and educational level, do not have a statistically significant impact on user satisfaction with online banking applications. Across all tested scales - efficiency, availability, and ease of contact scale - respondents from various demographic groups reported similar experiences and perceptions of the online banking applications. Whether users were male or female, from different age groups, or from varying educational levels, the application's functionality and user experience appeared to be universally appreciated. The respondents generally express high satisfaction with online banking applications, with the majority rating their experience positively, as evidenced by the mean score of 4.41 and the overwhelming proportion of satisfied and very satisfied users.

This finding is significant because it highlights that online banking applications have achieved a level of usability and accessibility that accommodates a broad spectrum of users. The design and functionality of these applications are evidently effective in serving a diverse client base, offering consistent and efficient service regardless of the user's demographic characteristics. Such uniformity in user satisfaction suggests that the application is intuitive, user-friendly, and capable of meeting the needs of various users with ease.

Moreover, these results underscore the growing importance of user-centric design in the development of online banking applications. A user-centric approach, which prioritizes accessibility, ease of use, and reliability, is essential to ensure that the application delivers a positive experience to all users. In an increasingly digital world, where banking services are expected to be available 24/7, the ability of an application to cater to diverse user needs becomes a crucial factor in maintaining user engagement and satisfaction. The application's ability to provide a reliable and straightforward experience suggests that it has been designed with a strong focus on client satisfaction, making it both accessible and effective for a wide range of users. Finally, the results suggest that the success of online banking applications lies not in catering to specific demographic groups but in offering a universally applicable, user-friendly interface. This reinforces the need for financial institutions and application developers to continue focusing on creating applications that are efficient, reliable, and inclusive, ensuring that all users, regardless of their background, can use them with confidence and ease.

This research is accompanied by several limitations that should be taken into account. Firstly, while the sample size of 198 respondents provides a reasonable basis for analysis, it is limited to users of online banking services in Serbia. As such, the findings may not be directly applicable to other regions or countries with different banking practices, cultural contexts, or technological infrastructures. Sec-ondly, the data collected through a questionnaire relies on self-reporting by participants. This intro-duces potential biases, such as social desirability bias, where respondents may provide answers, they believe are more socially acceptable or expected. Thirdly, although the research examines the impact of gender, age, and education on users' perceptions, other important demographic factors (such as income, occupation, or geographic location within Serbia) were not considered. These factors could potentially influence users' experiences with online banking services, and their omission may limit the generalizability of the findings.

Given the limitations of this research, future research could benefit from expanding the geographical scope of the research. A larger, more diverse sample that includes users from various regions or countries would help to assess whether the findings are consistent across different cultural contexts, banking systems, and technological infrastructures. Additionally, future research could explore the use of alternative data collection methods to minimize the biases introduced by self-reporting. Finally, future research should consider including a wider range of demographic factors that could influence user perceptions of online banking applications. Factors such as income, occupation, and geographic location within a given country (or across multiple regions) could provide valuable insights into how different segments of the population interact with online banking applications. By addressing these additional variables, future studies would contribute to a more nuanced understanding of the diverse factors that shape user experiences and satisfaction with online banking.

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UTICAJ RIZIKA KAMATNE STOPE NA POSLOVANJE BANAKA U BOSNI I HERCEGOVINI

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Rezime: *Osnovni cilj u ovom radu je da se identifikuju faktori koji imaju statistički značajan uticaj na izloženost banaka u BiH riziku kamatne stope, te refleksiju na indikatore profitabilnosti poslovanja. Dakle, ovaj rad istražuje uticaj rizika kamatne stope na performanse poslovanja banaka u Bosni i Hercegovini između 2014, i 2024. godine. Panel regresioni model najmanjih kvadrata vrši predikciju za povrat na aktivu i povrat na vlasničku glavnicu banaka u BiH kao funkciju rizika kamatne stope koji je indeksiran odnosom kredita i aktive, prosečnim koeficijentom pozajmljivanja i rizikom diversifikacije kamatnih stopa. Empirijski nalazi u radu su otkrili da nezavisna varijabla prosečni koeficijent pozajmljivanja, kao mera rizika kamatne stope po osnovu metode najmanjih kvadrata, ima značajno pozitivni uticaj na prvu i drugu zavisnu promenljivu, odnosno ROA i ROE sa signifikantnošću manjom od 5%. Korelacija između rizika diversifikacije kamata i prvog indikatora profitabilnosti (ROA) je pozitivna sa značajnošću manjom od 5%, dok je korelacija između rizika diversifikacije kamata i drugog indikatora (ROE) pozitivna, ali sa značajnošću većom od 5%. Posma-trano sa druge strane, negativna korelacija je zabeležena između odnosa kredita i sredstava i indikatora ROA sa značajnošću većom od 5%. Takođe, pozitivna korelacija je ostvarena između odnosa kredita i sred-stava i indikatora ROA sa verovatnoćom većom od 5%.*

Ključne riječi: Rizik kamatne stope, EURIBOR, povrat na aktivu, povrat na vlasničku glavnicu, regresiona analiza

JEL klasifikacija: G20, G21, E43

1. Uvodna razmatranja

Osetljivost ekonomske vrednosti banke na fluktuacije kamatnih stopa je posebno važno za akcionare, menadžment banke i supervizorsku vlast (Basel Committee on Banking Supervision, 2004). Dakle, ovo je važno zbog činjenice da varijacija u kamatnim stopama predstavlja veliku pretnju po finansijsku stabilnost banke. Veliki broj faktora u zadnjih nekoliko godina su dali ogroman značaj upravljanju rizika kamatnih stopa. Povećanje kolebljivosti kamatnih stopa na finansijskim tržištima izazvano ekonomskom krizom iz 2008. godine, doprinelo je nestabilnosti prihoda, troškova i ekonomske vrednosti banaka, dok je prihod od kamatnih stopa ostao najvažniji izvor prihoda banaka. Takođe, potrebno je istaći da regulatorni okvir poslovanja banaka definisan Bazelskim sporazumom II, i III zahteva da se rezerve izdaju prema procenjenoj izloženosti tržišnom riziku, što isto utiče na postavljanje pitanja analize i upravljanja kamatnim stopama.

Rizik kamatne stope je vrsta tržišnog rizika, što znači da banke trpe gubitke zbog promena tržišnih kamatnih stopa (Chorafas, 1999). Rizik kamatnih stopa je toliko važna vrsta rizika, da banke prosto mogu pretrpeti astronomske gubitke ako se rizikom kamatnih stopa ne upravlja efikasno. Generalno, depoziti banaka su kratkoročni, dok krediti dati klijentima imaju duži rok dospeća. Zbog date situacije svako povećanje kamatne stope uzrokuje gubitak za banke. Glavni razlog za ovaj problem ogleda se u tome što će banke početi da isplaćuju veće iznose kamata deponentima, ali sa druge strane neće biti promene u iznosu kamata koje dužnici plaćaju banci (Angbazo, 1997).

Dakle, rizik kamatne stope može se definisati kao potencijalni uticaj na ekonomsku vrednost ili profitabilnost banke zbog promene kamatnih stopa. Izvori rizika kamatne stope mogu biti različiti (Fraser i ostali, 2002). Najvažniji izvor rizika kamatnih stopa je rizik ponovnog određivanja kamatnih stopa, koji za banke prirodno nastaje zbog neusklađenosti u vremenu do dospeća ili vremenu do ponovnog određivanja kamatnih stopa između imovine i obaveza bilansa banaka. Primera radi, banka koja finansira dugoročne kredite s fiksnom kamatnom stopom kratkoročnim depozitima pretrpeće pad ekonomske vrednosti ako kamatne stope porastu jer će trošak sredstava rasti, dok će zarada od kredita ostati fiksna. S druge strane banka će umesto toga dobiti ako kamatne stope padnu.

Kamatne stope na kredite u BiH su u poslednjih 5 do 6 godina bile na izuzetno niskim nivoima i u kontinuiranom padu, pri čemu se najčešće korišćena referentna vrednost za promenjivi deo kamatne stope u kreditnim ugovorima EURIBOR nalazila u negativnom rasponu još od 2015. godine. Istovremeno, kamatne stope koje su banke plaćale na deponirana sredstva bile su značajno niske. U pogledu aktivnih kamatnih stopa, nije bilo značajnijih odstupanja u dinamici kretanja na domaćem tržištu i tržištu eurozone (https://banke-biznis.com). Ovaj rad ima osnovni cilj da ispita kako indirektno faktori rizika kamatnih stopa utiču na efikasnost poslovanja banaka u Bosni i Hercegovini u periodu između 2014., i 2024. godine. Empirijski nalazi će pomoći bankama u BiH da pronađu i identifikuju efekat faktora rizika kamatnih stopa, te da pomognu bankarskom menadžmentu da blagovremeno i sveobuhvatno prati i kontroliše rizik.

Rad je struktuiran iz pet delova. Prvi deo odnosi se na uvodna razmatranja sa posebnim osvrtom na definiciju kamatnog rizika, kratkog pregleda na kretanja kamatnih stopa u BiH i uticaja na profitabilnost poslovanja u bankarskom sektoru u BiH. Drugi deo opisuje kretanje referentne kamatne stope tj. EURIBOR te komparaciju sa domaćim kamatnim stopama, kao i kretanje indikatora profitabilnosti i kamatnih stopa na kredite u BiH. Treći deo opisuje pregled relevantnih istraživanja u kontekstu uticaja rizika kamatnih stopa na indikatore profitabilnosti depozitnih banaka u BiH. Četvrti deo opisuje izabranu metodologiju istraživanja i potrebne podatke. Peti deo predstavlja dobijene rezultate istraživanja, kao i određena zapažanja i preporuke.

2. Rizik kamatnih stopa u bankarskom sektoru

Bankarski prihodi mogu se klasifikovati kao prihodi od kamata ili kao prihodi koji ne potiču od kamata. Prihodi banke koji nisu od kamata generišu se od osiguranja, savetovanja i drugih usluga. Kada više kamatne stope smanje ekonomski rast obim početnih javnih ponuda i drugih usluga kao što su akvizicije, takođe se smanjuje. S tim u vezi, naknade koje banke generišu kao rezultat osiguranja, ili savetovanja smanjuju se. Što se banka više oslanja na ove vrste olakšica, veća bi trebala da bude njena osetljivost na povećanje kamatnih stopa. Stoga bi banke koje se više oslanjaju na prihode koji nisu od kamata trebalo da budu više izložene riziku kamatnih stopa.

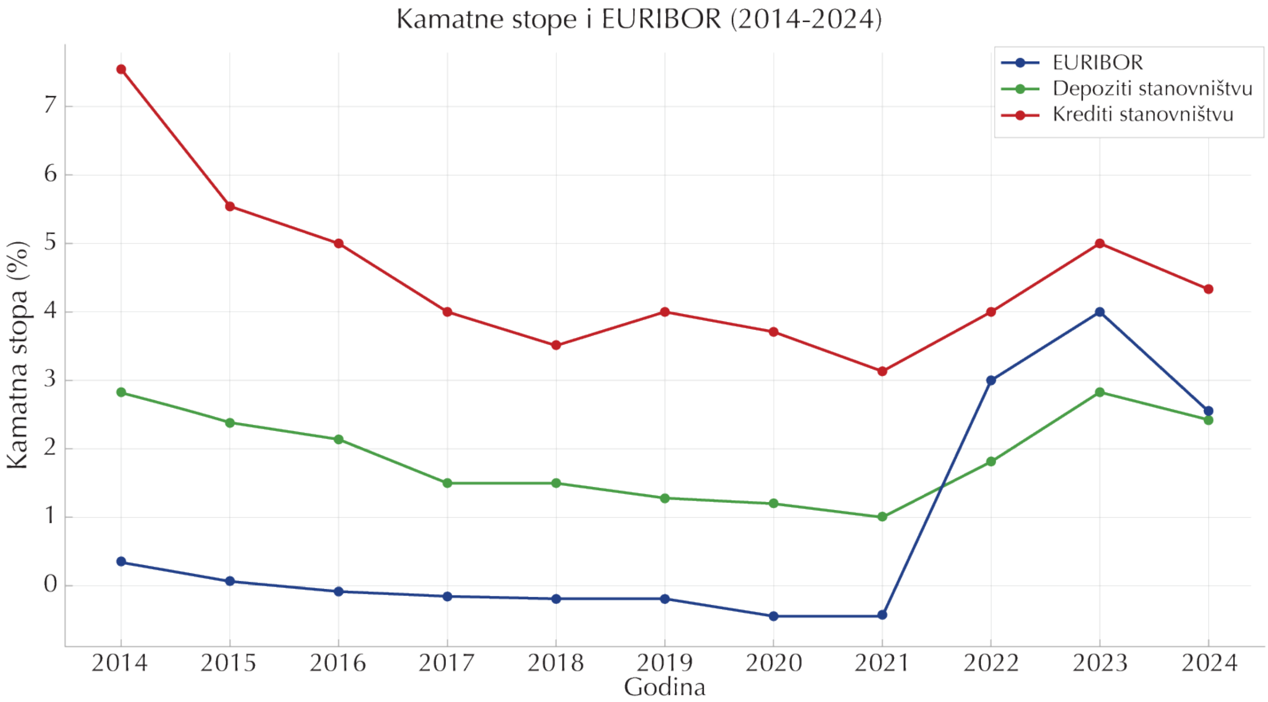
Rizik kamatne stope odnosi se na verovatnoću da banke pretrpe gubitak usled promena tržišne kamatne stope (Hellwig, 1994). Depoziti banaka su obično kratkoročni, dok krediti dati klijentima imaju duži rok dospeća. S tim u vezi, svako povećanje kamatnih stopa stvara probleme bankama. Drugačije rečeno, banke moraju da plaćaju veće kamate deponentima nakon datuma dospeća u slučaju porasta kamatnih stopa. S druge strane, nema promene u prihodima od kamata dobijenim od kredita datim klijentima (Stanton, 1997).

Uglavnom postoje dve različite metode za merenje rizika kamatnih stopa banaka. Prva metoda je GAP analiza koja ispituje kako promene kamatnih stopa utiču na bilans stanja banaka. Dakle, potrebno je definisati račune osetljive na kamatne stope u aktivi i obavezama. Nakon toga, izračunava se odnos aktive i obaveza. Ovaj odnos se naziva i GAP koeficijent (Kim i Koppenhaver, 1993). Ukoliko je ovaj koeficijent veći od 1 to znači da je imovina osetljivija na promene kamatnih stopa nego obaveze. Posmatrano sa druge strane, kada je ovaj odnos manji od 1 to implicira na zaključak da promene kamatnih stopa više utiču na obaveze nego na imovinu.

Druga metoda za merenje rizika kamatne stope je analiza trajanja. Ova metoda analizira kako promene kamatnih stopa utiču na sadašnju vrednost investicija (Macaulay, 1938). U ovoj analizi prvo, trajanje imovine i obaveza banaka se izračunava za različite rokove dospeća. Situacija u kojoj je trajanje imovine veće od obaveza pokazuje da je imovina te banke osetljivija na fluktuacije kamatnih stopa. S tim u vezi, ukoliko banka očekuje bilo kakvo povećanje kamatnih stopa, preferiraće da sačuva preostale pozicije jer će vrednost imovine rasti. Dakle, banka bi trebala da promeni strukturu svog bilansa stanja ako se očekuje pad kamatnih stopa u budućnosti (Bierwag ve Kaufman, 1985).

Centralna banka BiH, s obzirom na aranžman valutnog odbora kojeg sledi od 1997. godine, u svom instrumentariju ne poseduje eskontnu stopu jer joj je zakonom zabranjeno da odobrava kredite bilo kome. Kamatna stopa nije instrument monetarno kreditne politike Centralne banke BiH. S tim u vezi se kamatne stope slobodno formiraju na finansijskom tržištu bez uticaja Centralne banke. Komercijalne banke u BiH svoje kamatne stope formiraju u skladu sa svojom poslovnom politikom i stanjem na finansijskom tržištu, te nivou tržišnih kamatnih stopa. Grafikon u nastavku teksta ilustruje trend kretanja tržišne kamatne stope, tj. EURIBOR-a i kamatnih stopa na depozite i kredite sektora stanovništva banaka u BiH za period: 2014.-2024. godine.

Grafikon 1 - Kretanje EURIBOR-a i kamatnih stopa na depozite sektora stanovništva i kredite sektora stanovništva u bankama u BiH za period: 2014 – 2024. godine (u%)



Izvor: https://www.euribor-rates.eu i https://cbbh.ba (Prilagođeno od strane autora)

EURIBOR (engl. *Euro Interbank Offered Rate*) je ključna referentna kamatna stopa koja reflektuje kamate po kojima evropske banke međusobno posuđuju sredstva. Iz prethodnog grafikona je evidentno da je EURIBOR imao negativne vrednosti od 2015. godine sa stopom od minus 0,006 pa sve do 2021. godine, sa stopom -0,505. Od 2022. godine EURIBOR je doživeo značajne promene zahvaljujući politici Evropske centralne banke (ECB) usmerene na borbu protiv inflacije. Od 2022. godine pa do 2023. godine beleži rast vrednosti od oko 3,902% a odmah nakon 2023. godine ostvaruje pad na 2,431%. Ove promene odražavaju ekonomsku politiku ECB i tržišne uslove u eurozoni. Dakle, ECB i FED su u periodu skoro do 2022. godine sprovodili ekspanzivnu monetarnu politiku[1] u cilju daljeg smanjivanja referentne kamatne stope u periodima ekonomske stagnacije i recesije kako bi uticale na snižavanje kamatnih stopa radi podsticanja zaduživanja i daljeg ulaganja (Centralna banka BiH, 2019). ECB je nakon završetka ciklusa povećanja ključnih kamatnih stopa u septembru 2023. godine, zadržala restriktivnu monetarnu politiku[2] , skoro sve do polovine 2024. godine. Blagi zaokret u monetarnoj politici reflektovao se slabljenjem inflatornih pritisaka, te generalnim usporavanjem inflacije, što je u većoj meri bio rezultat prethodno vođenje restriktivne politike (Centralna banka BiH, 2024). Uticaj kamatnih stopa na evropskom novčanom tržištu ima efekte putem transmisionog mehanizma koji polazi

[1] *Ekspanzivna monetarna politika je skup mera koje Centralna banka provodi sa prvenstvenim ciljem povećanja ponude novca te podsticanja privredne aktivnosti.*
[2] *Restriktivna monetarna politika je skup mera koje Centralna banka preduzima sa prvenstvenim ciljem smanjenja količine novca u opticaju i povećanja kamatnih stopa, a sa daljim ciljem obuzdavanja inflacije i pregrevanja ekonomije.*

od Centralne banke BiH koja drži likvidna sredstva na kratkoročnoj osnovi u evropskim bankama sa najvećim kreditnim rejtingom. To dalje znači i relativno niže kamatne stope koje prati visoki kreditni rejting evropskih banaka sa kojima radi Centralna banka. S obzirom da Centralna banka BiH drži rezerve domaćih banaka na računima kod ino banaka, to kamatne stope na ta sredstva diktiraju i kamatne stope na rezerve, odnosno višak rezervi mimo obavezne rezerve koju Centralna banka obračunava komercijalnim bankama. Drugi kanal delovanja kamatnih stopa sa Evropskog tržišta je oročavanje sredstava domaćih banaka na računima stranih banaka koje je u uslovima izuzetno niskih kamatnih stopa apsolutno neprofitabilno za domaće banke. Iz tih razloga banke smanjuju oročenja i na ino računima stranih banaka i okreću se prekompoziciji svog portfolija u pravcu ulaganja u državne hartije od vrednosti koje nose znatno povoljniju kamatnu stopu (Plakalović i Alihodžić, 2015).

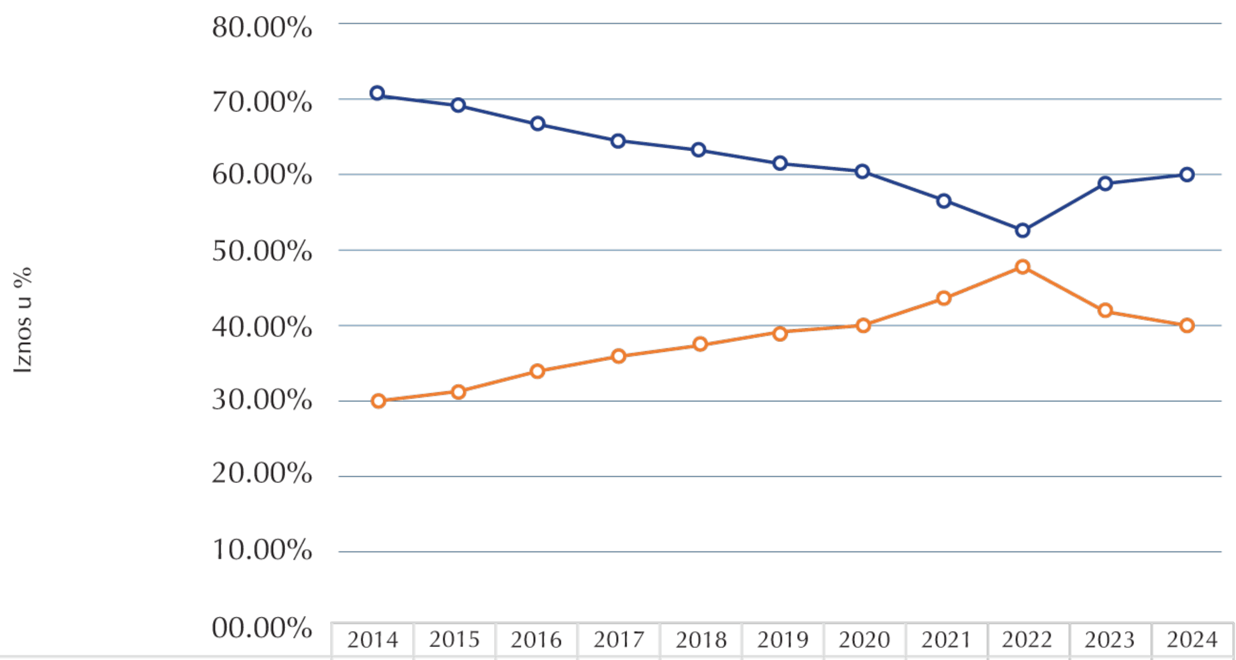
Tabela 1 - Tendencija kretanja povrata na aktivu i kamatnih stopa na kredite i depozite realnog sektora u BiH za period: 2014-2024. godine (u %)

Indikatori	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
ROA	0,80	0,91	1,00	1,30	1,20	1,20	0,70	1,20	1,40	1,80	1,90
Kamatne stope na kredite preduzećima	6,35	5,52	4,71	4,01	3,50	3,17	2,94	2,85	2,84	2,94	3,01
Kamatne stope na depozite preduzećima	3,52	1,94	1,82	1,82	1,96	1,49	1,47	0,95	1,50	2,73	3,02

IZVOR: Proračun autora na osnovu podataka Agencija za bankarstvo FBiH i Republike Srpske i Centralne banke BiH

Tabela 1 analizira da li postoji kauzalnost i uzajamna uslovljenost između indikatora ROA i kamatnih stopa na kredite i depozite preduzećima u BiH za period: 2014 - 2024. godine. Kao što se da primetiti direktna korelacija ne postoji izuzev za godine: 2022 - 2024., gde je vidljivo da sa blagim trendom rasta kamatnih stopa na kredite i depozite dolazi do blagog trenda povećanja vrednosti indikatora ROA. Ge-neralno, kamatne stope u BiH su imale trend pada, na primer kamatne stope na kredite preduzećima od 6,35% u 2014. godini, su pretrpele pad na 2,84% u 2022. godini.

Grafikon 2 - Tendencija kretanja prihoda od kamata i lizinga i ostalih operativnih prihoda banaka u BiH za period: 2014 - 2024. godine (u%)



	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Prihodi od kamata i lizinga	70.19%	68.75%	66.30%	64.16%	62.76%	61.06%	59.97%	56.48%	52.50%	58.17%	60.07%
Ostali operativni prihodi	28.81%	31.25%	33.70%	35.84%	37.24%	38.94%	40.03%	43.52%	47.50%	41.83%	39.93%

Izvor: Proračun autora na osnovu podataka Agencije za bankarstvo Federacije BiH i Agencije za bankarstvo Republike Srpske

Iz prethodnog grafikona je evidentno da prihodi od kamata i lizinga kao i ostali operativni prihodi banaka u BiH nisu imali isti obrazac kretanja za posmatrani period. Dakle, prihodi od kamata i lizinga banaka u BiH su sa 70,19% u 2014. godini zabeležili linearni pad na 52,50% u 2022. godini, da bi nakon toga krenuo blagi rast sa 58,17% u 2023. godini na 60,07% u 2024. godini. S druge strane, ostali operativni prihodi su ostvarili linearni rast sa 29,81% u 2014. godini na 47,50% u 2022. godini, te nakon toga pad na 39,93% u 2024. godini. Kao esencijalni faktori pada prihoda od kamata i lizinga kao core biznisa kojima se banke u BiH bave mogu se navesti sledeći: sve veći broj loših dužnika, averzija prema riziku, suzdržavanje ili neodobravanje kredita u onoj meri koliko to rezerve dozvoljavaju, itd. (Alihodžić, 2021). Takođe, posle blagog oporavka kreditne aktivnosti koji je usledio u 2022. godini kao rezultat pokretanja ekonomske aktivnosti po okončanju COVID-19, te povećanje makroekonomskih rizika koji su se prelili na ekonomiju u BiH doveli su do ponovnog usporavanja kreditne aktivnosti. Isto tako produžena neizvesnost i povećana percepcija rizika uticali su na usporavanje ukupnog kreditnog portfolija (Centralna banka BiH, 2022).

3. Teorijska osnova - pregled relevantne literature

U Bosni i Hercegovini je monetarna politika ograničena sistemom valutnog odbora, i banke posluju sa visokim iznosom stranog kapitala, i promene kamatnih stopa imaju značajan uticaj na profitabilnost poslovanja. Dakle, kamatne stope u BiH uglavnom prate kretanje kamatnih stopa u eurozoni. Promene kamatnih stopa u EU se prenose na BiH putem finansijskih tržišta, bez domaće intervencije. Osnovni problem u ovom istraživanju je utvrditi u kojoj meri i na koji način promene kamatnih stopa utiču na profitabilnost poslovanja banaka. S obzirom da je mali broj radova pisan na ovu temu na prostoru BiH ovo istraživanje zaslužuje posebnu pažnju. Izloženost komercijalnih banaka riziku kamatnih stopa bila je predmet značajnih empirijskih istraživanja. Većina istraživanja usredsredila se na dva međusobno povezana pitanja: 1) Da li su prinosi banaka osetljivi na promene kamatnih stopa? 2) Da li je osetljivost akcija banaka na kamatne stope povezana sa određenim karakteristikama imovine i obaveza pojedinih banaka? U literaturi, većina studija empirijskih i teorijskih ukazuje na to da fluktuacija kamatnih stopa ima izrazito značajan pozitivan odnos sa profitom banaka uopšte. Drugačije rečeno, većina autora se slaže da se u slučajevima povećanja kamatne stope povećava i profit banaka, dok se sa druge strane u periodu pada kamatne stope smanjuje profit banaka.

Veći broj studija otkriva da su prinosi akcija banaka negativno korelisani sa promenom kamatnih stopa. Na primer, Lynge i Zumwalt (1980.), Booth i Officer (1985.), Bae (1990.) i Kwan (1991.) pronalaze značajno negativnu vezu između promena kamatnih stopa i prinosa akcija banaka. Suprotno, Lloyd i Shick (1977.) te Chance i Lane (1980.) ne pronalaze značajnu povezanost između kretanja kamatnih stopa i prinosa bankovnih dionica.

Staikouras and Wood (2004) su radili sa izbalansiranim uzorkom koji je pokrivao sve bankarske industrije EU u periodu od 1994. godine, pa do 1998. godine. Rezultati studije su pokazali da su evropske banke pod uticajem eksternih i internih faktora, te da je kamatna stopa određena kao jedan od eksternih faktora koji utiču na značajnu pozitivnost evropskih banaka, drugačije rečeno, svako povećanje kamata izaziva i povećanje profitabilnosti banaka.

Zaganov i ostali (2009) su sproveli studiju u cilju prikazivanja kako banke regulišu svoj profil kamatnih stopa. Došli su do zaključka da je većina banaka u uzorku negativno pogođena nepovoljnim kretanjima kamatnih stopa, što implicira da menadžeri ne uspevaju da usvoje sveobuhvatne strategije zaštite od rizika. Isto tako su došli do novih zaključaka da veći nivo ekonomske slobode, bolje upravljanje, efikasnost pravnog sistema i viši kvalitet državnog nadzora su povezani sa manjom izloženošću banaka riziku kamatnih stopa.

Demirguc i Huizinga (1999) pronašli su pozitivnu korelaciju između kamatnih stopa i profita, posebno u razvijenim zemljama i zemljama u razvoju, dok studije kao što su Ebrahim i ostali (2013) pronašle negativnu značajnu vezu između rizika kamatne stope i profitabilnosti.

Bacha (2004) je analizirao obim potencijalne izloženosti riziku kamatnih stopa za malezijske islamske banke koristeći mesečne podatke od januara 1994. godine, do jula 2003. godine. U radu je implementiran Pearsonov koeficijent korelacije, zatim obična regresiona analiza najmanjih kvadrata i Grendžerov test uzročnosti. Došao je do zaključka da promene kamatnih stopa konvencionalnih banaka i ukupnih depozita uzrokuju promene stope prinosa islamskih banaka, respektivno.

Zainol i Kassim (2010) analizirali su dinamičke efekte promena kamatnih stopa na stopu prinosa islamskih banaka i iznos depozita u konvencionalnim i islamskim bankama u Maleziji. Koristeći podatke koji pokrivaju period od januara 1997., do oktobra 2008. godine, došli su do zaključka da stopa prinosa islamskih banaka i kamatna stopa konvencionalnih banaka imaju dugoročnu ravnotežu, te da između njih postoji dvosmerna kauzalnost. Takođe, su došli do zaključka da stope prinosa i depoziti islamskih banaka značajno reaguju na promene konvencionalnih kamatnih stopa. To implicira na zaključak da kada se kamatna stopa konvencionalnih banaka poveća, deponenti islamskih banaka će prebaciti svoja sredstva iz islamskih u konvencionalne banke.

Akpomiemie (2012) je istraživao uticaj fluktuacije tržišnih kamatnih stopa na profitabilnost komercijalnih banaka i to za 14 komercijalnih banaka i jednu investicionu banku u Južnoj Africi između 2001. i 2010. godine. On je otkrio da promene kamatnih stopa imaju pozitivan uticaj na profitabilnost komercijalnih banaka u Južnoj Africi. U vremenu rasta kamatnih stopa raste i profit malih poslovnih banaka.

Piergiorgio i Nelson (2012) su ispitali povezanost između kamatne stope i profita banaka koristeći regresioni model i jedinstveni skup podataka o bankama u Velikoj Britaniji u periodu od prvog kvartala 1992 do trećeg kvartala 2009. Rezultat je pokazao da povećanje kamatne stope u kratkom roku smanjuje profitabilnost, međutim svako povećanje kamatne stope na duži rok može dovesti do povećanja profitabilnosti.

Khedira & Khedhiri (2011) studirao je putem panel podataka i regresione analize u radu pod naslovom: Determinante bankarske neto kamatne marže u Tunisu, profite i kamatne stope za 10 komercijalnih banaka u Tunisu u periodu 1996-2003. godine. Rezultati studije su pokazali da kamatne stope utiču kako na troškove banaka, tako i na profitabilnost banaka.

Na osnovu gornje diskusije, ovaj rad će istražiti sledeće hipoteze:

H1: Postoji negativna korelacija između odnosa kredita i sredstava i indikatora profitabilnosti bankarskog sektora u BiH.

H2: Postoji pozitivna korelacija između prosečnog koeficijenta pozajmljivanja i indikatora profitabilnosti bankarskog sektora u BiH.

H3: Postoji pozitivna korelacija između rizika diversifikacije kamata i indikatora profitabilnosti bankarskog sektora u BiH.

4. Metodologija i podaci

4.1 Model

Osetljivost profita na promene kamatnih stopa može se neposredno izmeriti pomoću analize jaza (engl. gap analysis), u kojoj se od iznosa kamatno osetljive aktive oduzima iznos kamatno osetljive pasive i razlika množi sa promenom kamatne stope (Lukić, 2010).

Panel podaci se odnose na objedinjavanje opservacija o preseku domaćinstava, zemalja, preduzeća, itd., tokom nekoliko vremenskih perioda. Panel podaci se sastoje od vrednosti N broja jedinica za različite vremenske periode. Dakle, panel podaci kombinuju podatke preseka i vremenske serije. Broj jedinica je izražen kao N, dok je broj perioda izražen kao T (Baltagi, 2005).

Prateći Arcand i ostali (2015), započećemo naše procene regresijom jednačina pomoću metode najmanjih kvadrata (OLS). Klein i Weill (2018) ukazuju da OLS regresija nije samo koristan metod za opisivanje podataka, već i za pružanje prve (pristrasne) procene koeficijenata. Svi proračuni obično koriste nivo značajnosti od 5%. Stoga je test značajnosti izvršen za sve promenljive korišćenjem t- testa na nivou značajnosti od 95% (Chmelarova, 2007).

Model koji će se koristiti u ovoj studiji je prilagođena verzija modela od strane Zagonov i ostali (2009), odnosno to je model najmanjih kvadrata, gde su prinos na kapital (ROE) i prinos na aktivu (ROA) proxy varijable performansi banaka u BiH i u funkciji su sledećih nezavisnih varijabli: odnosa kredita i sredstava (LTAR), prosečnog koeficijenta pozajmljivanja (ALR), i rizika diversifikacije kamata (ROID), i svi oni predstavljaju indekse za merenje rizika kamatnih stopa. Funkcionalna veza modela je data u obliku sledećih jednačina. Ekonometrijske jednačine za model se mogu specifikovati na sledeći način:

$$ROA = \propto_0 + \propto_1 * LTAR + \propto_2 * ALR + \propto_3 * ROID + \mu \quad (1)$$

$$ROE = \propto_0 + \propto_1 * LTAR + \propto_2 * ALR + \propto_3 * ROID + \mu \quad (2)$$

Gde su:

$\propto_0$ - vrednost preseka ili konstantan član,

$\propto_1 - \propto_3$ - koeficijenti parametara u modelu,

LTAR - odnos kredita i sredstava,

ALR - prosečni koeficijent pozajmljivanja,

ROID - rizik diversifikacije kamata

μ- slučajna greška.

4.2 Podaci

U ovom istraživanju cilj je bio da se ispita kako rizik kamatnih stopa utiče na indikatore efikasnosti poslovanja banaka u BiH, odnosno ROA i ROE. U tom kontekstu korišćeni su kvartalni podaci za period između 2014. i 2024. godine za bankarski sektor u Bosni i Hercegovini. Podaci su prikupljeni sa oficijalnih web stranica Agencije za bankarstvo u Federaciji BiH i Agencije za bankarstvo u Republici Srpskoj. Rezultati analize su dobijeni na osnovu statističkog paketa STATA 17.0.

Sažetak merenja varijabli predstavljen je u tabeli 2:

Tabela 2 - Zavisne i nezavisne varijable

Skraćenica varijable	Varijabla	Metod izračunavanja	Poziv na literaturu
ROE	Povrat na kapital (%)	(Dobit nakon oporezivanja/ kapital)*100	Demirgüç-Kunt,A., i Huizinga,H. (1999), Khan and Sattar (2014)
ROA	Povrat na aktivu (%)	(Dobit nakon oporezivanja/ ukupna aktiva)*100	Hanweck i Kilcollin (1984), Memmel (2011), Peng i ostali (2003)

LTAR	Odnos kredita i sredstava	Neto krediti/Ukupna aktiva	Sierra and Yeager (2004), Drehmann and others (2010)
ALR	Prosečni koeficijent pozajmljivanja	Prihodi od kamata/Ukupna aktiva koja donosi prihod	Dietrich i Wanzenried (2011), ECB (2015), Trujillo-Ponce (2013), Bikker i Hu (2002).
ROID	Rizik diversifikacije kamata	1- (Neto prihodi od kamata – Nekamatni prihodi)/Ukupni poslovni prihodi	Mishkin and Eakins (2006), Scheiber i ostali (2016), Arseneau (2017), Nofiyanti (2014)

Izvor: Proračun autora

5. Empirijski nalazi

5.1 Deskriptivna statistika

Tabela 3 reprezentuje indikatore deskriptivne statistike korišćenih u ovom istraživanju. Ukupan broj observacija iznosi 44 što predstavlja relativno reprezentativan uzorak, kako u pogledu podataka na tržištu banaka u Bosni i Hercegovini, tako i u kontekstu vremenskog okvira. Određene banke su izuzete iz istraživanja zbog nedostupnosti podataka.

Tabela 3 - Deskriptivna statistika zavisnih i nezavisnih varijabli u modelu banaka u Bosni i Hercegovini za period: 2014 – 2024. godine

Skraćenica varijable	ROA	ROE	LTAR	ALR	ROID
Srednja vrednost	0,879	9,918	0,595	0,023	0,774
Standardna devijacija	0,413	5,183	0,033	0,015	0,132
Max	1,900	20,40	0,700	0,070	1,310
Min	0,300	2,30	0,480	0,001	0,580
Mera asimetrije	0,503	0,443	0,311	1,369	1,341
Spljoštenost	2,658	2,190	7,808	4,926	7,221
Broj observacija	44	44	44	44	44

Izvor: Proračun autora

Može se primetiti da se ROA za odabrane banke u Bosni i Hercegovini kreće od minimalnih 0,30% do maksimalnih 1,90 % sa prosekom od 0,88. Druga mera profitabilnosti banaka u BiH, tj. povrat na vlasničku glavnicu zabeležila je minimalnu vrednost od 2,30% do maksimalne vrednosti od 20,40% i prosečne vrednosti od oko 9,91%. Minimalnu vrednost od 2,30% je ostvario bankarski sektor u prvom kvartalu 2022. godine, usled smanjenog kreditiranja i prihoda po osnovu lizinga za oko 1,1% i smanjenja prosečne ponderisane nominalne kamatne stope na kredite sa 3,30% na 3,08% (Agencija za bankarstvo Federacije BiH, 2022). U kontekstu kretanja prve mere rizika odnosno standardne devijacije najjaču volatilnost su zabeležile sledeće varijable: stopa povrata na vlasničku glavnicu od oko 5,18%, zatim stopa povrata na aktivu banaka u BiH od oko 0,41% i rizik diversifikacije kamata od oko 0,13%. Dakle, date varijable su imale isti obrazac kretanja kao kretanje srednje vrednosti. Najveću srednju vrednost su ostvarile varijable ROE od oko 9,92%, ROA od oko 0,88% i rizik diversifikacije kamata od oko 0,77%. Na promenljiv i jako volatilan trend indikatora ROE, ROA i ROID su imali uticaj pad kreditne aktivnosti u delu prema realnom sektoru, te obnova depozitnog potencijala banaka nakon masovnog povlačenja depozita na početku pandemije COVID-19 (Centralna banka BiH, 2020).

5.2 Korelaciona analiza

Prema Cohen-u (1988) ukoliko se koeficijent korelacije kreće od 0,10 do 0,29 onda je reč o maloj korelaciji. Takođe, ukoliko se koeficijent korelacije kreće od 0,30 do 0,49 onda je prisutna srednja korelacija. I ukoliko koeficijent korelacije poprima vrednosti od 0,50 do 1,0 onda je evidentno da je korelacija velika.

Tabela 4 - Korelaciona analiza (Pearson koeficijent korelacije) između prve zavisne varijable (ROA) i nezavisnih varijabli banaka u Bosni i Hercegovini za period: 2014 – 2024. godine

		ROA	LTAR	ALR	ROID
ROA	Pearson korelacija	1,000	-0,042	0,307	0,180
	Sig. (2-tailed)	-	0,789	0,043	0,242
LTAR	Pearson korelacija	-0,042	1,000	0,486	-0,592
	Sig. (2-tailed)	0,789	-	0,001	0,000
ALR	Pearson korelacija	0,307	0,486	1,000	-,0570
	Sig. (2-tailed)	0,043	0,001	-	0,000
ROID	Pearson korelacija	0,180	-0,592	-0,570**	1,000
	Sig. (2-tailed)	0,242	0,000	0,000	-

Izvor: Kalkulacija autora na osnovu podataka Agencije za bankarstvo u FBiH i Agencije za bankarstvo u Republici Srpskoj

Iz prethodne tabele je evidentno da je najjača pozitivna korelaciju sa prvom zavisnom promenljivom, odnosno povratom na aktivu (ROA) ostvarena sa sledećim nezavisnim varijablama: prosečni koeficijent pozajmljivanja 0,307 pri signifikantnošću ($p<0,05$), te rizik diversifikacije kamata od oko 0,180 pri značajnošću većom od 5%. Dakle, sa povećanjem koeficijenta pozajmljivanja konsekventno dolazi i do povećanja indikatora ROA. Prosečni prihodi od kamata i lizinga u BiH bankama za period: 2014 - 2024. godina iznosili su oko 62%, dok se preostalih 38% odnosio na ostale operativne prihode. Köhler (2015) je istraživao stabilnost banaka u 15 zemalja EU i otkrio je da su banke znatno stabilnije i profitabilnije ukoliko povećaju svoj udeo u izvorima prihoda koji nisu od kamata. Dakle, Köhler je došao do zaključka da postoje značajne koristi od diversifikacije prihoda. Chiorazzo i ostali (2008) su otkrili da diversifikacija prihoda povećava prinose prilagođene riziku na uzorku italijanskih banaka. Prema Maudosu (2017) koji se bavio odnosom između korišćenja prihoda koji ne potiču od kamata i rizika i profitabilnosti za evropske banke tokom perioda 2002 - 2012. godina, došao je do zaključka da povećanje prihoda koji ne potiču od kamata ima negativan uticaj na profitabilnost, ali je povezano sa povećanjem rizika. Posmatrano sa druge strane, najjača negativna korelacija sa prvom zavisnom promenljivom, odnosno povratom na aktivu (ROA) zabeležena je sa nezavisnom varijablom odnos kredita i sredstava (-0,042) pri značajnošću većom od 5%. Na bankarskom tržištu u Federaciji BiH u 2014. godini učešće kredita u ukupnoj aktivi iznosilo je oko 69,10%, da bi u 2024. godini došlo do relativnog pada na oko 59,57% (Agencija za bankarstvo FBiH, 2024). Na bankarskom tržištu Republike Srpske u 2014. godini učešće kredita u ukupnoj aktivi iznosilo je oko 71,10%, da bi u 2024. godini došlo do relativnog pada na oko 59%. (Agencija za bankarstvo Republike Srpske, 2024).

Tabela 5 - Korelaciona analiza (Pearson koeficijent korelacije) između druge zavisne varijable (ROE) i nezavisnih varijabli banaka u Bosni i Hercegovini za period: 2014 – 2024. godine

		ROE	LTAR	ALR	ROID
ROA	Pearson korelacija	1,000	-0,070	0,316	0,019
	Sig. (2-tailed)	-	0,650	0,037	0,902
LTAR	Pearson korelacija	-0,070	1,000	0,486	-0,592
	Sig. (2-tailed)	0,650	-	0,001	0,000
ALR	Pearson korelacija	0,316	0,486	1,000	-,0570
	Sig. (2-tailed)	0,037	0,001	-	0,000
ROID	Pearson korelacija	0,019	-0,592	-0,570	1,000
	Sig. (2-tailed)	0,902	0,000	0,000	-

Izvor: Kalkulacija autora na osnovu podataka Agencije za bankarstvo u FBiH i Agencije za bankarstvo u Republici Srpskoj

Dobijeni rezultati korelacione analize između druge zavisne promenljive (ROE) i nezavisnih promenljivih su skoro pa identični rezultatima korelacione analize između prve zavisne promenljive (ROA) i nezavisnih promenljivih. Iz tabele 5 se jasno vidi da je najjača pozitivna korelaciju sa drugom zavisnom promenljivom, odnosno povratom na vlasničku glavnicu (ROE) ostvarena sa sledećim nezavisnim varijablama: prosečni koeficijent pozajmljivanja 0,316 pri signifikantnošću ($p<0,05$), te rizik diversifikacije kamata od oko 0,019 pri signifikantnošću većom od 5%. S druge strane najjača negativna korelacija sa drugom zavisnom promenljivom, odnosno povratom na vlasničku glavnicu (ROE) zabeležena je sa nezavisnom varijablom odnos kredita i sredstava (- 0,070) pri značajnošću većom od 5%.

Svaka varijabla u modelu koja ima VIF vrednost veću od 3 smatra se multikolinearnom, te je time odbačena iz modela. U slučaju multikolinearnosti, koeficijenti varijabli postali su nestabilni, a standardne greške precenjene. Tabela 6 prikazuje dobijene rezultate multikolinearne analize između posmatranih varijabli u modelu.

Tabela 6 - Multikolinearna analiza putem faktora inflacije varijanse (VIF)

Varijable	VIF	1/VIF
LTAR	1,62	0,616596
ALR	1,56	0,640855
ROID	1,83	0,545070

Izvor: Proračun autora (STATA 13.0)

Kao što se može primetiti iz prethodne tabele, svaka pojedinačna nezavisna varijabla ima vrednost koeficijenta VIF manju od 3. Jasno je da nema multikolinearnosti između varijabli, tako da je postavljeni model validan.

Tabela 7 ilustruje rezultate panel regresione analize zasnovane na modelu najmanjih kvadrata između nezavisnih varijabli i prinosa na aktivu bankarskog sektora Bosne i Hercegovine. Vrednost F – statistike kod metode najmanjih kvadrata iznosi 5,23 kao i verovatnoća je manja od 5% što ukazuje na to da je model jako značajan (tabela 7). U ovom empirijskom delu, regresija najmanjih kvadrata se razmatra zbog brojnih prednosti koje ima u odnosu na druge tehnike procene. Te prednosti se ogledaju pre svega u najboljem pronalaženju prave koja opisuje odnos između zavisne i nezavisnih varijabli i daje najbolju liniju trenda za skup posmatranih podataka. Takođe, u ovom istraživanju su korišćeni Breusch-Pagan-Godfrey test kao i Breusch-Pagan Harvey test za testiranje heteroskedastičnosti. Rezultat verovatnoće dobijen preko Breusch-Pagan-Godfrey test iznosi 0,1064 što je veće od 5% i što potvrđuje da u regresionom modelu nije prisutna heteroskedastičnost. Isto tako rezultat verovatnoće dobijen preko Breusch-Pagan Harvey testa iznosi 0,4797 što isto potvrđuje da u regresionom modelu nije prisutna heteroskedastičnost.

Tabela 7 - Koeficijenti nezavisnih promenljivih pri regresiji najmanjih kvadrata za period: 2014:Q1 - 2024:Q4

Regresioni model	Metod najmanjih kvadrata (OLS)		
Zavisna varijabla - ROA			
Nezavisne varijable	Koef.	Std. Greška	Verovatnoća
C	-0,437	1,5153	0,7742
LTAR	-0,510	2,1409	0,8127
ALR	16,717	4,5445	0,0001
ROID	1,5830	0,5665	0,001
Koeficijent determinacije	0,2819	-	-
Pseudo R- Squared	-	-	-
Prilagođeni koeficijent determinacije	0,22805	-	-

F-Statistic	5,2345	-	-
Prob (F-statistic)	0,003	-	-
Prob (Rn-squared st)	-	-	-
Prob (Quasi -LR stat)	-	-	-

Izvor: Proračun autora

Primenom jednačine (1) na dobijene podatke po metodi najmanjih kvadrata u tabeli 7 dolazimo do sledećeg prognoziranog modela:

$$ROA = -0,437 - 0,510 * LTAR + 16,717 * ALR + 1,5830 * ROID$$

Prilagođeni koeficijent determinacije kod modela najmanjih kvadrata iznosi 0,22805 ili 0,23. Ovo ukazuje da je 23% varijacije ROA objašnjeno promenama u merama rizika kamatne stope, dok je preostalih 77% objašnjeno faktorima koji nisu navedeni u modelu. Verovatnoća F-statistike kod metoda najmanjih kvadrata ima vrednost od 0,003, što pokazuje da je model statistički značajan na nivou značajnosti od 5% jer je p – vrednost manja od 5%.

Kod metode najmanjih kvadrata vrednost koeficijenata LTAR, ALR i ROID iznosi -0,510, 16,717 i 1,583 respektivno. ROA je negativno povezan sa LTAR i pozitivno sa ALR i ROID, gde je verovatnoća manja od 5% kod promenljivih ALR i ROID. Testiranjem prve istraživačke hipoteze da postoji negativna korelacija između odnosa kredita i sredstava i prvog indikatora profitabilnosti, tj. povrata na aktivu bankarskog sektora u BiH, dolazi se do zaključka da postoji negativna korelacija, ali sa verovatnoćom većom od 5%, čime se odbacuje prva istraživačka hipoteza.

Ako se prosečni koeficijent pozajmljivanja poveća za oko 1% prva zavisna promenljiva ROA kod metode najmanjih kvadrata će se povećati za oko 16,72 jedinice, pod pretpostavkom da ostale varijable ostanu nepromenjene. Testiranjem druge istraživačke hipoteze da postoji pozitivna korelacija između prosečnog koeficijenta pozajmljivanja i prvog indikatora profitabilnosti, tj. povrata na aktivu bankarskog sektora u BiH dolazi se do zaključka za prihvatanjem hipoteze jer je verovatnoća manja od 5%. Veći portfolio kredita generiše veliku većinu neto prihoda od kamata, što očigledno ima pozitivan odjek na profitabilnost banaka, ali je isto tako podložan većem kreditnom riziku, koji može zauzvrat pogoršati profitabilnost. Empirijski dokazi, Dietrich i Wanzenried (2011), ECB (2015), i Trujillo-Ponce (2013) otkrivaju da u celini, kreditiranje pozitivno utiče na profitabilnost. Bikker i Hu (2002) otkrivaju da je kreditiranje prociklično i da će banke sa većim profitom pozajmljivati izdašnije.

Ukoliko se rizik diversifikacije kamata poveća za oko 1% prva zavisna promenljiva ROA kod metode najmanjih kvadrata će se povećati za oko 1,58 jedinica, pod pretpostavkom da ostale varijable ostanu nepromenjene. Testiranjem treće istraživačke hipoteze da postoji pozitivna korelacija između rizika diversifikacije kamata i prvog indikatora profitabilnosti tj. povrata na aktivu bankarskog sektora u BiH dolazi se do zaključka za prihvatanjem hipoteze jer je verovatnoća manja od 5%. Scheiber i ostali

(2016) i Arseneau (2017) smatraju da rizik diversifikacije kamata i sposobnost banke da diversifikuju svoje izvore prihoda ima pozitivan uticaj na bankarsku profitabilnost. Aruwa i Musa (2014) pronašli su negativnu značajnu vezu između rizika kamatne stope i profitabilnosti.

Tabela 8 - Koeficijenti nezavisnih promenljivih pri regresiji najmanjih kvadrata za period: 2014:Q1 - 2024:Q4

Regresioni model	Metod najmanjih kvadrata (OLS)		
Zavisna varijabla - ROA			
Nezavisne varijable	Koef.	Std. Greška	Verovatnoća
C	-13,307	19,916	0,507
LTAR	15,671	28,138	0,581
ALR	170,620	59,729	0,006
ROID	12,902	7,446	0,091
Koeficijent determinacije	0,1949	-	-
Pseudo R- Squared	-	-	-
Prilagođeni koeficijent determinacije	0,1345	-	-
F-Statistic	3,228	-	-
Prob (F-statistic)	0,03		-
Prob (Rn-squared st)	-	-	-
Prob (Quasi -LR stat)	-	-	-

Izvor: Proračun autora

Primenom jednačine (2) na dobijene podatke po metodi najmanjih kvadrata u tabeli 8 dolazimo do sledećeg prognoziranog modela:

$$ROE = -13{,}307 + 15{,}671 * LTAR + 170{,}62 * ALR + 12{,}902 * ROID$$

Iz prethodne tabele je evidentno da prilagođeni koeficijent determinacije kod modela najmanjih kvadrata iznosi 0,1345 ili 13,45%. Ovo ukazuje da je 13% varijacije ROE objašnjeno promenama u merama rizika kamatne stope, dok je preostalih 87% objašnjeno faktorima koji nisu navedeni u modelu. Verovatnoća F- statistike kod metoda najmanjih kvadrata ima vrednost od 0,003, što pokazuje da je model statistički značajan na nivou značajnosti od 5% jer je p – vrednost manja od 5%. Kod posmatranog modela vrednost nezavisne promenljive prosečni koeficijent pozajmljivanja (ALR) ima pozitivnu vrednost i signifikantnost manju od 5%. Dakle, to dalje objašnjava da ako se prosečni koeficijent pozajmljivanja poveća za oko 1% da će se ROE kod metode najmanjih kvadrata povećati za oko 170,62 jedinice, pod uslovom da ostale varijable ostanu nepromenjene.

Testiranjem prve istraživačke hipoteze da postoji negativna korelacija između odnosa kredita i sredstava i drugog indikatora profitabilnosti tj. povrata na vlasničku glavnicu bankarskog sektora u BiH, dolazi se do zaključka da postoji pozitivna korelacija, ali sa verovatnoćom većom od 5%, čime se odbacuje prva istraživačka hipoteza. Rivai i ostali (2007) smatraju da je odnos kredita i sredstava odnos koji se koristi za demonstriranje sposobnosti banaka da zadovolje potražnju za kreditima koristeći ukupnu imovinu koju poseduju banke. Što je ovaj odnos veći, to je bolji nivo kreditnih performansi, jer je veća komponenta kredita u ukupnoj strukturi imovine. S druge strane, to negativno utiče na likvidnost, jer što je ovaj odnos veći to znači da se postojeća sredstva široko koriste za raspodelu kredita, a manje za kratkoročne obaveze. Testiranjem druge istraživačke hipoteze da postoji pozitivna korelacija između prosečnog koeficijenta pozajmljivanja i drugog indikatora profitabilnosti tj. povrata na vlasničku glavnicu bankarskog sektora u BiH dolazi se do zaključka za prihvatanjem hipoteze jer je verovatnoća manja od 5%. Testiranjem treće istraživačke hipoteze da postoji pozitivna korelacija između rizika diversifikacije kamata i drugog indikatora profitabilnosti tj. povrata na vlasničku glavnicu bankarskog sektora u BiH dolazi se do zaključka za odbacivanjem hipoteze jer je verovatnoća veća od 5%.

Zaključna razmatranja

Rizik kamatne stope predstavlja osnovni tržišni rizik koji može uticati na poslovne rezultate banaka. Banke upravljaju svojom imovinom i obavezama, gde usled neusklađenosti imovine i obaveza specifične za banke može da utiče na povećanje rizika kamatne stope. Centralna banka BiH u sistemu valutnog odbora ne može aktivno menjati kamatne stope niti voditi ekspanzivnu ili restriktivnu monetarnu politiku.

Cilj ovog rada je bio da se empirijski ispita kako indirektno specifični faktori rizika kamatnih stopa utiču na efikasnost poslovanja banaka u Bosni i Hercegovini, mereno preko indikatora ROA i ROE. Panel analiza je zasnovana na skupu podataka za bankarski sektor u BiH u periodu od 2014 do 2024. godine, a na osnovu podataka Agencije za bankarstvo u FBiH i Republici Srpskoj. Faktor rizika kamatne stope koji je identifikovan da ima značajnog uticaja na indikatore profitabilnosti banaka u BiH je prosečni koeficijent pozajmljivanja. Testiranjem prve istraživačke hipoteze da postoji negativna korelacija između odnosa kredita i sredstava i prvog indikatora profitabilnosti tj. povrata na aktivu bankarskog sektora u BiH, došlo se do zaključka da postoji negativna korelacija, ali sa verovatnoćom većom od 5%. Korelacija između odnosa kredita i sredstava i drugog indikatora profitabilnosti tj. povrata na vlasničku glavnicu je pozitivna, ali sa značajnošću većom od 5%, čime se odbacuje prva istraživačka hipoteza.

Ispitivanjem druge istraživačke hipoteze da postoji pozitivna korelacija između prosečnog koeficijenta pozajmljivanja i indikatora profitabilnosti ROA i ROE bankarskog sektora u BiH došlo se do zaključka za prihvatanjem hipoteze jer je verovatnoća manja od 5%. Dakle, prosečni koeficijent pozajmljivanja u svojstvu nezavisne varijable dobijen u ovom radu putem modela najmanjih kvadrata pokazuje da ima potpuno statistički značajnu predikciju na zavisnih promenljivih ROA i ROE. Prosečni koeficijent kreditiranja otkriva da veliki portfolio kredita povećava profitabilnost banaka. Posmatrano sa druge strane, veći kreditni rizik uzrokuje značajno pogoršanje profitabilnosti banaka. Štaviše, banke imaju manju izloženost riziku na nižim nivoima kamatnih stopa zbog negativne selekcije i loših dužnika.

Komercijalne banke u Bosni i Hercegovini svoje kamatne stope formiraju u skladu sa svojom poslovnom politikom, stanjem na finansijskim tržištima, te nivoom tržišnih kamatnih stopa. Dakle, kamatne stope u BiH uglavnom prate kretanje kamatnih stopa u eurozoni. Promene kamatnih stopa u EU se prenose na BiH putem finansijskih tržišta, bez domaće intervencije. Kamatne stope na kredite u BiH su u poslednjih nekoliko godina bile na izuzetno niskim nivoima i u kontinuiranom padu. U pogledu efekta okruženja niskih kamatnih stopa na preuzimanje rizika od strane banaka postoje generalno dva kanala preuzimanja rizika. Posmatrano sa jedne strane, nisu pronađeni jasni dokazi da su banke povećale svoju izloženost riziku u potrazi za prinosom. Do sada su banke bile u stanju da održe svoj nivo profitabilnosti, te s tim u vezi nisu kompenzovale smanjeni prihod od kamata rizičnijim investicijama. S druge strane, evidentno je da su u poslednje vreme banke u određenom iznosu smanjile nivo rezervisanja za kreditne gubitke u okruženju niskih kamatnih stopa. Dakle, banke su tako održale svoj ukupan nivo profitabilnosti na račun manjeg jastuka za kreditne gubitke. U narednom periodu banke će biti primorane da promene svoje poslovne modele i proširе svoje trgovačke aktivnosti kako bi bile manje zavisne od svojih tradicionalnih praksi kreditiranja i finansiranja.

Ispitivanjem treće istraživačke hipoteze da postoji pozitivna korelacija između rizika diversifikacije kamata i prvog indikatora profitabilnosti tj. povrata na aktivu bankarskog sektora u BiH došlo se do zaključka za prihvatanjem hipoteze jer je verovatnoća manja od 5%. S druge strane korelacija između rizika diversifikacije kamata i drugog indikatora profitabilnosti, tj. povrata na vlasničku glavnicu je pozitivna, ali sa verovatnoćom većom od 5%, što implicira na zaključak za odbacivanjem date hipoteze.

Ograničenje ovog istraživanja ogleda se u tome što su uzete u razmatranju samo depozitne banke u BiH, kao i to da su uzete samo tri mere rizika kamatne stope kao nezavisne promenljive. Dalja preporuka bi bila da se uzmu banke zemalja u razvoju, pojedinih zemalja članica EU i razvijenih zemalja, kao i više mere rizika kamatne stope.

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THE IMPACT OF INTEREST RATE RISK ON THE OPERATIONS OF BANKS IN BOSNIA AND HERZEGOVINA

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Summary: *The primary objective of this paper is to identify factors that have a statistically significant impact on the exposure of banks in Bosnia and Herzegovina to interest rate risk and its effect on business profitability indicators. Therefore, this paper investigates the impact of interest rate risk on the performance of banks in Bosnia and Herzegovina between 2014 and 2024. The least squares panel regression model predicts the return on assets and the return on equity of banks in Bosnia and Herzegovina as a function of interest rate risk, which is indexed by the ratio of loans to assets, the average lending ratio, and the risk of interest rate diversification. Empirical findings in the paper revealed that the independent variable, average lending ratio as a measure of interest rate risk based on the method of least squares, has a significantly positive influence on the first and second dependent variables, that is, ROA and ROE, with a significance of less than 5%. The correlation between the risk of interest diversification and the first indicator of profitability (ROA) is positive with a significance of less than 5%, while the correlation between the risk of diversification of interest and the second indicator (ROE) is positive but with a significance of more than 5%. On the other hand, a negative correlation was recorded between the loan-to-assets ratio and the ROA indicator, with a significance greater than 5%. Also, a positive correlation was achieved between the loan-to-assets ratio and the ROA indicator with a probability greater than 5%.*

Keywords: Interest rate risk, EURIBOR, return on assets, return on equity, regression analysis.

JEL classification: G20, G21, E43

1. Introductory Considerations

The sensitivity of a bank's economic value to interest rate fluctuations is particularly important for shareholders, bank management, and the supervisory authority (Basel Committee on Banking Supervision, 2004). Therefore, this is important due to the fact that the variation in interest rates represents a great threat to the financial stability of the bank. A large number of factors in the last few years have given enormous importance to the management of interest rate risks. The increase in the volatility of interest rates on the financial markets caused by the economic crisis of 2008 contributed to the instability of income, expenses, and economic value of banks, while income from interest rates remained the most important source of income for banks. Also, it should be pointed out that the regulatory framework of banking operations defined by the Basel II and III agreements requires that reserves be issued according to the estimated exposure to market risk, which also affects the analysis and management of interest rates.

Interest rate risk is a type of market risk, which means that banks suffer losses due to changes in market interest rates (Chorafas, 1999). Interest rate risk is such an important type of risk that banks can simply suffer astronomical losses if interest rate risk is not managed effectively. In general, bank deposits are short-term, while loans given to clients have a longer maturity. Due to the given situation, any increase in the interest rate causes a loss for the banks. The main reason for this problem is reflected in the fact that banks will start paying higher amounts of interest to depositors, but on the other hand, there will be no change in the amount of interest that debtors pay to the bank (Angbazo, 1997).

Therefore, interest rate risk can be defined as the potential impact on a bank's economic value or profitability due to changes in interest rates. The sources of interest rate risk can be different (Fraser et al., 2002). The most important source of interest rate risk is interest rate redetermination risk, which naturally arises for banks due to mismatches in the time to maturity or the time to redetermination of interest rates between the assets and liabilities of banks' balance sheets. For example, a bank that finances long-term loans with a fixed interest rate with short-term deposits will suffer a decline in economic value if interest rates rise because the cost of funds will rise, while earnings from loans will remain fixed. On the other hand, the bank will instead gain if interest rates fall.

In the last 5 to 6 years, interest rates on loans in Bosnia and Herzegovina have been at extremely low levels and in continuous decline, with the most commonly used reference value for the variable part of the interest rate in credit contracts, EURIBOR, being in the negative range since 2015. At the same time, the interest rates paid by banks on deposited funds were significantly low. In terms of active interest rates, there were no significant deviations in the dynamics of the domestic market and the Eurozone market (https://banke-biznis.com). The main goal of this paper is to examine how the interest rate risk factors indirectly affect the efficiency of banks in Bosnia and Herzegovina in the period between 2014 and 2024. Empirical findings will help banks in B&H to find and identify the effect of interest rate risk factors, and to help bank management to timely and comprehensively monitor and control risk.

The paper is structured in five parts. The first part refers to introductory considerations with a special focus on the definition of interest rate risk, a brief overview of interest rate trends in B&H, and the impact on the profitability of business operations in the banking sector in B&H. The second part describes the movement of the reference interest rate, i.e., EURIBOR, and comparison with domestic interest rates, as well as the movement of profitability indicators and interest rates on loans in B&H.

The third part describes an overview of relevant research in the context of the impact of interest rate risk on profitability indicators of deposit banks in B&H. The fourth part describes the chosen research methodology and the required data. The fifth part presents the obtained research results, as well as certain observations and recommendations.

2. Interest Rate Risk in the Banking Sector

Banking income can be classified as either interest income or non-interest income. The bank's non-interest income is generated from insurance, consulting, and other services. When higher interest rates reduce economic growth, the volume of initial public offerings and other services, such as acquisitions, also decreases. In this regard, fees generated by banks as a result of insurance, or consulting are reduced. The more a bank relies on these types of facilities, the greater its sensitivity to interest rate increases should be. Therefore, banks that rely more on non-interest income should be more exposed to interest rate risk.

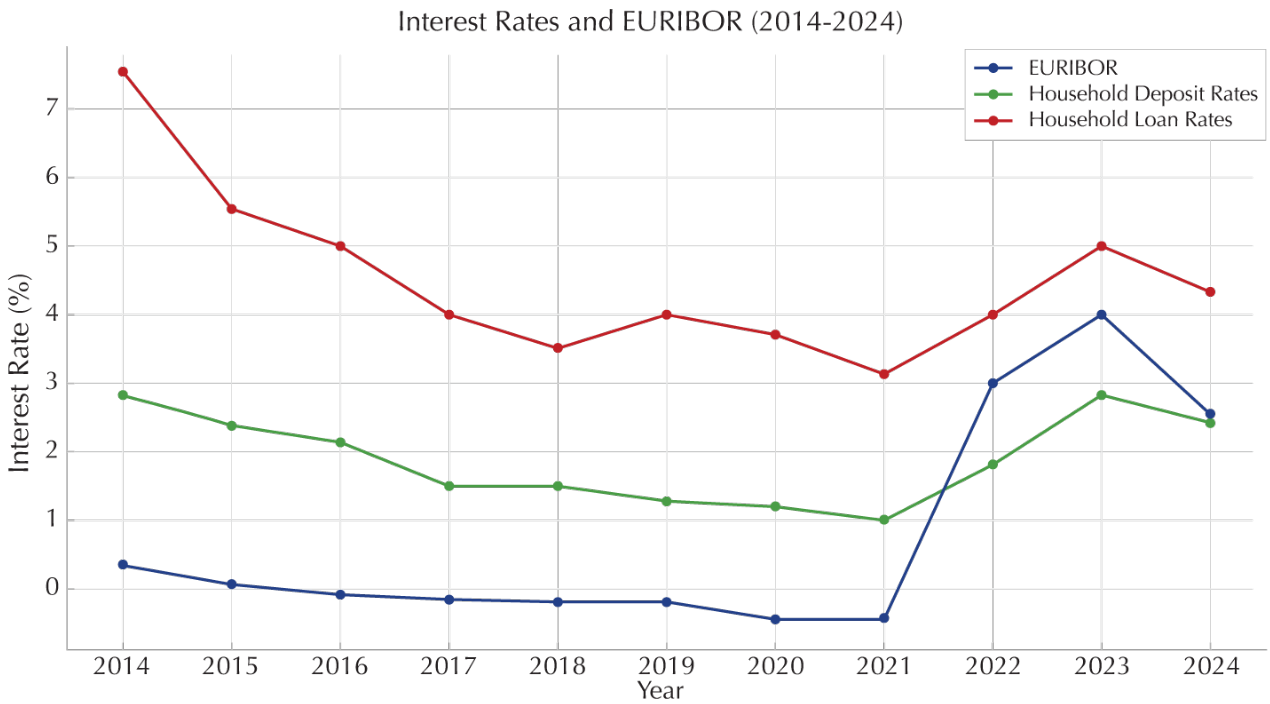
Interest rate risk refers to the probability that banks will incur a loss due to changes in the market interest rate (Hellwig, 1994). Bank deposits are usually short-term, while loans given to clients have a longer maturity. In this regard, any increase in interest rates creates problems for banks. In other words, banks have to pay higher interest to depositors after the maturity date in case of rising interest rates. On the other hand, there is no change in interest income received from loans given to clients (Stanton, 1997).

There are mainly two different methods for measuring bank interest rate risk. The first method is GAP analysis, which examines how changes in interest rates affect banks' balance sheets. Therefore, it is necessary to define accounts sensitive to interest rates in assets and liabilities. After that, the ratio of assets and liabilities is calculated. This ratio is also called the GAP ratio (Kim & Koppenhaver, 1993). If this coefficient is greater than 1, it means that assets are more sensitive to changes in interest rates than liabilities. On the other hand, when this ratio is less than 1, it implies the conclusion that changes in interest rates affect liabilities more than assets.

Another method for measuring interest rate risk is duration analysis. This method analyzes how changes in interest rates affect the present value of investments (Macaulay, 1938). In this analysis, first, the duration of banks' assets and liabilities is calculated for different maturities. A situation where the duration of assets is longer than liabilities shows that the bank's assets are more sensitive to interest rate fluctuations. In this regard, if the bank expects any increase in interest rates, it will prefer to preserve the remaining positions because the value of the assets will increase. Therefore, the bank should change the structure of its balance sheet if interest rates are expected to fall in the future (Bierwag ve Kaufman, 1985).

Considering the arrangement of the currency board that it has followed since 1997, the Central Bank of Bosnia and Herzegovina does not have a discount rate in its instruments because it is forbidden by law to grant loans to anyone. The interest rate is not an instrument of the monetary credit policy of the Central Bank of Bosnia and Herzegovina. In this regard, interest rates are freely formed on the financial market without the influence of the Central Bank. Commercial banks in B&H set their interest rates in accordance with their business policy and the state of the financial market, as well as the level of market interest rates. The graph below illustrates the trend of the market interest rate, i.e., EURIBOR and interest rates on deposits and loans of the household sector of banks in B&H for the period: 2014-2024.

Graph 1 - Movement of EURIBOR and Interest Rates on Deposits of the Household Sector and Loans of the Household Sector in Banks in BiH for the Period: 2014 - 2024 (in%)



SOURCE: https://www.euribor-rates.eu and https://cbbh.ba (Adapted by the author)

Euro Interbank Offered Rate (EURIBOR) is a key reference interest rate that reflects the interest rates at which European banks lend funds to each other. It is evident from the previous graph that EURIBOR had negative values from 2015, with a rate of minus 0.006 until 2021, with a rate of -0.505. From 2022, EURIBOR has experienced significant changes thanks to the policy of the European Central Bank (ECB) aimed at fighting inflation. From 2022 to 2023, it records a growth in value of about 3.902%, and after 2023, it declines to 2.431%.

These changes reflect the ECB's economic policy and market conditions in the Eurozone. Therefore, the ECB and the FED implemented an expansionary monetary policy[1] in the period until 2022 in order to further reduce the reference interest rate in periods of economic stagnation and recession, in order to influence the lowering of interest rates in order to encourage borrowing and further investment (The Central Bank of Bosnia and Herzegovina, 2019). After the end of the key interest rate increase cycle in September 2023, the ECB maintained a restrictive monetary policy[2] almost until the middle of 2024.

[1] Expansionary monetary policy is a set of measures implemented by the Central Bank with the primary goal of increasing the money supply and stimulating economic activity.
[2] Restrictive monetary policy is a set of measures undertaken by the Central Bank with the primary goal of reducing the amount of money in circulation and increasing interest rates, and with the further goal of curbing inflation and overheating the economy.

The slight turn in monetary policy was reflected in the weakening of inflationary pressures and the general slowdown of inflation, which was largely the result of the previous restrictive policy (The Central Bank of Bosnia and Herzegovina, 2024). The influence of interest rates on the European money market has effects through a transmission mechanism that originates from the Central Bank of B&H, which holds liquid assets on a short-term basis in European banks with the highest credit rating. This also means relatively lower interest rates, which are accompanied by the high credit rating of the European banks with which the Central Bank works. Given that the Central Bank of Bosnia and Herzegovina holds reserves of domestic banks in accounts with foreign banks, the interest rates on these funds also dictate the interest rates on reserves, i.e., excess reserves over and above the mandatory reserve that the Central Bank calculates for commercial banks. Another channel of the effect of interest rates from the European market is the term deposit of funds of domestic banks in the accounts of foreign banks, which is absolutely unprofitable for domestic banks in conditions of extremely low interest rates. For these reasons, banks are reducing terms on foreign bank accounts and are turning to overcomposition of their portfolio in the direction of investing in government securities that carry a significantly more favorable interest rate (Plakalović & Alihodžić, 2015).

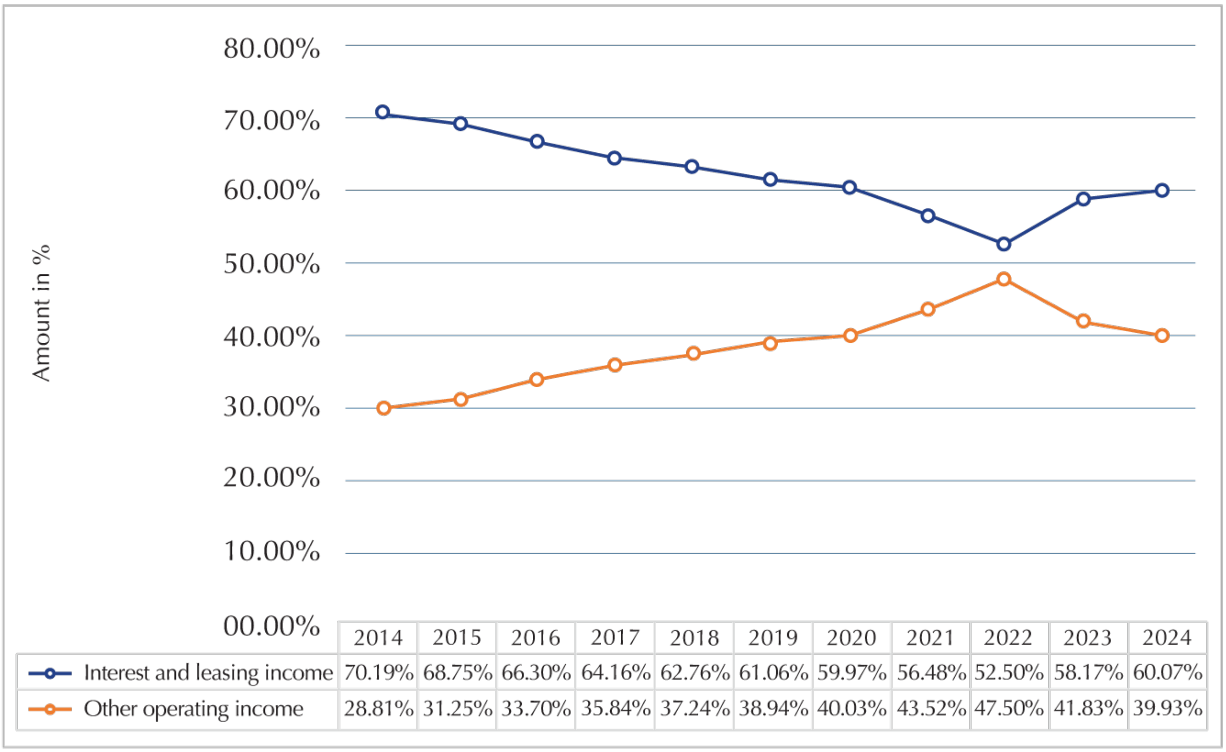
Table 1 - Tendency of Return on Assets and Interest Rates on Loans and Deposits of the Real Sector in B&H for the period: 2014 - 2024. (in %)

Indicators	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
ROA	0.80	0.91	1.00	1.30	1.20	1.20	0.70	1.20	1.40	1.80	1.90
Interest rates on loans to companies	6.36	5.52	4.70	4.01	3.50	3.17	2.94	2.85	2.84	2.94	3.01
Interest rates on deposits to companies	3.52	1.94	1.82	1.82	1.96	1.49	1.47	0.95	1.50	2.73	3.02

SOURCE: Calculation by the author based on data from the Banking Agency of the FB&H and Republika Srpska and The Central Bank of B&H

Table 1 analyzes whether there is causality and mutual dependence between the ROA indicator and interest rates on loans and deposits to companies in B&H for the period 2014-2024. As you can see, there is no direct correlation except for the years 2022-2024, where it is visible that with a slight trend of growth in interest rates on loans and deposits, there is a slight trend of increasing the value of the ROA indicator. In general, interest rates in Bosnia and Herzegovina have had a downward trend, for example, interest rates on loans to companies from 6.35% in 2014 have suffered a decline to 2.84% in 2022.

Graph 2 - Tendency of Interest and Leasing Income, and Other Operating Income of Banks in B&H for the Period: 2014-2024. (in%)



SOURCE: Calculation by the author based on data from the Banking Agency of the Federation of Bosnia and Herzegovina and the Banking Agency of the Republika Srpska

From the previous graph, it is evident that income from interest and leasing, as well as other operating income of banks in B&H, did not have the same pattern of movement for the observed period. Therefore, the income from interest and leasing of banks in Bosnia and Herzegovina was recorded as a linear decline from 70.19% in 2014 to 52.50% in 2022, after which a slight growth started from 58.17% in 2023 to 60.07% in 2024. On the other hand, other operating income showed a linear growth from 29.81% in 2014 to 47.50% in 2022, and then a decline to 39.93% in 2024. The following can be cited as essential factors for the decline in income from interest and leasing as the core business that banks in Bosnia and Herzegovina deal with: the increasing number of bad debtors, risk aversion, withholding or not approving loans to the extent that reserves allow, etc (Alihodžić, 2021). Also, after the slight recovery of credit activity that followed in 2022 as a result of the start of economic activity after the end of COVID-19, and the increase in macroeconomic risks that spilled over to the economy in B&H, led to another slowdown in credit activity. Likewise, extended uncertainty and increased risk perception influenced the slowdown of the overall loan portfolio (The Central Bank of Bosnia and Herzegovina, 2022).

3. Theoretical Basis - Review of Relevant Literature

In Bosnia and Herzegovina, monetary policy is limited by the currency board system, and banks operate with a high amount of foreign capital, and changes in interest rates have a significant impact on business profitability. Therefore, interest rates in Bosnia and Herzegovina generally follow the trend of interest rates in the Eurozone. Changes in interest rates in the EU are transferred to B&H through financial markets, without domestic intervention. The main problem in this research is to determine to what extent and in what way changes in interest rates affect the profitability of bank operations. Given that a small number of papers have been written on this topic in B&H, this research deserves special attention.

The exposure of commercial banks to interest rate risk has been the subject of considerable empirical research. Most research has focused on two interrelated questions: 1. Are bank returns sensitive to changes in interest rates? 2. Is the sensitivity of bank shares to interest rates related to certain characteristics of assets and liabilities of individual banks? In the literature, most empirical and theoretical studies indicate that interest rate fluctuations have a highly significant positive relationship with bank profits in general. In other words, most authors agree that in cases of interest rate increases, banks' profits also increase, while on the other hand, in periods of interest rate decreases, bank profits decrease.

A number of studies reveal that bank stock returns are negatively correlated with changes in interest rates. For example, Lynge and Zumwalt (1980), Booth and Officer (1985), Bae (1990), and Kwan (1991) find a significantly negative relationship between changes in interest rates and bank stock returns. On the contrary, Lloyd and Shick (1977) and Chance and Lane (1980) find no significant relationship between interest rate movements and bank stock returns.

Staikouras and Wood (2004) worked with a balanced sample that covered all EU banking industries in the period from 1994 to 1998. The results of the study showed that European banks are influenced by external and internal factors, and that the interest rate is determined as one of the external factors that influence the significant positivity of European banks; in other words, any increase in interest rates causes an increase in bank profitability.

Zaganov et al. (2009) conducted a study to show how banks regulate their interest rate profile. They came to the conclusion that most banks in the sample are negatively affected by adverse interest rate movements, which implies that managers fail to adopt comprehensive hedging strategies. They also came to new conclusions that a higher level of economic freedom, better governance, efficiency of the legal system, and a higher quality of state supervision are associated with lower exposure of banks to interest rate risk.

Demirguc and Huizinga (1999) found a positive correlation between interest rates and profits, especially in developed and developing countries, while studies such as Ebrahim et al. (2013) found a significant relationship between interest rate risk and profitability.

Bacha (2004) analyzed the extent of potential exposure to interest rate risk for Malaysian Islamic banks using monthly data from January 1994 to July 2003. The paper implements Pearson's coefficient of correlation, then ordinary least squares regression analysis, and Granger's causality test. He came to the conclusion that changes in interest rates of conventional banks and total deposits cause changes in the rate of return of Islamic banks, respectively.

Zainol and Kassim (2010) analyzed the dynamic effects of interest rate changes on the rate of return of Islamic banks and the amount of deposits in conventional and Islamic banks in Malaysia. Using data covering the period from January 1997 to October 2008, they came to the conclusion that the rate of return of Islamic banks and the interest rate of conventional banks have a long-term equilibrium, and that there is a two-way causality between them. Also, they came to the conclusion that rates of return and deposits of Islamic banks react significantly to changes in conventional interest rates. This implies the conclusion that when the interest rate of conventional banks increases, depositors of Islamic banks will transfer their funds from Islamic to conventional banks.

Akpomiemie (2012) investigated the impact of market interest rate fluctuations on commercial bank profitability for 14 commercial banks and one investment bank in South Africa between 2001 and 2010. He found that changes in interest rates have a positive impact on the profitability of commercial banks in South Africa. At a time of rising interest rates, the profits of small commercial banks also grow.

Piergiorgio and Nelson (2012) examined the relationship between interest rate and bank profits using a regression model and a unique dataset of UK banks in the period from the first quarter of 1992 to the third quarter of 2009. The result showed that an increase in the interest rate in the short term reduces profitability; however, any increase in the interest rate in the long term can lead to an increase in profitability.

Khedira & Khedhiri (2011) studied through panel data and regression analysis in a paper entitled: Determinants of banking net interest margin in Tunisia, profits and interest rates for 10 commercial banks in Tunisia in the period 1996-2003. The results of the study showed that interest rates affect both bank costs and bank profitability.

Based on the above discussion, this paper will investigate the following hypotheses:

H1: *There is a negative correlation between the ratio of loans and assets and profitability indicators of the banking sector in Bosnia and Herzegovina.*

H2: *There is a positive correlation between the average lending ratio and profitability indicators of the banking sector in B&H.*

H3: *There is a positive correlation between the risk of interest diversification and profitability indicators of the banking sector in Bosnia and Herzegovina.*

4. Methodology and Data

4.1 Model

The sensitivity of profit to changes in interest rates can be directly measured using gap analysis, in which the amount of interest-sensitive assets is subtracted from the amount of interest-sensitive liabilities, and the difference is multiplied by the change in the interest rate (Lukić, 2010).

Panel data refers to the pooling of observations on a cross-section of households, countries, businesses, etc., over several time periods. Panel data consists of the values of N units for different time periods. Therefore, panel data combines cross-sectional and time-series data. The number of units is expressed as N, while the number of periods is expressed as T (Baltagi, 2005).

Following Arcand et al. (2015), we begin our estimations by regression equations using the method of least squares (OLS). Klein and Weill (2018) indicate that OLS regression is not only a useful method for describing the data, but also for providing a first (biased) estimate of the coefficients. All calculations typically use a 5% significance level. Therefore, the significance test was performed for all variables using the t-test at a significance level of 95% (Chmelarova, 2007).

The model that will be used in this study is an adapted version of the model by Zagonov et al. (2009), that is, it is a least squares model, where return on equity (ROE) and return on assets (ROA) are proxy variables of the performance of banks in B&H and are a function of the following independent variables: loan-to-asset ratio (LTAR), average lending ratio (ALR), and interest diversification risk (ROID), and all of them represent indices for measuring interest rate risk. The functional relationship of the model is given in the form of the following equations. The econometric equations for the model can be specified as follows:

$$ROA = \propto_0 + \propto_1 * LTAR + \propto_2 * ALR + \propto_3 * ROID + \mu \quad (1)$$

$$ROE = \propto_0 + \propto_1 * LTAR + \propto_2 * ALR + \propto_3 * ROID + \mu \quad (2)$$

Where:

$\propto_0$ - intercept value or constant term,

$\propto_1 - \propto_3$ - parameter coefficients in the model,

LTAR - loan-to-asset ratio,

ALR - average lending ratio,

ROID - interest rate diversification risk.

μ- random error.

4.2 Data

In this research, the goal was to examine how the risk of interest rates affects the efficiency indicators of banks in Bosnia and Herzegovina, that is, ROA and ROE. In this context, quarterly data for the period between 2014 and 2024 were used for the banking sector in Bosnia and Herzegovina. The data were collected from the official websites of the Banking Agency in the Federation of Bosnia and Herzegovina and the Banking Agency of Republika Srpska. The results of the analysis were obtained based on the statistical package STATA 17.0.

A summary of the measurement variables is presented in Table 2

Table 2 - Dependent and Independent Variables

Variable abbreviation	Variable	Calculation method	Call for literature
ROE	Return on equity (%)	(Profit after taxation/capital) *100	Demirgüç-Kunt,A., & Huizinga ,H.(1999), Khan and Sattar (2014)

ROA	Return on assets (%)	(Profit after tax/total assets) *100	Hanweck & Kilcollin (1984), Memmel (2011), Peng et. al. (2003)
LTAR	Loan-to-asset ratio	Net loans/Total assets	Sierra and Yeager (2004), Drehmann and others (2010)
ALR	Average lending ratio	Interest income/Total income generating assets	Dietrich & Wanzenried (2011), ECB (2015), Trujillo-Ponce (2013), Bikker & Hu (2002).
ROID	Risk of diversification interest	1-(Net interest income - Non-interest income)/Total business income	Mishkin and Eakins (2006), Scheiber et. al. (2016), Arseneau (2017), Nofiyanti (2014)

Source: Calculation by the author

5. Empirical Findings

5.1 Descriptive Statistics

Table 3 represents the indicators of descriptive statistics used in this research. The total number of observations is 44, which represents a relatively representative sample both in terms of data on the banking market in Bosnia and Herzegovina and in the context of the time frame. Certain banks were excluded from the survey due to the unavailability of data.

Table 3 - Descriptive Statistics of Dependent and Independent Variables in the Model of Banks in Bosnia and Herzegovina for the Period: 2014 - 2024

Statistical measures	ROA	ROE	LTAR	ALR	ROID
Mean	0.879	9.918	0.595	0.023	0.774
Standard deviation	0.413	5.183	0.033	0.015	0.132
Max	1.900	20.40	0.700	0.070	1.310
Min	0.300	2.30	0.480	0.001	0.580
Skewness	0.503	0.443	0.311	1.369	1.341
Kurtosis	2.658	2.190	7.808	4.926	7.221
Number of observations	44	44	44	44	44

Source: Calculation by the author

It can be noted that the ROA for selected banks in Bosnia and Herzegovina ranges from a minimum of 0.30% to a maximum of 1.90% with an average of 0.88. Another measure of bank profitability in B&H, i.e., return on equity, was recorded at a minimum value of 2.30% to a maximum value of 20.40% and an average value of around 9.91%. The minimum value of 2.30% was achieved by the banking sector in the first quarter of 2022, due to reduced lending and income from leasing by about 1.1% and a decrease in the average weighted nominal interest rate on loans from 3.30% to

3.08% (Banking Agency of the FB&H, 2022). In terms of the movement of the first measure of risk, i.e., the standard deviation, the following variables were recorded the strongest volatility: the rate of return on equity of about 5.18%, then the rate of return on assets of banks in B&H of about 0.41% and the risk of interest diversification of about 0.13%. Therefore, the given variables had the same pattern of movement as the movement of the mean value. The highest mean values were achieved by the variables ROE of around 9.92%, ROA of around 0.88% and risk of interest diversification of around 0.77%. The changeable and highly volatile trend of the ROE, ROA and ROID indicators was influenced by the decline in credit activity in the part towards the real sector, and the restoration of the deposit potential of banks after the massive withdrawal of deposits at the beginning of the COVID-19 pandemic (The Central Bank of Bosnia and Herzegovina, 2020).

5.2 Correlation Analysis

According to Cohen (1988), if the coefficient of correlation ranges from 0.10 to 0.29, then it is a small correlation. Also, if the coefficient of correlation ranges from 0.30 to 0.49, then there is a medium correlation. And if the coefficient of correlation takes values from 0.50 to 1.0, then it is evident that the correlation is high.

Table 4 - Correlation Analysis (Pearson Coefficient of Correlation) Between the First Dependent Variable (ROA) and Independent Variables of Banks in Bosnia and Herzegovina for the Period: 2014 – 2024.

		ROA	LTAR	ALR	ROID
ROA	Pearson Correlation	1.000	-0.042	0.307	0.180
	Sig. (2-tailed)	-	0.789	0.043	0.242
LTAR	Pearson Correlation	-0.042	1.000	0.486	-0.592
	Sig. (2-tailed)	0.789	-	0.001	0.000
ALR	Pearson Correlation	0.307	0.486	1.000	-.0570
	Sig. (2-tailed)	0.043	0.001	-	0.000
ROID	Pearson Correlation	0.180	-0.592	-0.570**	1.000
	Sig. (2-tailed)	0.242	0.000	0.000	-

Source: Calculation by the author based on data from the Banking Agency of the FB&H and the Banking Agency of Republika Srpska

From the previous table, it is evident that the strongest positive correlation with the first dependent variable, i.e., return on assets (ROA), was achieved with the following independent variables: average lending coefficient of 0.307 at significance ($p<0.05$), and risk of interest diversification of around 0.180 at significance greater than 5%. Therefore, with an increase in the lending ratio, the ROA indicator also increases. Average income from interest and leasing in B&H banks for the period: 2014-2024, amounted to about 62%, while the remaining 38% related to other operating income. Köhler (2015) investigated the stability of banks in 15 EU countries and found that banks are significantly more stable and profitable if they increase their share of non-interest income sources. Therefore, Köhler came to the conclusion that there are significant benefits from income diversification. Chiorazzo et al. (2008) found that income diversification increases risk-adjusted returns in a sample of Italian banks. According to Maudos (2017), who dealt with the relationship between the use of non-interest income and risk and profitability for European banks during the period 2002-2012, he came to the conclusion that an increase in non-interest income has a negative impact on profitability, but is associated with an increase in risk. On the other hand, the strongest negative correlation with the first dependent variable, i.e., return on assets (ROA), was recorded with the independent variable loan-to-assets ratio (-0.042) at a significance of more than 5%. In the banking market in the Federation of Bosnia and Herzegovina in 2014, the share of loans in total assets was about 69.10%, and in 2024, there would be a relative decline to about 59.57% (Banking Agency of the FB&H, 2024). In the banking market of Republika Srpska in 2014, the share of loans in total assets was about 71.10%, and in 2024, there would be a relative decline to about 59% (Banking Agency of Republika Srpska, 2024).

Table 5 - Correlation Analysis (Pearson Coefficient of Correlation) Between the Second Dependent Variable (ROE) and Independent Variables of Banks in Bosnia and Herzegovina for the Period: 2014 – 2024.

		ROE	LTAR	ALR	ROID
ROA	Pearson Correlation	1.000	-0.070	0.316	0.019
	Sig. (2-tailed)	-	0.650	0.037	0.902
LTAR	Pearson Correlation	-0.070	1.000	0.486	-0.592
	Sig. (2-tailed)	0.650	-	0.001	0.000
ALR	Pearson Correlation	0.316	0.486	1.000	-.0570
	Sig. (2-tailed)	0.037	0.001	-	0.000
ROID	Pearson Correlation	0.019	-0.592	-0.570	1.000
	Sig. (2-tailed)	0.902	0.000	0.000	-

Source: Calculation by the author based on data from the Banking Agency of the FB&H and the Banking Agency of Republika Srpska

The obtained results of the correlation analysis between the second dependent variable (ROE) and the independent variables are almost identical to the results of the correlation analysis between the first dependent variable (ROA) and the independent variables. Table 5 clearly shows that the strongest positive correlation with the second dependent variable, i.e., return on equity (ROE), was recorded with the following independent variables: average lending ratio of 0.316 at significance ($p<0.05$), and rate of interest diversification of around 0.019 at significance greater than 5%. On the other hand, the strongest negative correlation with the second dependent variable, namely return on equity (ROE), was recorded with the independent variable loan-to-asset ratio (- 0.070) at a significance level greater than 5%.

Any variable in the model that has a VIF value greater than 3 is considered multicollinear and is thus rejected from the model. In the case of multicollinearity, the coefficients of the variables became unstable, and the standard errors were overestimated. Table 6 shows the obtained results of the multicollinear analysis between the observed variables in the model.

Table 6 - Multicollinear Analysis Using Variance Inflation Factor (VIF)

Variables	VIF	1/VIF
LTAR	1.62	0.616596
ALR	1.56	0.640855
ROID	1.83	0.545070

Source: Calculation by the author (STATA 13.0)

As can be seen from the previous table, every single independent variable has a value of the VIF coefficient less than 3. It is clear that there is no multicollinearity between the variables; therefore, the set model is valid.

Table 7 illustrates the results of the panel regression analysis based on the least squares model between the independent variables and return on assets of the banking sector of Bosnia and Herzegovina. The value of the F-statistics for the method of least squares is 5.23, and the probability is less than 5%, which indicates that the model is very significant (Table 7). In this empirical section, least squares regression is discussed because of the numerous advantages it has over other estimation techniques. These advantages are primarily reflected in the best finding of the line that describes the relationship between the dependent and independent variables and gives the best trend line for the set of observed data. Also, in this research, the Breusch-Pagan-Godfrey test and the Breusch-Pagan Harvey test were used to test heteroskedasticity. The probability result obtained through the Breusch-Pagan-Godfrey test is 0.1064, which is greater than 5% and confirms that there is no heteroskedasticity in the regression model. Likewise, the probability result obtained through the Breusch-Pagan Harvey test is 0.4797, which also confirms that there is no heteroskedasticity in the regression model.

Table 7 - Coefficients of Independent Variables in Ordinary Least Squares Regression for the Period: 2014:Q1 - 2024:Q4

Regression model	Ordinary Least squares method (OLS)		
Dependent variable - ROA			
Independent variables	Coeff.	Std. Error	Probability
C	-0.437	1.5153	0.7742
LTAR	-0.510	2.1409	0.8127
ALR	16.717	4.5445	0.0001
ROID	1.5830	0.5665	0.001

Coefficient of determination	0.2819	-	-
Pseudo R- Squared	-	-	-
Adjusted coefficient of determination	0.22805	-	-
F-Statistic	5.2345	-	-
Prob (F-statistic)	0.003	-	-
Prob (Rn-squared st)	-	-	-
Prob (Quasi -LR stat)	-	-	-

Source: Calculation by the author

By applying equation (1) to the data obtained by the method of least squares in Table 7, we arrive at the following predicted model:

$$ROA = -0{,}437 - 0{,}510 * LTAR + 16{,}717 * ALR + 1{,}5830 * ROID$$

The adjusted coefficient of determination in the least squares model is 0.22805 or 0.23. This indicates that 23% of the ROA variation is explained by changes in interest rate risk measures, while the remaining 77% is explained by factors not specified in the model. The probability of the F-statistic in the least squares method has a value of 0.003, which shows that the model is statistically significant at the 5% significance level because the p-value is less than 5%.

With the method of least squares, the value of the LTAR, ALR, and ROID coefficients is -0.510, 16.717, and 1.583, respectively. ROA is negatively associated with LTAR and positively with ALR and ROID, where the probability is less than 5% for the ALR and ROID variables. By testing the first research hypothesis that there is a negative correlation between the ratio of loans and assets and the first indicator of profitability, i.e., return on assets of the banking sector in Bosnia and Herzegovina, the conclusion is reached that there is a negative correlation, but with a probability higher than 5%, thus rejecting the first research hypothesis.

If the average leverage ratio increases by about 1%, the first dependent variable ROA in the least squares method will increase by about 16.72 units, assuming that other variables remain unchanged. By testing the second research hypothesis that there is a positive correlation between the average lending ratio and the first indicator of profitability, i.e., return on the assets of the banking sector in B&H, the conclusion is reached to accept the hypothesis because the probability is less than 5%. A larger loan portfolio generates a large majority of net interest income, which obviously has a positive impact on bank profitability, but is also subject to higher credit risk, which may in turn worsen profitability. Empirical evidence, Dietrich and Wanzenried (2011), ECB (2015), and Trujillo-Ponce (2013) reveal that overall, lending has a positive effect on profitability. Bikker and Hu (2002) find that lending is procyclical and that banks with higher profits will lend more generously.

If the risk of interest diversification increases by about 1%, the first dependent variable ROA in the least squares method will increase by about 1.58 units, assuming that other variables remain unchanged. By testing the third research hypothesis that there is a positive correlation between the risk of interest diversification and the first indicator of profitability, i.e., return on assets of the banking sector in B&H, the conclusion is reached to accept the hypothesis because the probability is less than 5%. Scheiber et al. (2016) and Arseneau (2017) believe that the risk of interest diversification and the ability of banks to diversify their sources of income have a positive impact on banking profitability. Aruwa and Musa (2014) found a negative relationship between interest rate risk and profitability.

Table 8 - Coefficients of Independent Variables in Ordinary Least Squares Regression for the Period: 2014:Q1 - 2024:Q4

Regression model	Ordinary Least squares method (OLS)		
Dependent variable - ROE			
Independent variables	Coeff.	Std. Error	Probability
C	-13.307	19.916	0.507
LTAR	15.671	28.138	0.581
ALR	170.620	59.729	0.006
ROID	12.902	7.446	0.091
Coefficient of determination	0.1949	-	-
Pseudo R- Squared	-	-	-
Adjusted coefficient of determination	0.1345	-	-
F-Statistic	3.228	-	-
Prob (F-statistic)	0.03		-
Prob (Rn-squared st)	-	-	-
Prob (Quasi -LR stat)	-	-	-

Source: Calculation by the author

By applying equation (2) to the data obtained by the method of least squares in Table 8, we arrive at the following predicted model:

$$ROE = -13,307 + 15,671 * LTAR + 170,62 * ALR + 12,902 * ROID$$

It is evident from the previous table that the adjusted coefficient of determination in the least squares model is 0.1345 or 13.45%. This indicates that 13% of the ROE variation is explained by changes in interest rate risk measures, while the remaining 87% is explained by factors not specified in the model. The probability of the F-statistic in the least squares method has a value of 0.003, which shows that the model is statistically significant at the 5% significance level because the p-value is less than 5%. In the observed model, the value of the independent variable, average lending ratio (ALR), has a positive value and a significance of less than 5%. Therefore, it further explains that if the average leverage ratio increases by about 1% then ROE will increase by about 170.62 units, under the least squares method, provided that other variables remain unchanged.

By testing the first research hypothesis that there is a negative correlation between the ratio of loans and assets and the second indicator of profitability, i.e., return on equity of the banking sector in Bosnia and Herzegovina, it is concluded that there is a positive correlation, but with a probability greater than 5%, thus rejecting the first research hypothesis.

Rivai et al. (2007) consider that the loan-to-asset ratio is a ratio used to demonstrate the ability of banks to meet the demand for loans using the total assets held by banks. The higher this ratio, the better the level of credit performance, because the greater the component of credit in the total structure of assets. On the other hand, it has a negative effect on liquidity, because the higher this ratio is, it means that existing funds are widely used for the distribution of loans, and less for short-term liabilities. By testing the second research hypothesis that there is a positive correlation between the average lending ratio and another indicator of profitability, i.e., the return on equity of the banking sector in B&H, the conclusion is reached to accept the hypothesis because the probability is less than 5%. By testing the third research hypothesis that there is a positive correlation between the risk of interest diversification and the second indicator of profitability, i.e. the return on equity of the banking sector in B&H, the conclusion is reached to reject the hypothesis because the probability is greater than 5%.

Concluding Remarks

Interest rate risk represents the basic market risk that can affect the business results of banks. Banks manage their assets and liabilities, where due to a mismatch of bank-specific assets and liabilities it can increase interest rate risk. In the currency board system, the Central Bank of Bosnia and Herzegovina cannot actively change interest rates or conduct an expansive or restrictive monetary policy.

The aim of this paper was to empirically examine how specific interest rate risk factors indirectly affect the efficiency of bank operations in Bosnia and Herzegovina, as measured by ROA and ROE indicators. The panel analysis is based on a set of data for the banking sector in B&H in the period from 2014 to 2024, and based on data from the Banking Agency in FB&H and Republika Srpska. The interest rate risk factor identified as having a significant impact on the profitability indicators of banks in Bosnia and Herzegovina is the average lending ratio. By testing the first research hypothesis that there is a negative correlation between the ratio of loans and assets and the first indicator of profitability, i.e., return on assets of the banking sector in Bosnia and Herzegovina, it was concluded that there is a negative correlation, but with a probability higher than 5%. Correlation between the ratio of loans and assets and another indicator of profitability i.e., return on equity, is positive but with a significance greater than 5%, which rejects the first research hypothesis.

By examining the second research hypothesis that there is a positive correlation between the average lending ratio and profitability indicators ROA and ROE of the banking sector in B&H, the conclusion was reached to accept the hypothesis because the probability is less than 5%. Therefore, the average lending ratio as an independent variable obtained in this paper through the least squares model shows that it has a completely statistically significant prediction on the dependent variables ROA and ROE. The average lending ratio reveals that a large loan portfolio increases banks' profitability. On the other hand, higher credit risk causes a significant deterioration in banks' profitability. Moreover, banks have less exposure to risk at lower levels of interest rates due to adverse selection and bad borrowers.

Commercial banks in Bosnia and Herzegovina set their interest rates in accordance with their business policy, the state of the financial markets, and the level of market interest rates. Therefore, interest rates in Bosnia and Herzegovina generally follow the trend of interest rates in the Eurozone. Changes in interest rates in the EU are transferred to B&H through financial markets, without domestic intervention. Interest rates on loans in Bosnia and Herzegovina have been at extremely low levels and in continuous decline in the last few years. Regarding the effect of the low-interest-rate environment on risk-taking by banks, there are generally two channels of risk-taking. On the one hand, no clear evidence was found that banks increased their risk exposure in search of return. Until now, banks have been able to maintain their level of profitability and, in this regard, have not compensated for reduced interest income with riskier investments. On the other hand, it is evident that recently, banks have reduced the level of provisions for loan losses by a certain amount in the environment of low interest rates. Therefore, the banks maintained their overall level of profitability at the expense of a smaller cushion for loan losses. In the coming period, banks will be forced to change their business models and expand their trading activities in order to be less dependent on their traditional lending and financing practices.

Examining the third research hypothesis that there is a positive correlation between the risk of interest diversification and the first indicator of profitability, i.e., return on assets of the banking sector in B&H, the conclusion was reached to accept the hypothesis because the probability is less than 5%. On the other hand, the correlation between the risk of interest diversification and another indicator of profitability, i.e., return on equity, is positive, but with a probability greater than 5%, which implies the conclusion to reject the given hypothesis.

The limitation of this research is reflected in the fact that only deposit banks in Bosnia and Herzegovina were taken into consideration, as well as the fact that only three measures of interest rate risk were taken as independent variables. A further recommendation would be to take banks from developing countries, individual EU member states, and developed countries, as well as more measures of interest rate risk.

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IZVEŠTAVANJE O ODRŽIVOSTI: STUDIJA SLUČAJA ODABRANIH KOMPANIJA U REPUBLICI SRBIJI

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„Pravila EU zahtevaju od velikih kompanija i kompanija koje se kotiraju na berzi da redovno objavljuju izveštaje o društvenim i ekološkim rizicima sa kojima se suočavaju i o tome kako njihove aktivnosti utiču na ljude i životnu sredinu."

Evropska komisija

Rezime: *Jedan od ključnih izazova 21. veka jeste pitanje održivosti, koje neposredno utiče na načine funkcionisanja vlada, privrednih subjekata i svih relevantnih ekonomskih aktera. Intenzivne posledice klimatskih promena, degradacija životne sredine i rastuće socijalne nejednakosti uslovile su značajnu transformaciju u poslovnoj praksi, pri čemu fokus više nije usmeren isključivo na finansijske performanse, već i na ostvarivanje ciljeva održivog razvoja. Cilj ovog rada jeste analiza izveštavanja o održivosti na primeru Republike Srbije. Izveštavanje o održivosti predstavlja jedan od najvažnijih instrumenata savremenog korporativnog upravljanja, budući da doprinosi jačanju poverenja investitora, unapređenju korporativne transparentnosti, ali i pružanju podrške globalnim inicijativama usmerenim ka ostvarivanju ciljeva održivog razvoja. U radu je primenjen mešoviti metodološki okvir koji obuhvata analizu relevantne akademske literature, razmatranje regulatornog okvira Evropske unije i Republike Srbije, kao i pregled izveštaja o održivosti objavljenih od strane odabranih kompanija koje posluju u Srbiji. Rezultati istraživanja ukazuju da se Srbija još uvek nalazi u inicijalnoj fazi razvoja izveštavanja o održivosti, ali i da postoji značajan potencijal za unapređenje prakse u ovoj oblasti, naročito kroz harmonizaciju sa evropskim regulativama i dalji razvoj institucionalnih kapaciteta.*

Ključne reči: izveštavanje o održivosti, ESG, korporativna transparentnost, regulativa EU, održivi razvoj.

JEL klasifikacija: M14, Q01, Q50

**Za stavove iznete u ovom radu odgovoran je autor i stavovi ne predstavljaju nužno zvaničan stav Udruženja ekonomista Beograd.*

Uvod

Jedna od osnovnih komponenti današnjeg poslovanja predstavlja izveštavanje o održivosti, što direktno odražava rastući značaj jačanja odgovornosti i transparentnosti poslovanja. Izveštavanje o održivosti je vođeno međunarodnim inicijativama, kao što su Globalna inicijativa izveštavanja (eng. *Global Reporting Initiative - GRI*) i ciljevi održivog razvoja (eng. *Sustainable Development Goals – SDGs*), kao i jačanjem regulatornog okvira Evropske unije. Za Srbiju, zemlju kandidata za članstvo u Evropskoj uniji, usklađivanje sa odredbama Direktive o nefinansijskom izveštavanju (eng. *Non-Financial Reporting Directive – NFRD*) i Direktive o korporativnom izveštavanju o održivosti (*Corporate Sustainability Reporting Directive - CSRD*) predstavlja veliki izazov, ali i neophodno regulatorno prilagođavanje. Mnoge domaće kompanije u Srbiji se suočavaju sa ograničenim kapacitetima izveštavanja, ali i sa nedovoljnim nivoom ekspertize u ovoj oblasti. I pored izazova, Srbija pokazuje značajan potencijal za razvoj izveštavanja o održivosti, vođen prilagođavanjem EU standardima, očekivanjima investitora i međunarodnim priznanjem održivosti kao konkurentske prednosti. Kako bi se Srbija uskladila sa evropskim standardima održivosti neophodno je da ojača domaći regulatorni okvir, da nastavi sa izgradnjom institucionalnih kapaciteta i da poveća svest korporacija o integraciji izveštavanja o održivosti u svakodnevnu poslovnu praksu.

Sledeća istraživačka pitanja (eng. *Research questions – RQ*) su zastupljena u ovom radu:

RQ 1: Koji su glavne institucionalne prepreke i regulatorni izazovi i za implementaciju održivog izveštavanja u Srbiji?

RQ 2: Kako se praksa izveštavanja u Srbiji poredi sa zahtevima Evropske unije?

RQ 3: Koje su glavne koristi i potencijali za srpske kompanije koje primenjuju održivo izveštavanje u poslovanju?

Ovaj rad je strukturiran na sledeći način. Nakon uvoda sledi pregled relevantne literature i analiza primenjene metodologije. Sledeći deo rada se odnosi na prikaz regulative o izveštavanju o održivosti, kao i analiza prakse izabranih kompanija u Srbiji po pitanju njihovog iskustva o izveštavanju o održivosti. U zaključku su sažeti najvažniji nalazi rada.

Pregled literature

Pregled literature o održivosti izveštavanja pruža odličnu osnovu za sagledavanje ključnih zaključaka, kao i dosadašnje prakse u primeni ovog regulatornog zahteva na nacionalnom i međunarodnom nivou. Time se pruža mogućnost boljeg razumevanja međunarodnih inicijativa kao što su globalne inicijative izveštavanja, praćenje ciljeva održivog razvoja i sagledavanje direktive o korporativnom izveštavanju o održivosti. Pregledom literature može se ukazati na koji način su navedene globalne inicijative o održivosti prilagođene nacionalnom konceptu, uključujući one koje su primenjene u Republici Srbiji.

Održivost i digitalna transformacija postali su ključni elementi savremenog bankarskog poslovanja. Održivi razvoj omogućava bankama da odgovore na društvene, ekološke i ekonomske izazove, dok digitalna transformacija poboljšava agilnost, efikasnost i kvalitet usluga (Kontić i Kontić, 2023). Od velikog značaja je i korporativna društvena odgovornost koja predstavlja važan strateški alat za jačanje korporativnog imidža čijom integracijom u strateško upravljanje omogućava bankama da stvore dugoročnu vrednost, unaprede reputaciju i povećaju stabilnost poslovanja (Radivojević et al., 2022). Kompanije koje dosledno primenjuju ESG (eng. *Environmental, Social and Governance*) standarde ostvaruju višu otpornost na ekonomske i tržišne turbulencije, jer bolje razumeju rizike i prilike povezane sa održivim praksama (Petrović Tomić, 2023). Od značaja za izveštavanje o održivosti jesu ciljevi održivog razvoja čija uspešna integracija u izveštavanje o održivosti zavisi od kombinacije unutrašnjih kapaciteta kompanije i spoljašnjih institucionalnih faktora. Institucionalni pritisci i regulativa igraju ključnu ulogu u motivaciji kompanija da sistematski uključuju ciljeve održivog razvoja u svoje izveštaje, dok unutrašnja posvećenost održivosti i kvalitet menadžmenta utiču na dubinu i kredibilitet izveštavanja (Rosati i Faria, 2019). Ciljevi održivog razvoja predstavljaju svetski poziv na delovanje radi iskorenjivanja siromaštva, očuvanja životne sredine i obezbeđivanja uslova za dostojanstven i prosperitetan život ljudi (Martin, 2023). Primena izveštavanja o održivosti predstavlja ne samo regulatornu obavezu, već strateški alat za unapređenje konkurentnosti, harmonizaciju praksi i dugoročno finansijsko i društveno održivo poslovanje (Suljić, 2024).

Obavezno izveštavanje o održivosti može imati značajne pozitivne ekonomske i društvene efekte, ali njegovi realni rezultati zavise od pažljivog dizajna regulative, dosledne primene i integracije sa širim okvirom korporativnog upravljanja (Christensen et al., 2021). Abeysekera (2021) ukazuje na potrebu da se uspostavi sveobuhvatan sistem koji povezuje finansijske i nefinansijske informacije, kako bi se omogućilo objektivnije i transparentnije sagledavanje uticaja poslovnih aktivnosti na društvo, ekonomiju i životnu sredinu. Autorka ističe da tradicionalni finansijski izveštaji više nisu dovoljni da prikažu celokupne performanse kompanija, jer zanemaruju društvene i ekološke posledice poslovanja. U tom kontekstu, izveštavanje o održivosti postaje ključni instrument za postizanje korporativne odgovornosti, legitimnosti i poverenja javnosti. Ioannoua i Serafeima (2017) su istraživali kako je obavezno izveštavanje o korporativnoj održivosti uticalo na ponašanje kompanija, kvalitet izveštavanja, strategije održivosti i performanse kompanija, sa naglaskom na dugoročne posledice za tržište kapitala i korporativnu odgovornost. Zaključak rada je da obavezno izveštavanje o održivosti ima značajne pozitivne posledice, kako za kvalitet informacija koje kompanije pružaju, tako i za stvarno poboljšanje korporativnih ESG performansi. Kvalitet ESG izveštaja i prisustvo nezavisne verifikacije predstavljaju ključne faktore za finansijski uspeh kompanija u savremenom poslovnom okruženju. Shodno tome García-Sánchez et al. (2019) preporučuju menadžmentu da ulaže u sistematično i transparentno izveštavanje, kao i u uspostavljanje robustnih procesa verifikacije, jer se time povećava kredibilitet kompanije, smanjuju se finansijski rizici i olakšava se pristup kapitalu za finansiranje održivih projekata.

Landrum i Ohsowski (2017) su istraživali tri različite perspektive i pristupe koje kompanije primenjuju u izveštavanju o održivosti i to: (1) Tržišno orijentisan pogled na svet (kompanije naglašavaju profitabilnost, efikasnost i ekonomske koristi ESG inicijativa. Ove kompanije koriste održivost primarno kao alat za poboljšanje konkurentske prednosti i optimizaciju troškova); (2) Pogled na svet usmeren ka zainteresovanim stranama (kompanije fokus stavljaju na potrebe i interese različitih interesnih grupa, uključujući zajednicu, zaposlene i investitore, balansirajući ekonomske ciljeve sa društvenom odgovornošću) i (3) Integrisani pogled na održivost (kompanije tretiraju održivost kao integralni deo strategije, gde su ekološki, društveni i ekonomski ciljevi međusobno povezani i strateški integrisani u poslovanje). Rad doprinosi teorijskom i praktičnom razumevanju različitih perspektiva održivosti i njihove uloge u oblikovanju korporativne strategije i komunikacije sa svim zainteresovanim stranama. Papoutsi i Sodhi (2020) su predstavili detaljnu empirijsku analizu odnosa između obima objavljivanja informacija u izveštajima o održivosti i stvarnih performansi kompanija u oblasti održivog razvoja. Autori su nastojali da ispitaju da li transparentnost i obim izveštavanja o održivosti zaista odražavaju realne rezultate kompanija u pogledu zaštite životne sredine, društvene odgovornosti i korporativnog upravljanja (ESG dimenzije), ili su pre pokazatelj reputacionih i marketinških strategija kompanija. Rezultat njihove analize ukazuje da ne postoji konzistentna i snažna korelacija između obima izveštavanja i stvarnog učinka održivosti. Kompanije koje imaju detaljne i opsežne izveštaje o održivosti ne ostvaruju nužno bolje rezultate u pogledu ekološke efikasnosti ili društvene odgovornosti. Naprotiv, u pojedinim slučajevima, obimnije izveštavanje je povezano sa slabijim performansama, što autori objašnjavaju mogućim pokušajem kompanija da kroz komunikaciju ublaže percepciju loših rezultata - fenomen poznat kao greenwashing (oblik manipulacije kojim kompanije pokušavaju da stvore pozitivan imidž „zelenog" poslovanja bez stvarnog sprovođenja održivih praksi).

U teorijskom okviru rada, Buallay (2018) polazi od pretpostavke da ESG izveštavanje može imati višestruke koristi za finansijske institucije: povećanje poverenja klijenata i investitora, jačanje korporativnog ugleda i poboljšanje odnosa sa interesnim stranama. Međutim, autorka ističe da postoje i različita gledišta u literaturi: dok pojedini autori tvrde da ESG aktivnosti predstavljaju trošak koji smanjuje profitabilnost, drugi smatraju da dugoročno doprinose stabilnosti i konkurentnosti banaka. Međutim, autorka ukazuje i na izazove, kao što su nedostatak jedinstvenih standarda izveštavanja, različite metode procene ESG faktora i mogućnost selektivnog objavljivanja informacija. Buallay, et al. (2021) su na uzorku evropskih i zalivskih banaka u periodu od 2008. do 2016. godine istraživali uticaj izveštavanja o održivosti na poslovne performanse banaka u periodu nakon globalne finansijske krize iz 2008. godine. Istraživanje je pokazalo da je u periodu nakon finansijske krize došlo do značajnog porasta nivoa izveštavanja o održivosti, posebno u pogledu društvenih i upravljačkih aspekata. Ipak, taj uticaj izveštavanja na performanse banaka varira između regiona: dok je u evropskim bankama identifikovana pozitivna i statistički značajna povezanost između izveštavanja i finansijskih rezultata, u bankama zalivskog regiona ta veza je slabija ili statistički beznačajna. Ove razlike autori objašnjavaju institucionalnim okvirima, regulatornim zahtevima i stepenom zrelosti finansijskih tržišta. Al-Shaer i Zaman (2018) su istraživali da li aktivno i efikasno funkcionisanje odbora za reviziju doprinosi povećanju poverenja zainteresovanih strana u tačnost, verodostojnost i transparentnost izveštaja o ESG pitanjima. Autori su zaključili da kompanije sa većim i stručno osposobljenim odborima za reviziju pokazuju veću verodostojnost u objavljenim podacima, dok kompanije sa slabijim nadzornim strukturama imaju veći rizik od selektivnog objavljivanja ili greenwashing-a.

Transparentno i kvalitetno izveštavanje o održivosti predstavlja ključni faktor unapređenja performansi i stvaranja održive konkurentske prednosti. Rezultati istraživanja Buallay et al. (2020), na uzorku kompanija iz 60 zemalja koja su bila predmet analize u periodu od 2007. do 2016. godine, ukazuju da postoji pozitivna i statistički značajna veza između izveštavanja o održivosti i performansi kompanija. Kompanije koje dosledno objavljuju ESG izveštaje ostvaruju bolje finansijske rezultate, veći povraćaj na kapital i efikasnije koriste resurse. Novićević Čečević et al. (2024) bavili su se ispitivanjem veze između izveštavanja o održivosti i poslovnog uspeha kompanija u Republici Srbiji i zaključili su da postoji pozitivna, ali umereno izražena povezanost između prakse izveštavanja o održivosti i poslovnog uspeha srpskih kompanija. Kompanije koje redovno objavljuju podatke o održivosti pokazuju veći stepen korporativne odgovornosti, imaju veću reputaciju i bolje odnose sa investitorima i zajednicom. Međutim, autori primećuju da većina analiziranih kompanija još uvek izveštava fragmentarno, bez sistematičnog pristupa i u skladu sa međunarodnim standardima. Novaković i Cvetanović (2020) su analizirali praksu izveštavanja o održivosti među pedeset najvećih srpskih kompanija, a koje su rangirane prema prihodima i tržišnoj kapitalizaciji, gde je fokus objavljivanja informacija o ESG aspektima poslovanja. Rezultati istraživanja pokazuju da, iako postoji trend rasta objavljivanja informacija o održivosti, većina srpskih kompanija još uvek objavljuje fragmentarne podatke, bez sistematičnog pristupa i jasnih indikatora performansi. Najveći identifikovani izazovi su nedostatak regulative, ograničena svest menadžmenta i manjak stručnih kadrova za kvalitetno izveštavanje.

Na osnovu pregleda literature može se zaključiti da izveštavanje o održivosti predstavlja ključni instrument za postizanje korporativne odgovornosti, unapređenje reputacije i jačanje dugoročne konkurentske prednosti kompanija. Pregled literature ukazuje i na izazove, kao što su fragmentarno izveštavanje, nedostatak jedinstvenih standarda i ograničeni kapaciteti menadžmenta, posebno u nacionalnom kontekstu, ali i na značajan potencijal izveštavanja o održivosti kao strateškog alata za dugoročno finansijsko i društveno održivo poslovanje.

Metodologija istraživanja

Metodologija istraživanja zasniva se na kvalitativnom pristupu koji kombinuje analizu literature, regulatornog okvira i prakse vodećih kompanija. Prvo, prethodno prikazani pregled literature omogućava sagledavanje teorijskih osnova, dosadašnjih empirijskih istraživanja i uvida u međunarodnu praksu, ističući izazove kao što su fragmentarno izveštavanje i potencijalni fenomen greenwashing-a. U nastavku rada analizira se regulativa u EU, posebno Direktiva o izveštavanju o održivosti korporacija, kao i regulativa u Republici Srbiji, uključujući relevantne zakone o zaštiti životne sredine i klimatskim promenama, kako bi se identifikovale razlike u obaveznosti, standardima i implementaciji.

Studija slučaja zasnovana je na analizi izveštaja vodećih srpskih kompanija dostupnih na platformi SustainabilityReports.com, kao što su NIS, EPS, Tigar, Dunav osiguranje, Aerodrom Nikola Tesla i Fintel Energija, pri čemu se ispituju obim, kvalitet i pristup ESG izveštavanju, uključujući kvantitativne i narativne podatke, transparentnost i prisustvo nezavisne verifikacije. Sekundarni podaci prikupljeni sa ove platforme omogućavaju komparativnu analizu prakse u Republici Srbiji u odnosu na EU, sagledavanje institucionalnih i regulatornih faktora, kao i identifikovanje prepreka kao što su nedostatak jedinstvenih standarda, ograničena svest menadžmenta i manjak stručnih kadrova. Ovakav metodološki pristup omogućava sveobuhvatan uvid u stanje izveštavanja o održivosti u Republici Srbiji, ocenu njegovog kvaliteta i relevantnosti, kao i formulisanje preporuka za unapređenje prakse u skladu sa međunarodnim standardima i strategijama održivog razvoja.

Regulativa o izveštavanju o održivosti

Regulativa o izveštavanju o održivosti predstavlja ključni okvir kojim se uređuje transparentno objavljivanje informacija o uticaju poslovanja kompanija na životnu sredinu, društvo i upravljanje (ESG faktore). U kontekstu sve većih globalnih izazova povezanih sa klimatskim promenama, energetskom tranzicijom i društvenom odgovornošću, Evropska unija (EU) je razvila obiman sistem propisa koji obavezuje kompanije da redovno izveštavaju o svojim aktivnostima u oblasti održivosti. Ovi propisi imaju za cilj da obezbede uporedivost, pouzdanost i relevantnost podataka koji su neophodni investitorima, donosiocima odluka i široj javnosti. Republika Srbija, koja je zemlja u procesu pristupanja EU, postepeno usklađuje svoje zakonodavstvo sa evropskim propisima u oblasti održivog poslovanja. Uporednom analizom regulative između EU i Republike Srbije postiže se pregled i analiza ključnih regulatornih okvira koji uređuju izveštavanje o održivosti čime se ističu sličnosti, razlike i izazove u procesu njihove implementacije – Slika 1.

Slika 1 - Prikaz regulative o izveštavanju o održivosti

Izvor: Ilustracija autora

EU je među globalnim predvodnicima u razvoju regulatornog okvira za održivost, s ciljem da obezbedi transparentno, odgovorno i održivo poslovanje privrednih subjekata. Regulativa o održivosti u EU obuhvata niz direktiva i uredbi koje postavljaju obaveze za kompanije u pogledu izveštavanja o njihovim ekološkim, društvenim i upravljačkim (ESG) aspektima.

Akcioni plan za održivo finansiranje (eng. *Action Plan on Financing Sustainable Growth*) predstavlja inicijativu Evropske komisije koja je pokrenuta u martu 2018. god. Ovim planom postavljena je sveobuhvatna strategija za povezivanje finansija sa ciljevima održivog razvoja i klimatskim ciljevima EU. Glavni ciljevi plana su da upravlja finansijskim rizicima koji proističu iz klimatskih i ekoloških promena, zatim da preusmeri tokove kapitala ka održivim investicijama, i da podstakne transparentnost i dugoročno odlučivanje tržišta kapitala. Regulativa EU o taksonomiji (eng. *EU Taxonomy Regulation*) je stupila na snagu 2020. god. i predstavlja neposredan proizvod strateških smernica iz Akcionog plana. Zelenom taksonomijom EU je uspostavila klasifikacioni sistem za ekonomske aktivnosti koje se mogu smatrati ekološki održivim. Glavni ciljevi taksonomije odnose na jasno postavljanje definicije šta predstavlja održiva aktivnost, zatim nastojanje da se smanji *greenwashing* i da se omogući kompanijama i investitorima da izveštavaju o aktivnostima koje su usklađene sa taksonomijom. Time se omogućava bolja kapitalna mobilnost ka održivim investicijama i direktno se utiče na smanjenje emisija ugljen-dioksida, kao i drugih uzročnika zagađivanja.

Jedan od ključnih instrumenata Akcionog plana EU za održivo finansiranje je Uredba o objavljivanju informacija o održivosti u finansijskom sektoru (eng. *Sustainable Finance Disclosure Regulation – SFDR*), koju su doneli Evropski parlament i Evropski savet, a koja je stupila na snagu u martu 2021. godine. Glavni cilj ove Uredbe jeste povećanje upotrebljivosti i transparentnosti podataka o održivosti u okviru finansijskog sektora, potom smanjenje rizika od *greenwashing*-a i da se investitorima omogući donošenje investicionih odluka na bazi pouzdano postavljenih ESG kriterijuma. Time je Uredba postavila zahteve finansijskim institucijama, poput banaka koje nude proizvode iz domena investicionog bankarstva, investicionih i penzionih fondova, kao i društva za osiguranje, da na jasan način prikažu na koji način prilikom donošenja investicionih odluka u obzir uzimaju faktore održivosti, ali i da objasne da li i u kojoj meri njihovi proizvodi doprinose održivom razvoju. Kako bi EU postala klimatski neutralna do 2050. god. Evropska komisija je u decembru 2015. god. usvojila Akcioni plan za cirkularnu ekonomiju (eng. *Circular Economy Action Plan*), dok je novi plan usvojila u martu 2020. god. Cilj ovog Akcionog plana je transformacija Unije kako bi se smanjila količina otpada, produžio životni vek proizvoda, ali i podstaklo njihovo ponovno korišćenje i reciklaža, kao i da se smanji pritisak na prirodne resurse.

Direktiva o izveštavanju o korporativnoj održivosti (eng. *Corporate Sustainability Reporting Directive – CSRD*) predstavlja jednu od ključnih reformi u zakonodavnom okviru EU za izveštavanje o održivosti. Ova Direktiva je usvojena 14. decembra 2022. godine i stupila je na snagu 1. januara 2024. godine. Primenom ove Direktive proširuje se obaveza izveštavanja na veći broj kompanija, uključujući i one koje nisu ranije bile obavezne, te uvodi strože i detaljnije zahteve u pogledu sadržaja i kvaliteta izveštaja o održivosti. Tri grupe kompanija su u obavezi da izveštavaju shodno ovog Direktivi, i to: (1) sve velike kompanije koje ispunjavaju najmanje dva od tri kriterijuma (250 i više zaposlenih; ukupna aktiva od 20 miliona evra ili više, i prihod od 40 miliona evra ili više); (2) sve javno kotirane kompanije čije akcije su listirane na uređenim tržištima EU i (3) kompanije iz trećih zemalja koje ostvaruju prihod od 150 miliona evra u EU i imaju barem jednu ćerku-kompaniju ili podružnicu u EU. Direktiva o dužnoj pažnji u oblasti korporativne održivosti (eng. *Corporate Sustainability Due Diligence Directive-CSDDD*) je usvojena u junu 2024. god., s tim što nacionalna zakonodavstva imaju rok primene do jula 2026. Ova Direktiva predstavlja zakonodavni okvir Evropske unije koji obavezuje velike kompanije da identifikuju, spreče, ublaže i isprave negativne uticaje na ljudska prava i životnu sredinu u svojim poslovnim operacijama i celokupnim lancima vrednosti. Time se jača odgovornost korporacija i proširuje obaveza transparentnosti duž čitavog lanca vrednosti.

Kroz niz direktiva i uredbi – uključujući taksonomiju, *SFDR, CSRD i CSDDD* – kao i akcione planove za održivo finansiranje i cirkularnu ekonomiju, EU postavlja jasne standarde za izveštavanje, upravljanje rizicima i primenu ESG principa. Ovaj regulatorni okvir ne samo da povećava transparentnost i kvalitet informacija o održivosti, već i podstiče kompanije da odgovorno upravljaju svojim ekološkim i društvenim uticajima, čime se doprinosi postizanju klimatske neutralnosti, zaštiti životne sredine i dugoročnom održivom razvoju unije i njenih partnera.

Iako Republika Srbija nije članica EU, domaće zakonodavstvo se postepeno usklađuje sa evropskim standardima, uključujući obaveze izveštavanja o održivosti, zaštitu životne sredine i društvenu odgovornost kompanija. Član 34 Zakona o računovodstvu propisuje da pravna lica prilikom prikazivanja rezultata poslovanja u okviru godišnjeg izveštaja o poslovanju, pored finansijskih, prikažu i informacije o ulaganjima u cilju zaštite životne sredine. Ovim članom se Republika Srbija usaglašava sa *CSRD* direktivom, čime se postavlja temelj za sistematično izveštavanje o održivosti. Kao odgovor na potrebu da se nacionalni razvojni prioriteti usklade sa globalnim trendovima i ciljevima održivog razvoja koje su promovisale Ujedinjene nacije, Republika Srbija je prvu Strategiju održivog razvoja usvojila 2008. godine. Kako su 2015. god. usvojene Agende UN 2030 i Ciljevi održivog razvoja Republika Srbija je 2019. god. usvojila Strategiju održivog urbanog razvoja Republike Srbije do 2030. godine. Strategija ima za cilj da uspostavi održiv urbani razvoj kombinovanjem ekonomskih, socijalnih i ekoloških dimenzija i direktno doprinosi ostvarivanju 11 cilja održivog razvoja, koji se odnosi na uspostavljanje održivih gradova i zajednica. Osnovni pravni okvir za životne sredine u Srbiji predstavlja Zakon o zaštiti životne sredine koji je usvojen 2004. godine, a potom su usledile izmene i dopune 2009, 2016, 2018 i 2024. godine. Njegov osnovni cilj je obezbeđenje prava građana na zdravu i očuvanu životnu sredinu, kao i uspostavljanje ravnoteže između ekonomskog razvoja i očuvanja prirodnih ekosistema. Zakon promoviše principe održivog razvoja, prevencije zagađenja i odgovornosti zagađivača, kao i uključivanje javnosti u donošenje odluka koje utiču na životnu sredinu. U skladu sa evropskim standardima, Zakon takođe predviđa obavezu strateških procena uticaja na životnu sredinu i integraciju ekoloških kriterijuma u sektorima kao što su energetika, poljoprivreda, saobraćaj i industrija. Na taj način ovaj Zakon predstavlja osnovu za sprovođenje savremene ekološke politike Srbije i ključni instrument u procesu usklađivanja sa pravnim tekovinama Evropske unije.

Zakon o klimatskim promenama, koji je usvojen 2021. godine, predstavlja sveobuhvatan sistem za smanjenje emisija gasova sa efektom staklene bašte i prilagođavanje na klimatske promene. Zakon obuhvata izradu i sprovođenje strategije niskougljeničnog razvoja i programa prilagođavanja, kao i praćenje, izveštavanje i unapređenje tih mera. Ovim Zakonom se uređuje postupak za izdavanje dozvola za emisije gasova operatorima postrojenja i vazduhoplova, kao i pravila za monitoring, izveštavanje, verifikaciju i akreditaciju verifikatora. Pored toga, propisuje administrativne takse, nadzor i druga pitanja od značaja za ograničenje emisija i adaptaciju na klimatske promene. U aprilu 2021. godine Ministarstvo rudarstva i energetike je izvršilo izmene i dopune Zakona o energetici kojim je propisana obaveza izrade Integrisanog nacionalnog energetskog i klimatskog plana Republike Srbije za period do 2030. godine sa vizijom do 2050. godine. Integrisani nacionalni energetski i klimatski plan predstavlja ključni strateški dokument Republike Srbije kojim se definiše okvir za sprovođenje politike u oblasti energetike i klimatskih promena u skladu sa ciljevima Evropske unije i međunarodnim obavezama iz oblasti zaštite životne sredine.

Osnovni dokumenti Republike Srbije koji uređuju sistem održivog upravljanja otpadom predstavljaju Program upravljanja otpadom u Republici Srbiji za period 2022 – 2031. godine i Zakon o upravljanju otpadom. Program definiše dugoročne ciljeve i pravce razvoja u oblasti upravljanja otpadom, sa posebnim naglaskom na smanjenje količine otpada, povećanje reciklaže, ponovnu upotrebu materijala i bezbedno odlaganje otpada koji se ne može iskoristiti. Time se podstiče prelazak sa linearnog modela potrošnje na cirkularnu ekonomiju, gde se resursi koriste efikasnije i produžava njihov životni ciklus. Zakon o upravljanju otpadom pravno uređuje način sakupljanja, transporta, skladištenja, obrade, reciklaže i odlaganja otpada, uz propisivanje obaveza svih učesnika u sistemu – od proizvođača i uvoznika do lokalnih samouprava i operatera postrojenja. Zajedno, program i zakon predstavljaju osnovu za unapređenje sistema zaštite životne sredine, smanjenje negativnih uticaja otpada i ispunjavanje obaveza Srbije u procesu približavanja standardima Evropske unije u oblasti cirkularne ekonomije i upravljanja otpadom. U novembru 2021. god. Ministarstvo finansija je usvojilo Strategiju za razvoj tržišta kapitala za period 2021. do 2026. godine i Akcioni plan za period 2021–2023. godine za sprovođenje Strategije za razvoj tržišta kapitala za period od 2021. do 2026. godine. Sa aspekta održivosti, Strategija, kao i prateći Akcioni plan, prepoznaju značaj razvoja inovativnih i alternativnih finansijskih instrumenata, uključujući zelene i održive obveznice, kao i potrebu za unapređenjem korporativnog upravljanja, transparentnosti i objavljivanja informacija koje obuhvataju i nefinansijske aspekte poslovanja.

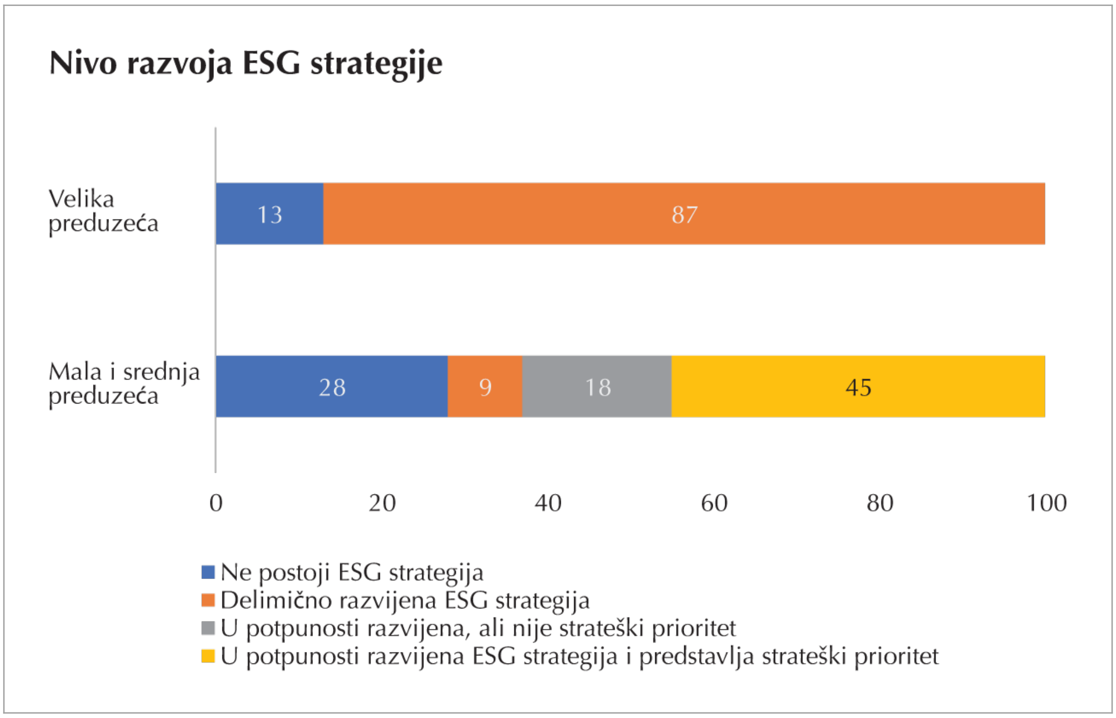
Kako bi se uspostavila čista proizvodnja, ojačala konkurentnost srpske privrede i uspostavila zdravija životna sredina, Ministarstvo finansija Srbije je početkom oktobra 2025. godine započelo javnu raspravu o dva ključna zakona koji se odnose na Nacrt Zakon o porezu na emisije gasova sa efektom staklene bašte i na Nacrt Zakona o porezu na uvoz ugljenično intenzivnih proizvoda. Nacrt Zakona o porezu na uvoz ugljenično intenzivnih proizvoda ima za cilj smanjenje emisija gasova sa efektom staklene bašte u industriji i usklađivanje Republike Srbije sa evropskim klimatskim politikama, primenom poreza na proizvode čija proizvodnja generiše značajne emisije CO2, poput čelika, cementa, aluminijuma i đubriva. Nacrt zakona predviđa obračun poreza na osnovu ugljenične intenzivnosti proizvoda, uz mogućnost poreskog kredita za uvoznike koji su već platili sličan porez u zemlji porekla, čime se izbegava dvostruko oporezivanje. Nacrt Zakona o porezu na emisije gasova sa efektom staklene bašte ima za cilj smanjenje emisija gasove sa efektom staklene bašte Republike Srbije, usklađivanje sa evropskim klimatskim politikama i podsticanje zelene tranzicije. Nacrt Zakona predviđa uvođenje poreskog opterećenja za velike emitere, kao što su energetski sektor, cementna, čelična i aluminijumska industrija, pri čemu će visina poreza zavisiti od količine emitovanih gasova. Poreski obveznici će biti obavezni da izveštavaju o svojim emisijama, dok će poreski prihod biti usmeren ka finansiranju projekata energetske efikasnosti i smanjenja ugljeničkog otiska. Javna rasprava po osnovu ova dva nacrt zakona trajaće 20 dana i predviđeno je da zakoni počnu da se primenjuju od 1. januara 2026. godine. Možemo zaključiti da Republika Srbija postepeno usklađuje svoje zakonodavstvo sa evropskim i međunarodnim standardima u oblasti održivosti, što se ogleda kroz obaveze izveštavanja o zaštiti životne sredine, društvenu odgovornost kompanija, upravljanje otpadom i smanjenje emisija gasova sa efektom staklene bašte.

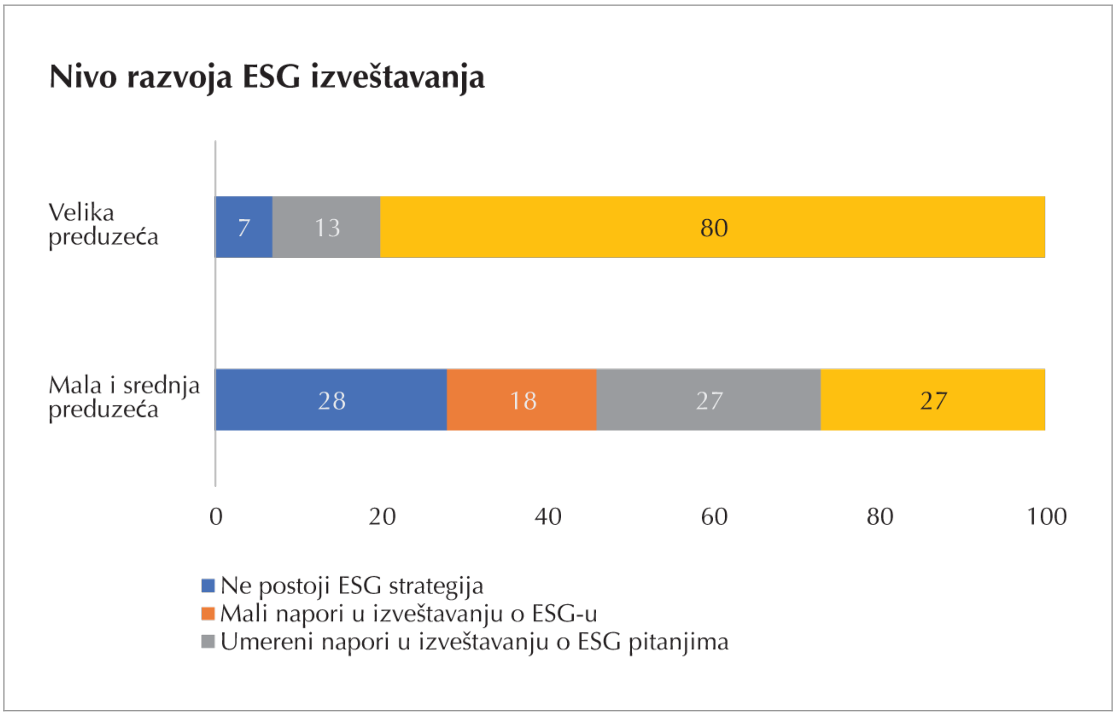
Prezentacija i analiza slučaja Republike Srbije

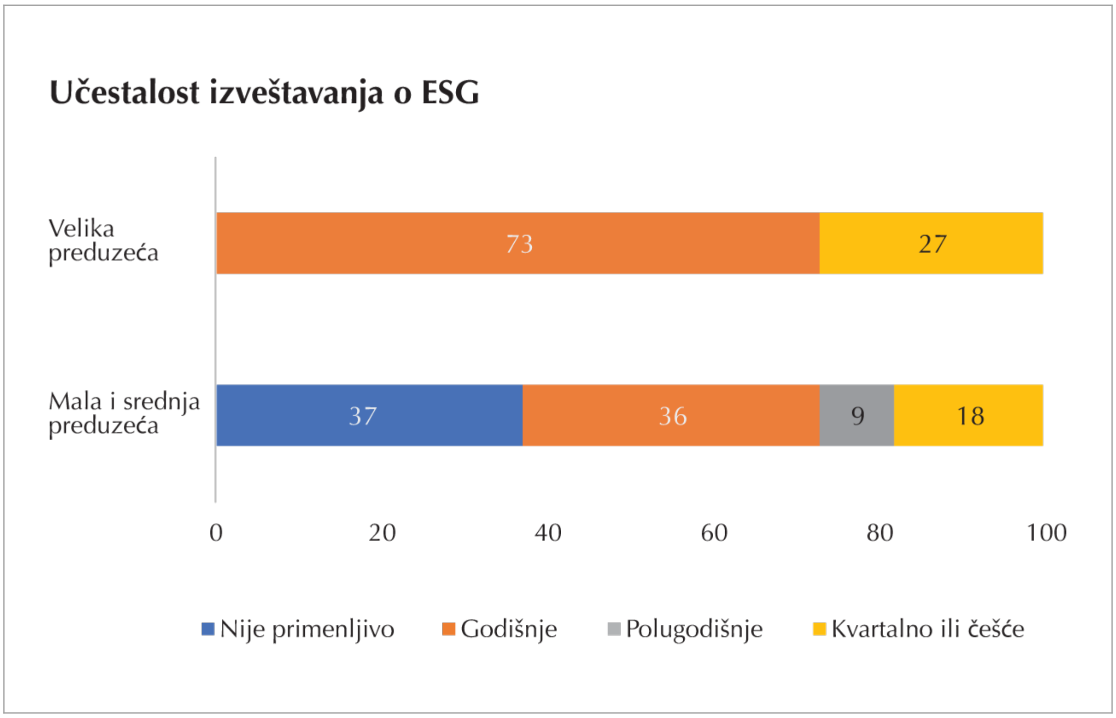
U poslednjih nekoliko godina, Srbija je zabeležila značajan napredak u integraciji principa održivosti u poslovanje, što je potvrđeno kroz istraživanje koje je sprovela konsultantska kompanija Kearney. Međutim, postoje značajne razlike u implementaciji ESG strategija između velikih kompanija i malih i srednjih kompanija. Dok velika preduzeća pokazuju snažnu posvećenost ESG principima, mala i srednja preduzeća se suočavaju s izazovima u implementaciji tih strategija. Prema podacima iz istraživanja, velika preduzeća češće integrišu ESG faktore u svoje poslovanje, dok mala i srednja preduzeća često nemaju razvijene ESG strategije. Ova razlika ukazuje na potrebu za dodatnom podrškom i edukacijom malih i srednjih preduzeća kako bi se poboljšala njihova ESG praksa i uskladila s globalnim standardima – Grafikon 1. Ove informacije ukazuju na to da Srbija prepoznaje važnost održivosti u poslovanju, ali i na potrebu za daljim naporima u edukaciji i podršci sektoru malih i srednjih preduzeća kako bi se postigao ravnomeran napredak u implementaciji ESG principa.

U analizi slučaja o primeni održivih poslovnih praksi u Srbiji, koristićemo podatke dostupne na platformi SustainabilityReports.com, koja pruža pristup ESG izveštajima kompanija registrovanih u Srbiji. Ova platforma omogućava detaljan uvid u strategije održivosti, ciljeve i postignuća kompanija u različitim industrijama. Pregledom dostupnih izveštaja, možemo identifikovati ključne oblasti u kojima srpske kompanije implementiraju održive prakse, kao što su smanjenje emisije ugljen-dioksida, unapređenje energetske efikasnosti, odgovorno upravljanje otpadom i društvena odgovornost. Analizom ovih izveštaja, moguće je proceniti kako srpske kompanije usklađuju svoje poslovanje sa globalnim ESG standardima i koje konkretne rezultate postižu u oblasti održivosti. Pregledom dostupnih izveštaja, fokus je stavljen na sledeće kompanije: Naftna Industrija Srbije a.d., Energoprojekt Holding a.d., Metalac a.d., Tigar a.d., Aerodrom Nikola Tesla a.d. i Fintel Energija a.d. - Tabela 1.

Grafikon 1 - ESG strategije i izveštavanje preduzeća u Republici Srbiji







Napomena: ESG je akronim za Environmental (Ekološki), Social (Društveni) i Governance (Upravljanje)

Tabela 1 - Izveštaji o održivosti kompanija sa sedištem u Republici Srbiji

Ime kompanije	Sektor	Industrija	Simbol	ISIN	Broj dostupnih izveštaja
Naftna Industrija Srbije AD	Energetika	Energetika	NIIS	RSNISHE79420	21
Energoprojekat Holding AD	Industrija	Kapitalna dobra	ENHL	RSHOLDE58279	10
Metalac AD	Roba široke potrošnje	Trajna potrošna dobra	MTLC	RSMETAE71629	5
Tigar AD	Roba široke potrošnje	Automobili i komponente	TIGR	RSTIGRE55421	5
Aerodrom Nikola Tesla AD	Industrija	Transport	AERO	RSANTBE11090	3
Fintel Energija AD	Komunalne usluge	Komunalne usluge	FINT	RSFINEE60549	3

Napomena: ISIN (eng. International Securities Identification Number) predstavlja međunarodni identifikacioni broj hartije od vrednosti
Izvor: Sustainability Reporting Database

Kompanija NIS predstavlja jednu od najvećih vertikalno integrisanih energetskih grupa u Jugoistočnoj Evropi, sa 13.500 zaposlenih, i delatnostima koje obuhvataju istraživanje, proizvodnju, preradu nafte i gasa, kao i prodaju i energetiku. Osnovana je 1991. godine, a od 2008. godine većinski vlasnik je ruski Gasprom Neft. NIS ima dugu tradiciju izveštavanja o održivom razvoju i društvenoj odgovornosti, koji su u potpunosti usklađeni sa standardima Globalne inicijative izveštavanja (eng. *Global Reporting Initiative - GRI*), uključujući dodatke specifične za sektor nafte i gasa. Izveštaji su javno dostupni na sajtu kompanije (nis.rs) i obuhvataju ekonomske, društvene i ekološke aspekte poslovanja, uključujući ciljeve održivog razvoja, ulaganja u zaštitu životne sredine, energetsku efikasnost, zdravlje i bezbednost na radu, kao i odnose sa zaposlenima i zajednicom. Poslednji izveštaj o održivosti poslovanja NIS je objavio za 2023. godinu u kojem ističe da je tokom te godine kompanija uložila oko 801,8 miliona dinara u ekološke projekte, čime su direktno smanjene emisije ugljen-dioksida za oko 6% u odnosu na 2022. godinu. Takođe, kompanija planira da smanji intenzitet emisije ugljenika za 30% do 2030. godine u poređenju sa nivoom iz 2018. godine. U okviru „Zelene agende", NIS se zalaže za povećanje energetske efikasnosti i širenje obnovljivih izvora energije. U 2023. godini ostvareno je smanjenje potrošnje energije koja je ekvivalentna iznosu od 7.936 tona nafte i ostvarena je ušteda u vrednosti od 734,8 miliona dinara. U pogledu proizvodnje obnovljivih izvora energije NIS planira da do 2030. godine obezbedi proizvodnju koja pokriva 50% sopstvene potrošnje. U pogledu komunikacije sa zainteresovanim stranama, NIS organizuje dan investitora (eng. *Investor Day*), kvartalne prezentacije za investitore, aktivno učestvuje u dijalogu sa lokalnim zajednicama, obrazovnim institucijama, partnerima i medijima. Kompanija NIS je veoma aktivna i u domenu društvene odgovornosti time što organizuje program „Zajednička stvar zajednica" (eng. *Common Cause Community*) za koji je u 2023. god. izdvojila rekordni iznos od 144,5 miliona dinara kako bi pružila podršku projektima u oblasti razvoja nauke i obrazovanja. U oblasti razvoja ljudskih resursa zabeleženo je gotovo 4.300 edukativnih aktivnosti sa više od 4.000 zaposlenih i ulaganjima od 273 miliona dinara. Izveštaj o održivom razvoju NIS-a za 2023. godinu potvrđuje da kompanija dosledno primenjuje međunarodne standarde transparentnosti i odgovornog poslovanja, sistematski integrišući ekonomske, ekološke i društvene aspekte u svoju strategiju razvoja i doprinos održivoj energetskoj tranziciji Srbije.

Energoprojekt Holding a.d. (EPH) je jedna od vodećih inženjering i projektno-investicionih kompanija u Srbiji i regionu, sa tradicijom dužom od 70 godina u oblasti projektovanja, konsaltinga, inženjeringa i izgradnje složenih infrastrukturnih objekata. Kompanija se bavi realizacijom projekata u oblastima energetike, industrije, visokogradnje i niskogradnje, telekomunikacija, vodoprivrede, zaštite životne sredine i drugih javnih i komercijalnih objekata. EPH je u aprilu 2022. god. na polju održivosti izveštavanja saopštila da nastoji da stalno unapredi svoje poslovanje i u domenu upravljanja, kontrole i koordinacije aktivnosti, a sve u cilju obezbeđenja zadovoljstva klijenata, postojećih i budućih. U tom pogledu EPH je uspostavio sopstveni integrisani sistem menadžmenta (IMS) koji obuhvata menadžment zaštite životne sredine, menadžment upravljanja kvalitetom i menadžment upravljanja bezbednošću i zdravljem na radu. Svi delovi IMS su usaglašeni sa međunarodno priznatim standardima ISO. EPH nastoji da sve svoje poslovne aktivnosti redovno usklađuje kako bi se postigla zaštita životne sredine, kao i bezbednost i zdravlje na radu.

Metalac a.d. iz Gornjeg Milanovca je javno akcionarsko društvo, osnovano u aprilu 1959. godine, sa skoro 2.000 zaposlenih, koje se bavi proizvodnjom širokog spektra proizvoda, koje izvozi u 40 zemalja. Poslednji ESG izveštaj za kompaniju Metalac se odnosi na 2024. godinu i sastavljen je prema smernicama GRI standarda. Metalac primenjuje integrisani sistem sistema kvaliteta (IMS), koji kombinuje metode i instrumente za usklađenost sa zahtevima za kvalitet i zaštitu životne sredine. Od 1994. primenjuje se sistem menadžmenta kvalitetom ISO 9001 (odnosi se na sistem upravljanja kvalitetom u poslovnoj organizaciji), a od 2002. godine kompanija je sertifikovana za sistem zaštite životne sredine ISO 14001:201 (odnosi se na oblast upravljanja životnom sredinom i pomaže kompanijama da minimizuju negativno dejstvo svojih aktivnosti i procesa na okolinu). Najviše rukovodstvo kompanije, kao i zavisna društva, aktivno primenjuju politiku kvaliteta i zaštite životne sredine, time što se postavljaju ciljevi kvaliteta i zaštite životne sredine, uz punu posvećenost sprečavanju zagađenja i poboljšanju ekoloških performansi. Metalac nastoji da unapređenje svog poslovanja postigne kroz pozitivan uticaj na društvenu zajednicu i kroz poštovanje ESG principa. Ciljevi do 2030. godine obuhvataju ulaganje u projekte lokalne zajednice u vrednosti od 3 miliona evra, zatim smanjenje Scope 2 emisije (odnose se na posredne emisije gasova sa efektom staklene bašte koje nastaju iz proizvodnje kupljene električne energije, toplote, pare ili hlađenja koje kompanija koristi u svom poslovanju) za 30% u poređenju sa 2021. godinu, kao i povećanje proizvodnje električne energije iz obnovljivih izvora za 10% u poređenju sa 2023. godinom. Ovakvi ciljevi imaju svoju promenljivost imajući u vidu da je tokom 2024. god. kompanija potrošila 15.785.262 KhW električne energije, što je ispod potrošnje iz 2023. god. (18.428.429 KhW). Imajući u vidu prirodu poslovanja, kompanija Metalac ne može reciklirani materijal da koristi u svojoj primarnoj proizvodnji, već u okviru kartonske ambalaže čija upotreba tokom 2024. god. je iznosila 467,9 tona (u 2023. godini 205,4 tona). Metalac ima značajna ulaganja u domenu društvene odgovornosti. Tako je u 2024. godini izdvojeno više od 11 miliona dinara za obuku zaposlenih, što je porast od 140% u poređenju sa 2023. god., ali su pokrenuti brojni projekti upravljanja karijerom zapo-slenih, poput „Pogled ka vrhu" i „Znanje se množi deljenjem".

Kompanija Tigar a.d. je osnovana 1935. godine kao radionica za proizvodnju gumenih proizvoda i svih vrsta gumene obuće. Od 2007. godine, Tigar je deo francuske kompanije Michelin, koja je 2010. godine postala 100% vlasnik fabrike Tigar Tyres. Kompanija Tigar implementira politiku zaštite životne sredine i visok nivo ekološke svesti kao deo korporativne kulture, a kroz članstvo u grupaciji Michelin učestvuje i u globalnim inicijativama održivosti, uključujući program „3P" (eng. *People, Planet, Profit*), koji teži balansiranju profita sa očuvanjem životne sredine i poboljšanjem kvaliteta života zaposlenih i lokalne zajednice. U saradnji sa lokalnim institucijama, Tigar podržava projekte u obrazovanju, zdravstvu, kulturi i sportu, uključujući donacije za škole, bolnice i sportske organizacije. Kompanija takođe promoviše ekološku svest i održivi razvoj, učestvujući u kampanjama za zaštitu životne sredine i reciklažu. Kroz ove aktivnosti, Tigar a.d. nastoji da bude odgovoran član društva i doprinosi njegovom održivom razvoju.

Aerodrom Nikola Tesla Beograd (ANTB) je otvoren 1962. godine i predstavlja najveći i najprometniji međunarodni aerodrom u Srbiji koji je ime dobio po naučniku Nikoli Tesli. U decembru 2018. godine, *VINCI Airports*, francuski lider u upravljanju aerodromima, preuzeo je koncesiju na period od 25 godina, sa planiranim investicijama od preko 730 miliona evra, kako bi unapredio kapacitet i operativnu efikasnost aerodroma. Cilj je da se poveća broj putnika na 15 miliona godišnje do 2043. godine. Aerodrom Nikola Tesla Beograd se u oblasti održivog razvoja pridržava principa i ciljeva koje je definisala grupacija *VINCI Airports*, kojoj pripada. Kompanija posluje u skladu sa nacionalnim zakonodavstvom i međunarodnim standardima zaštite životne sredine, implementirajući odgovarajuće sisteme menadžmenta. U okviru svojih aktivnosti, aerodrom se fokusira na smanjenje emisije ugljen-dioksida, efikasno korišćenje resursa, upravljanje otpadom i očuvanje bioraznolikosti. Takođe, angažuje se u društvenim projektima i transparentno izveštava zainteresovane strane o svojim naporima i postignućima u oblasti održivosti. U skladu sa globalnom strategijom *VINCI Airports*, ANTB je postavio ambiciozne ciljeve smanjenja emisije ugljen-dioksida, uključujući smanjenje emisija za 10% do 2030. godine i postizanje neto nulte emisije do 2050. godine. Među ključnim inicijativama su instalacija fotonaponske elektrane snage, zamena sistema osvetljenja LED tehnologijom, kao i ugradnja punjača za električna vozila.

Fintel nergija a.d. je osnovana 2016. godine i predstavlja vodećeg nezavisnog proizvođača električne energije iz obnovljivih izvora u Srbiji, specijalizovan za energetske projekte na bazi vetra. Fintel Energija trenutno upravlja kapacitetom od 86 MW kroz tri operativna vetroparka, a do 2030. god. planira da instalira dodatnih 1 GW kapaciteta kroz 13 novih projekata, uz ukupna ulaganja od oko milijardu evra. Kompanija je većinski u vlasništvu italijanske grupe Fintel Energia Group S.p.A., koja je lider u sektoru obnovljivih izvora energije u Italiji. Fintel Energija je takođe poznata po tome što je 2018. godine sprovela prvu inicijalnu javnu ponudu (eng. *initial public offer - IPO*) na Beogradskoj berzi posle skoro 80 godina, što predstavlja značajan korak u razvoju tržišta kapitala u Srbiji. Misija kompanije je da postane lider u proizvodnji čiste energije, održavajući najviše standarde kvaliteta, bezbednosti i ekološke održivosti. Kompanija se pridržava najviših standarda korporativnog upravljanja i posluje etički, kontinuirano unapređujući interese svojih akcionara. Kroz ove inicijative, Fintel Energija doprinosi smanjenju emisije ugljen-dioksida u Srbiji i dugoročnom održivom razvoju zemlje. Ovu rezultati su prepoznati time što je kompaniji u decembru 2015. god., dodeljena nagrada „Iskorak godine", od strane Srpske asocijacije menadžera, za projekat izgradnje prvog vetroparka u Srbiji, dok je u septembru 2017. kompanija dobila nagradu za najuspešniji realizovani projekat u oblasti energetike u Jugoistočnoj Evropi.

U narednim godinama, očekuje se da će sve više kompanija u Srbiji usmeriti svoje strategije ka održivosti, kako bi se uskladile sa globalnim trendovima i regulativama, te doprinele održivom razvoju društva i životne sredine.

Zaključak

SIzveštavanje o održivosti u savremenom poslovnom okruženju ima ključnu ulogu u povezivanju ekonomskih, društvenih i ekoloških dimenzija razvoja, čime postaje temelj savremenog korporativnog upravljanja. Rezultati istraživanja ukazuju da se Republika Srbija nalazi u fazi intenzivne institucionalne i regulatorne transformacije, u nastojanju da svoje zakonodavstvo i praksu uskladi sa evropskim standardima definisanim kroz Direktivu o korporativnom izveštavanju o održivosti i prateće regulative o održivom finansiranju. Analiza izveštaja vodećih kompanija u Srbiji – kao što su NIS, Metalac, Aerodrom Nikola Tesla, Energoprojekt i Fintel Energija – pokazuje da su pojedine organizacije prepoznale značaj održivog izveštavanja kao strateškog alata za unapređenje korporativne reputacije, transparentnosti i odnosa sa investitorima, ali i kao sredstvo za dugoročno smanjenje rizika i povećanje konkurentnosti. Ipak, praksa izveštavanja o održivosti u Srbiji je još uvek nedovoljno razvijena i dominantno je prisutna među velikim preduzećima, dok mala i srednja preduzeća i dalje pokazuju nizak nivo uključenosti i ograničene kapacitete u pogledu primene ESG standarda. Ključni izazovi se odnose na nedostatak stručnih kadrova, neujednačenost metodologije izveštavanja, ograničenu verifikaciju i nedovoljnu institucionalnu podršku. U tom kontekstu, neophodno je dalje jačanje regulatornog okvira, razvoj nacionalnih standarda, kao i sistemska edukacija menadžmenta i zaposlenih u cilju povećanja kvaliteta i relevantnosti objavljenih informacija.

Usklađivanje sa zahtevima EU i uvođenje obaveznih mehanizama verifikacije doprineće većem poverenju javnosti, investitora i regulatornih tela, čime se postavlja osnova za stabilan prelazak Srbije ka zelenoj i održivoj ekonomiji. Stoga se može zaključiti da izveštavanje o održivosti u Republici Srbiji, iako još u razvoju, ima potencijal da postane ključni instrument za podsticanje odgovornog poslovanja, jačanje institucionalne stabilnosti i ostvarivanje dugoročnih ciljeva održivog razvoja u skladu sa evropskim i globalnim standardima.

Buduća istraživanja o izveštavanju o održivosti u Srbiji trebalo bi da se usmere na širu empirijsku analizu praksi u različitim sektorima i na utvrđivanje faktora koji utiču na kvalitet ESG izveštaja. Posebno je važno ispitati uticaj novih regulatornih okvira, kao i ulogu institucija u jačanju kapaciteta za izveštavanje. Dalji rad može obuhvatiti komparativne analize sa zemljama EU, kao i istraživanje primene digitalnih tehnologija u obradi i verifikaciji podataka. Na taj način bi se doprinelo razvoju transparentnijeg i efikasnijeg sistema izveštavanja o održivosti u Srbiji.

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SUSTAINABILITY REPORTING: A CASE STUDY OF SELECTED COMPANIES IN THE REPUBLIC OF SERBIA

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"EU rules require large companies and listed companies to publish regular reports on the social and environmental risks they face, and on how their activities impact people and the environment."

European Commission

Summary *Sustainability has emerged as one of the major challenges of the 21st century, influencing the operations of governments, businesses, and other economic stakeholders. The significant effects of climate change, environmental degradation, and increasing social inequalities have led companies to alter their practices, placing greater importance on achieving sustainable development goals rather than focusing solely on financial results. The aim of this paper is to analyze sustainability reporting on the example of the Republic of Serbia. Sustainability reporting is one of the most important instruments of modern corporate governance, since it contributes to strengthening investor confidence, improving corporate transparency, and also providing support to global initiatives aimed at achieving sustainable development goals. The paper employs a mixed-methodological framework that incorporates an analysis of relevant academic literature, consideration of the regulatory frameworks of the European Union and the Republic of Serbia, as well as a review of sustainability reports published by selected companies operating in Serbia. The research results indicate that Serbia is still in the initial phase of development of sustainability reporting, but also that there is significant potential for improving practice in this area, especially through harmonization with European regulations and further development of institutional capacities.*

Keywords: sustainability reporting, ESG, corporate transparency, EU regulation, sustainable develop-ment.

JEL classification: M14, Q01, Q50.

**The views expressed in this paper are those of the author and do not necessarily represent the official view of the Economists Association of Belgrade.*

Introduction

One of the basic components of today's business is reporting on sustainability, which directly reflects the growing importance of strengthening responsibility and transparency of business. Sustainability reporting is driven by international initiatives, such as the Global Reporting Initiative (GRI) and the Sustainable Development Goals (SDGs), as well as by strengthening the regulatory framework of the European Union. For Serbia, a candidate country for membership in the European Union, compliance with the provisions of the Non-Financial Reporting Directive (NFRD) and the Corporate Sustainability Reporting Directive (CSRD) represents a major challenge, but also a necessary regulatory adjustment. Many domestic companies in Serbia are faced with limited reporting capacities, but also with an insufficient level of expertise in this area. Despite the challenges, Serbia shows significant potential for the development of sustainability reporting, driven by adaptation to EU standards, investor expectations and international recognition of sustainability as a competitive advantage. In order for Serbia to comply with European standards of sustainability, it is necessary to strengthen the domestic regulatory framework, to continue building institutional capacities and to increase the awareness of corporations about the integration of sustainability reporting into everyday business practice.

The following research questions (RQ) are presented in this work:

RQ 1: What are the main institutional obstacles and regulatory challenges for the implementation of sustainable reporting in Serbia?

RQ 2: How does reporting practice in Serbia compare with the requirements of the European Union?

RQ 3: What are the main benefits and potentials for Serbian companies that apply sustainable reporting in business?

This paper is structured as follows. The introduction is followed by a review of the relevant literature and an analysis of the applied methodology. The next part of the paper refers to the presentation of the regulation on sustainability reporting, as well as the analysis of the practices of the selected companies in Serbia regarding their experience on sustainability reporting. In the conclusion, we will summarize the most important findings of the paper.

Literature Review

A review of the literature on sustainability reporting provides an excellent basis for reviewing key con-clusions, as well as current practices in the implementation of this regulatory requirement at the na-tional and international level. This provides the possibility of a better understanding of international initiatives such as global reporting initiatives, monitoring of sustainable development goals and view-ing direct corporate reporting on sustainability. By reviewing the literature, it can be pointed out how global sustainability initiatives are adapted to the national concept, including those implemented in the Republic of Serbia.

Sustainability and digital transformation have become key elements of modern banking operations. Sustainable development enables banks to respond to social, environmental and economic challenges, while digital transformation improves agility, efficiency and service quality (Kontić and Kontić, 2023). Corporate social responsibility is also of great importance, which represents an important strategic tool for strengthening the corporate image, which, by integrating it into strategic management, enables banks to create long-term value, improve reputation and increase business stability (Radivojević et al., 2022). Companies that consistently apply ESG (Environmental, Social and Governance) standards achieve higher resistance to economic and market turbulence, because they better understand the risks and opportunities associated with sustainable practices (Petrović Tomić, 2023). Of importance for sustainability reporting are the goals of sustainable development, whose successful integration into sustainability reporting depends on a combination of the company's internal capacities and external institutional factors. Institutional pressures and regulation play a key role in motivating companies to systematically include SDGs (Sustainable Development Goals) in their reports, while internal sustainability commitment and management quality influence the depth and credibility of reporting (Rosati and Faria, 2019). The SDGs represent a global call to action to eradicate poverty, preserve the environment and ensure conditions for a dignified and prosperous life for people (Martin, 2023). The application of sustainability reporting is not only a regulatory obligation, but a strategic tool for improving competitiveness, harmonization of practices and long-term financial and socially sustainable business (Suljić, 2024).

Mandatory sustainability reporting can have significant positive economic and social effects, but its real results depend on careful regulatory design, consistent implementation and integration with a broader corporate governance framework (Christensen et al., 2021). Abeysekera (2021) indicates the need to establish a comprehensive system that connects financial and non-financial information, in order to enable a more objective and transparent assessment of the impact of business activities on society, the economy and the environment. The author points out that traditional financial reports are no longer sufficient to show the overall performance of the company, because they ignore the social and environmental consequences of business. In this context, sustainability reporting becomes a key instrument for achieving corporate responsibility, legitimacy and public trust. Ioannoua and Serafeima (2017) investigated how mandatory corporate sustainability reporting affected company behavior, reporting quality, sustainability strategies and company performance, with an emphasis on long-term consequences for capital markets and corporate responsibility. The conclusion of the paper is that mandatory sustainability reporting has significant positive consequences, both for the quality of information provided by companies and for the actual improvement of corporate ESG performance. The quality of ESG reports and the presence of independent verification are key factors for the financial success of companies in the modern business environment. Accordingly, García-Sánchez et al. (2019) recommend management to invest in systematic and transparent reporting, as well as in establishing robust verification processes, as this increases the credibility of the company, reduces financial risks, and facilitates access to capital for financing sustainable projects.

Landrum and Ohsowski (2017) investigated three different perspectives and approaches applied by companies in sustainability reporting, namely: (1) Market-Oriented Worldview (companies emphasize profitability, efficiency and economic benefits of ESG initiatives. These companies use sustainability primarily as a tool to improve competitive advantage and optimize costs); (2) Stakeholder-Oriented Worldview (companies focus on the needs and interests of various interest groups, including the community, employees and investors, balancing economic goals with social responsibility) and (3) Integrated Sustainability Worldview (companies treat sustainability as an integral part of strategy, where environmental, social and economic goals are interconnected and strategically integrated into business). The paper contributes to the theoretical and practical understanding of different sustainability perspectives and their role in shaping corporate strategy and communication with all interested parties. Papoutsi and Sodhi (2020) presented a detailed empirical analysis of the relationship between the extent of information disclosure in sustainability reports and the actual performance of companies in the area of sustainable development.

The authors sought to examine whether the transparency and scope of sustainability reporting really reflect the real results of companies in terms of environmental protection, social responsibility, and corporate governance (ESG dimensions), or are rather an indicator of the companies' reputational and marketing strategies. The result of their analysis indicates that there is no consistent and strong correlation between the extent of reporting and actual sustainability performance. Companies that have detailed and comprehensive sustainability reports do not necessarily perform better in terms of environmental efficiency or social responsibility. On the contrary, in some cases, more extensive reporting is associated with weaker performance, which the authors explain as a possible attempt by companies to mitigate the perception of bad results through communication - a phenomenon known as greenwashing (a form of manipulation by which companies try to create a positive image of "green" business without actually implementing sustainable practices).

In the theoretical framework of the paper, Buallay (2018) starts from the assumption that ESG reporting can have multiple benefits for financial institutions: increasing the trust of clients and investors, strengthening corporate reputation and improving relations with stakeholders. However, the author points out that there are different points of view in the literature: while some authors claim that ESG activities represent a cost that reduces profitability, others believe that they contribute to the stability and competitiveness of banks in the long term. However, the author also points to challenges, such as the lack of uniform reporting standards, different methods of assessing ESG factors and the possibility of selective disclosure of information. Buallay, et al. (2021) investigated the impact of sustainability reporting on the business performance of banks in the period after the 2008 global financial crisis on a sample of European and Gulf banks in the period from 2008 to 2016. The research showed that in the period after the financial crisis, there was a significant increase in the level of sustainability reporting, especially in terms of social and governance aspects. However, the impact of reporting on bank performance varies between regions: while in European banks a positive and statistically significant relationship between reporting and financial results has been identified, in Gulf region banks this relationship is weaker or statistically insignificant. The authors explain these differences with institutional frameworks, regulatory requirements and the degree of maturity of financial markets. Al-Shaer and Zaman (2018) investigated whether the active and effective functioning of audit committees contributes to increasing stakeholder confidence in the accuracy, credibility and transparency of reports on ESG issues. The authors concluded that companies with larger and professionally trained audit committees show greater credibility in published data, while companies with weaker supervisory struc-tures have a greater risk of selective disclosure or greenwashing.

Transparent and high-quality sustainability reporting is a key factor in improving performance and creating a sustainable competitive advantage. The results of the research by Buallay et al. (2020), based on a sample of companies from 60 countries that were the subject of analysis in the period from 2007 to 2016, indicate that there is a positive and statistically significant relationship between sustainability reporting and company performance. Companies that consistently publish ESG reports achieve better financial results, higher returns on capital and more efficient use of resources. Novičević Čečeviét al. (2024) examined the relationship between sustainability reporting and the business success of companies in the Republic of Serbia and concluded that there is a positive, but moderately pronounced relationship between the practice of sustainability reporting and the business success of Serbian companies. Companies that regularly publish sustainability data demonstrate a greater degree of corporate responsibility, a stronger reputation and better relations with investors and the community. However, the authors note that most of the analyzed companies still report fragmentarily, with no systematic approach and in accordance with international standards. Novaković and Cvetanović (2020) analyzed the practice of sustainability reporting among the fifty largest Serbian companies, which are ranked by revenue and market capitalization, where the focus is on publishing information on ESG aspects of business. The research results show that although there is a growing trend in the publication of sustain-ability information, most Serbian companies still publish fragmentary data, without a systematic ap-proach and clear performance indicators. The biggest identified challenges are the lack of regulation, limited awareness of management and lack of professional staff for quality reporting.

Based on the literature review, it can be concluded that sustainability reporting is a key instrument for achieving corporate responsibility, improving reputation and strengthening the long-term competi-tive advantage of companies. The literature review points to challenges, such as fragmented reporting, lack of uniform standards and limited management capacities, especially in the national context, but also to the significant potential of sustainability reporting as a strategic tool for long-term financially and socially sustainable business.

Research Methodology

The research methodology is based on a qualitative approach that combines the analysis of literature, the regulatory framework and the practices of leading companies. First, the previously presented literature review enables an overview of theoretical foundations, previous empirical research and insight into international practice, highlighting challenges such as fragmentary reporting and the potential phenomenon of greenwashing. In the continuation of the work, the regulation in the EU, especially the Directive on reporting on the sustainability of corporations, as well as the regulation in the Republic of Serbia, including the relevant laws on environmental protection and climate change, are analyzed in order to identify differences in obligations, standards and implementation.

The case study is based on the analysis of reports of leading Serbian companies available on the SustainabilityReports.com platform, such as NIS, EPS, Tigar, Dunav osiguranje, Aerodrom Nikola Tesla, and Fintel Energija, examining the scope, quality, and approach to ESG reporting, including quanti-tative and narrative data, transparency, and the presence of independent verification. The secondary data collected from this platform enables a comparative analysis of practice in the Republic of Serbia in relation to the EU, an overview of institutional and regulatory factors, as well as the identification of obstacles such as the lack of uniform standards, limited management awareness, and a lack of profes-sional staff. This methodological approach enables a comprehensive insight into the state of reporting on sustainability in the Republic of Serbia, an assessment of its quality and relevance, as well as the formulation of recommendations for improving practice in accordance with international standards and sustainable development strategies.

Sustainability Reporting Regulations

The Sustainability Reporting Regulation is a key framework that governs the transparent publication of information on the impact of companies' operations on the environment, society, and governance (ESG factors). In the context of increasing global challenges related to climate change, energy transition and social responsibility, the European Union (EU) has developed an extensive system of regu-lations that obliges companies to regularly report on their sustainability activities. These regulations aim to ensure the comparability, reliability and relevance of data necessary for investors, decision makers and the general public. The Republic of Serbia, which is a country in the process of joining the European Union, is gradually harmonizing its legislation with European regulations in the field of sustainable business. A comparative analysis of the regulations between the EU and the Republic of Serbia achieves an overview and analysis of the key regulatory frameworks that regulate sustainability reporting, which highlights similarities, differences and challenges in the process of their implementation - Figure 1.

Figure 1 - Presentation of the Regulation on Sustainability Reporting

Source: Author's illustration

The EU is among the global leaders in the development of the regulatory framework for sustainability, with the aim of ensuring transparent, responsible and sustainable operations of economic entities. Sustainability regulation in the EU comprises a series of directives and regulations that set obligations for companies to report on their environmental, social and governance (ESG) aspects. The Action Plan on Financing Sustainable Growth is an initiative of the European Commission that was launched in March 2018. This plan sets a comprehensive strategy for connecting finance with sustainable development goals and EU climate goals. The main objectives of the plan are to manage financial risks arising from climate and environmental changes, to redirect capital flows towards sustainable investments, and to encourage transparency and long-term decision-making in capital markets. The EU Taxonomy Regulation entered into force in 2020 and is a direct product of the strategic guidelines from the Action Plan. With the Green Taxonomy, the EU has established a classification system for economic activities that can be considered environmentally sustainable. The main objectives of the taxonomy relate to clearly setting the definition of what constitutes a sustainable activity, then the effort to reduce greenwashing and to enable companies and investors to report on activities that are aligned with the taxonomy. This enables better capital mobility towards sustainable investments and directly affects the reduction of carbon dioxide emissions, as well as other causes of pollution.

One of the key instruments of the EU Action Plan for Sustainable Finance is the Sustainable Finance Disclosure Regulation (SFDR), adopted by the European Parliament and the European Council, which came into force in March 2021. The primary objective of this Regulation is to enhance the usability and transparency of sustainability data within the financial sector, thereby reducing the risk of greenwashing and enabling investors to make informed investment decisions based on reliably established ESG criteria. Thus, the Regulation set requirements for financial institutions, such as banks that offer products from the domain of investment banking, investment and pension funds, as well as insurance companies, to clearly show how they take sustainability factors into account when making investment decisions, but also to explain whether and to what extent their products contribute to sustainable development. In order for the EU to become climate neutral by 2050, the European Commission adopted the Circular Economy Action Plan in December 2015, while the new plan was adopted in March 2020. The goal of this Action Plan is to transform the Union in order to reduce the amount of waste, extend the life of products, but also to encourage their reuse and recycling, as well as to reduce the pressure on natural resources.

The Corporate Sustainability Reporting Directive (CSRD) represents one of the key reforms in the EU legislative framework for sustainability reporting. This Directive was adopted on December 14, 2022 and entered into force on January 1, 2024. The implementation of this Directive extends the obligation to report to a larger number of companies, including those that were not previously obligated, and introduces stricter and more detailed requirements regarding the content and quality of sustainability reports. Three groups of companies are obliged to report according to this Directive, namely: (1) all large companies that meet at least two of the three criteria (250 or more employees; total assets of EUR 20 million or more, and revenue of EUR 40 million or more); (2) all publicly listed companies whose shares are listed on regulated EU markets and (3) companies from third countries that generate revenue of EUR 150 million in the EU and have at least one daughter company or subsidiary in EU. The Corporate Sustainability Due Diligence Directive (CSDDD) was adopted in June 2024, with national legislation due to be implemented by July 2026. This Directive is a legislative framework of the European Union that obliges large companies to identify, prevent, mitigate and correct negative impacts on human rights and the environment in their business operations and entire value chains obligation of transparency along the entire value chain.

Through a series of directives and regulations – including the Taxonomy, SFDR, CSRD and CSDDD – as well as action plans for sustainable finance and the circular economy, the EU sets clear standards for reporting, risk management and the application of ESG principles. This regulatory framework not only increases the transparency and quality of sustainability information but also encourages companies to responsibly manage their environmental and social impacts, thus contributing to the achievement of climate neutrality, environmental protection and the long-term sustainable development of the Union and its partners.

Although the Republic of Serbia is not a member of the EU, domestic legislation is gradually being harmonized with European standards, including reporting obligations on sustainability, environmental protection and corporate social responsibility. Article 34 of the Law on Accounting stipulates that when presenting the results of operations in the annual report on operations, in addition to financial information, legal entities must also present information on investments for the purpose of environmental protection. With this article, the Republic of Serbia complies with the CSRD directive, which lays the foundation for systematic reporting on sustainability. In response to the need to align national development priorities with global trends and sustainable development goals promoted by the United Nations, the Republic of Serbia adopted the first Sustainable

Development Strategy in 2008. As the UN Agenda 2030 and Sustainable Development Goals were adopted in 2015, the Republic of Serbia in 2019 adopted the Strategy of Sustainable Urban Development until 2030. The Strategy aims to establish sustainable urban development by combining economic, social and environmental dimensions and directly contributes to the achievement of sustainable development goal number 11, which relate to the establishment of sustainable cities and communities. The basic legal framework for the environment in Serbia is the Law on Environmental Protection, which was adopted in 2004, followed by amendments in 2009, 2016, 2018 and 2024. Its main goal is to ensure the right of citizens to a healthy and preserved environment, as well as to establish a balance between economic development and the preservation of natural ecosystems. The Law promotes the principles of sustainable development, pollution prevention and polluter responsibility, as well as the involvement of the public in decisionmaking that affects the environment. In accordance with European standards, the Law also foresees the obligation of strategic environmental impact assessments and the integration of environmental criteria in sectors such as energy, agriculture, transport and industry. In this way, this Law represents the basis for the implementation of Serbia's modern environmental policy and a key instrument in the process of harmonization with the legal acquis of the European Union.

The Law on Climate Change, which was adopted in 2021, is a comprehensive system for reducing greenhouse gas emissions and adapting to climate change. The Law includes the development and implementation of a low-carbon development strategy and adaptation program, as well as the monitoring, reporting, and improvement of those measures. This Law regulates the procedure for issuing permits for gas emissions to plant and aircraft operators, as well as rules for monitoring, reporting, verification and accreditation of verifiers. In addition, it prescribes administrative fees, supervision and other matters of importance for the limitation of emissions and adaptation to climate change. In April 2021, the Ministry of Mining and Energy amended the Law on Energy, which stipulates the obligation to prepare the Integrated national energy and climate plan of the Republic of Serbia for the period up to 2030 with a vision up to 2050. The Integrated National Energy and Climate Plan is a key strategic document of the Republic of Serbia, which defines the framework for the implementation of policy in the field of energy and climate change in accordance with the goals of the European Union and international obligations in the field of environmental protection.

The basic documents of the Republic of Serbia that regulate the system of sustainable waste management are the Waste Management Program in the Republic of Serbia for the period 2022 - 2031 and the Law on Waste Management. The program defines long-term goals and development directions in the field of waste management, with a special emphasis on reducing the amount of waste, increasing recycling, reuse of materials and safe disposal of waste that cannot be used. This encourages the transition from a linear model of consumption to a circular economy, where resources are used more efficiently and their life cycle is extended. The Law on Waste Management legally regulates the man-ner of collection, transport, storage, processing, recycling and disposal of waste, while prescribing the obligations of all participants in the system - from producers and importers to local governments and plant operators. Together, the program and the law represent the basis for improving the environmental protection system, reducing the negative impacts of waste and fulfilling Serbia's obligations in the process of approaching EU standards in the area of circular economy and waste management. In November 2021, the Ministry of Finance adopted the Capital Market Development Strategy for the period 2021-2026 and the Action Plan for the period 2021–2023 for the implementation of the Capital Market Development Strategy for the period from 2021 to 2026. From the aspect of sustainability, the Strategy, as well as the accompanying Action

Plan, recognizes the importance of developing innovative and alternative financial instruments, including green and sustainable bonds, as well as the need to improve corporate governance, transparency, and publication of information that includes non-financial aspects of business.

In order to establish clean production, strengthen the competitiveness of the Serbian economy and establish a healthier environment, at the beginning of October 2025, the Ministry of Finance of Serbia started a public debate on two key laws related to the Draft Law on the tax on emissions of greenhouse gases and the Draft Law on the tax on the import of carbon-intensive products. The Draft Law on the tax on the import of carbon-intensive products aims to reduce greenhouse gas emissions in industry and align the Republic of Serbia with European climate policies, by applying a tax on products whose production generates significant CO2 emissions, such as steel, cement, aluminum and fertilizers. The Draft Law foresees the calculation of taxes based on the carbon intensity of products, with the possibility of a tax credit for importers who have already paid a similar tax in the country of origin, thereby avoiding double taxation. The Draft Law on the tax on greenhouse gas emissions aims to reduce the greenhouse gas emissions of the Republic of Serbia, harmonize with European climate policies and encourage the green transition. The Draft Law envisages the introduction of a tax burden for large emitters, such as the energy sector, cement, steel and aluminum industries, whereby the amount of the tax will depend on the amount of emitted gases. Taxpayers will be required to report on their emissions, while tax revenue will be directed towards financing energy efficiency and carbon footprint reduction projects. The public debate on the basis of these two draft laws will last 20 days, and it is planned that the laws will begin to be implemented on January 1, 2026. It can be concluded that the Republic of Serbia is gradually harmonizing its legislation with European and international standards in the field of sustainability, which is reflected in reporting obligations on environmental protection, social responsibility of companies, waste management and reduction of greenhouse gas emissions.

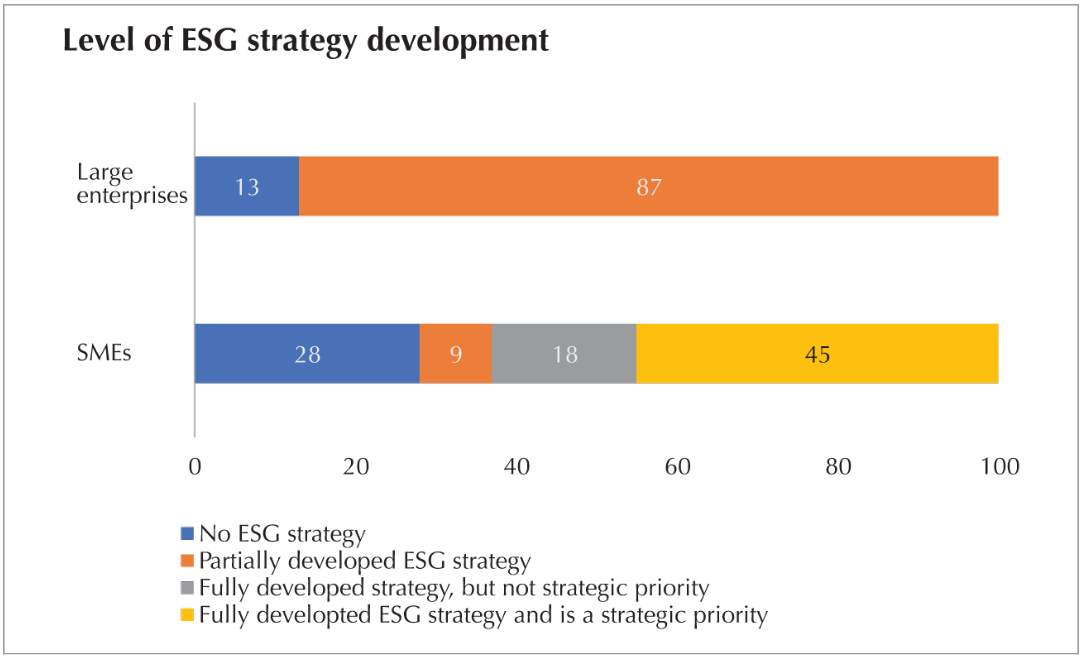
Presentation and Analysis of the Case of the Republic of Serbia

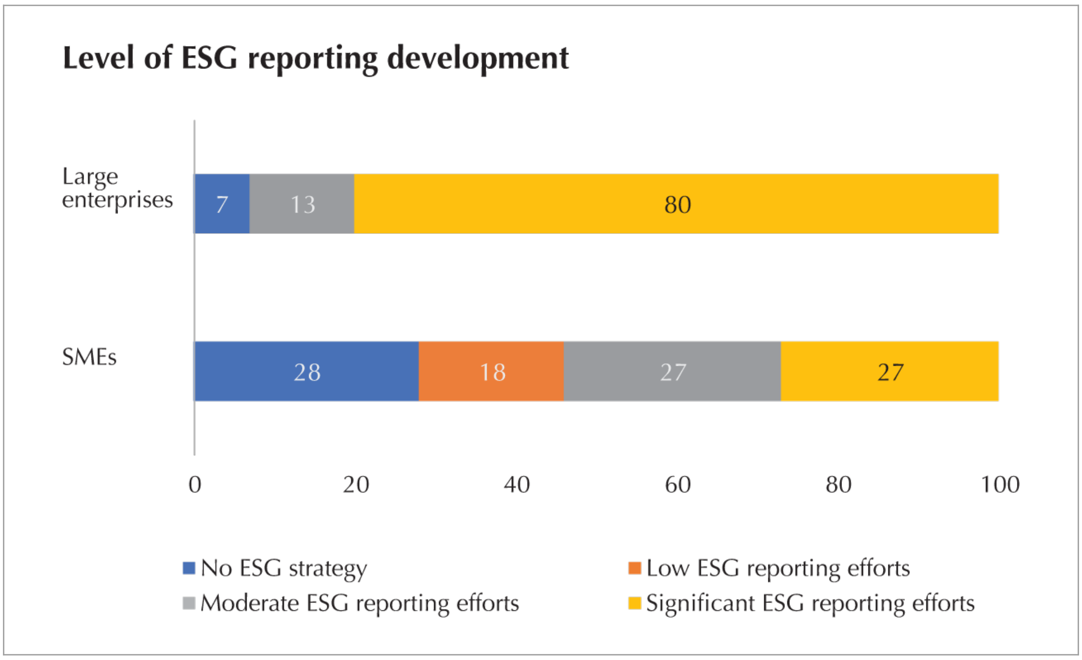
In the last few years, Serbia has made significant progress in the integration of sustainability principles into business, which was confirmed through research conducted by the consulting firm Kearney. However, there are significant differences in the implementation of ESG strategies between large enterprises and SMEs. While large companies show a strong commitment to ESG principles, small and medium-sized companies face challenges in implementing these strategies. According to research data, large companies more often integrate ESG factors into their operations, while small and medium-sized companies often do not have developed ESG strategies. This difference indicates the need for additional support and education of SMEs in order to improve their ESG practices and align them with global standards - Graph 1. This information indicates that Serbia recognizes the importance of sustainability in business, but also the need for further efforts in education and support of the SME sector in order to achieve even progress in the implementation of ESG principles.

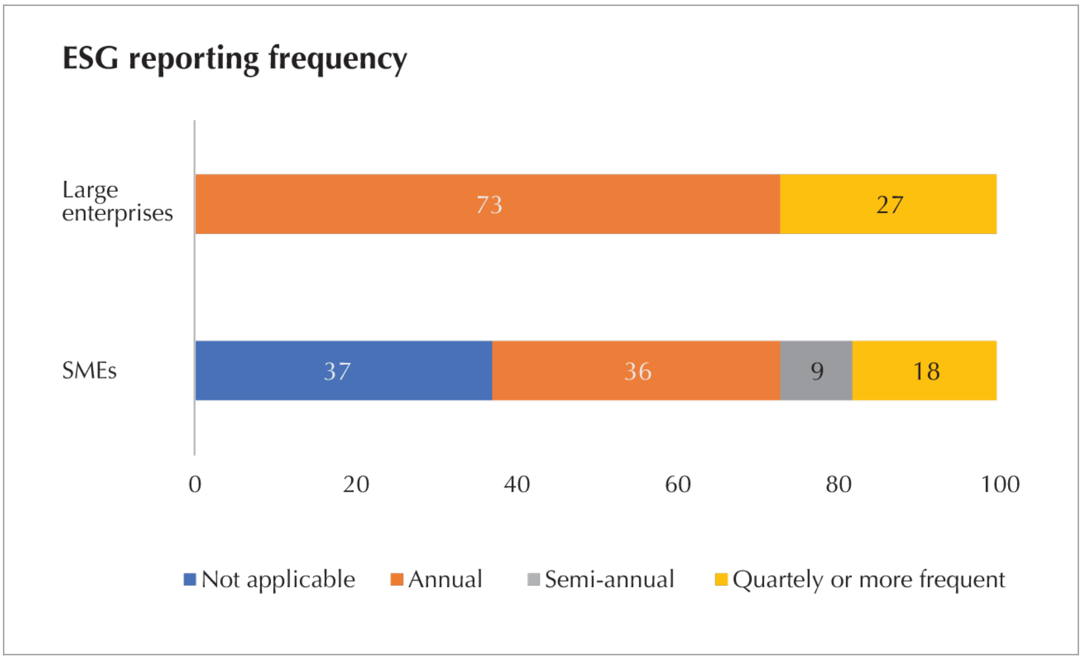
In the case analysis of the application of sustainable business practices in Serbia, we will use data available on the SustainabilityReports.com platform, which provides access to ESG reports of companies registered in Serbia. This platform provides a detailed insight into the sustainability strategies, goals and achievements of companies in various industries. By reviewing the available reports, we can identify key areas in which Serbian companies implement sustainable practices, such as reducing carbon dioxide emissions, improving energy efficiency, responsible waste management and social responsibility. By analyzing these reports, it will be possible to assess how

Serbian companies align their operations with global ESG standards and what specific results they achieve in the field of sustainability. By reviewing the available reports, the focus is on the following companies: Naftna Industrija Srbije AD, Energoprojekt Holding AD, Metalac AD, Tigar AD, Aerodrom Nikola Tesla AD and Fintel Energija - Table 1.

Graph 1 - ESG Strategies and Reporting of the Enterprises in the Republic of Serbia







Note: ESG is Envionmental, Social and Governance; SMEs are small and medium-sized enterprises
Source: Kearney analysis

Table 1 - Sustainability Reports from Companies Based in the Republic of Serbia

Company name	Sector	Industry	Ticker	ISIN	Number of available sustainable reports
Naftna Industrija Srbije AD	Energy	Energy	NIIS	RSNISHE79420	21
Energoprojekat Holding AD	Industrials	Capital Goods	ENHL	RSHOLDE58279	10
Metalac AD	Consumer Discretionary	Consumer Durabels and Apparel	MTLC	RSMETAE71629	5
Tigar AD	Consumer Discretionary	Automobiles and Components	TIGR	RSTIGRE55421	5
Aerodrom Nikola Tesla AD	Industrials	Transportation	AERO	RSANTBE11090	3
Fintel Energija AD	Utilities	Utilities	FINT	RSFINEE60549	3

Note: ISIN (International Securities Identification Number) represents the international identification number of a security
Source: Sustainability Reporting Database

The NIS company represents one of the largest vertically integrated energy groups in Southeast Europe, with 13,500 employees, and activities that include exploration, production, oil and gas processing, as well as sales and energy. It was founded in 1991, and since 2008 the majority owner is the Russian Gazprom Neft. NIS has a long tradition of reporting on sustainable development and social responsibility, which are fully aligned with the standards of the Global Reporting Initiative (GRI), including supplements specific to the oil and gas sector. The reports are publicly available on the company's website (nis.rs) and include economic, social and environmental aspects of business, including sustainable development goals, investments in environmental protection, energy efficiency, health and safety at work, as well as relations with employees and the community. The last published report on business sustainability NIS published for 2023, in which it points out that during that year the company invested about RSD 801.8 million in environmental projects, which directly reduced carbon dioxide emissions by about 6% compared to 2022. Also, the company plans to reduce the intensity of carbon emissions by 30% by 2030 compared to the level of 2018. As part of the "Green Agenda", NIS advocates for increasing energy efficiency and expansion of renewable energy sources. In 2023, a reduction in energy consumption equivalent to 7,936 tons of oil and savings in the amount of RSD 734.8 million were achieved. With regard to the production of renewable energy sources, NIS plans to provide production that reaches 50% of its own consumption by 2030. In terms of communication with interested parties, NIS organizes Investor Day, quarterly presentations for investors, actively participates in dialogue with local communities, educational institutions, partners and the media. NIS is also very active in the field of social responsibility by organizing the "Common Cause Community" program, for which it allocated a record amount of RSD 144.5 million in 2023 to support projects in the field of science and education development. In the field of human resources development, almost 4,300 educational activities were recorded with more than 4,000 employees and investments of RSD 273 million. The NIS Sustainable Development Report for 2023 confirms that the company consistently applies international standards of transparency and responsible business, systematically integrating economic, environmental and social aspects into its development strategy and contribution to Serbia's sustainable energy transition.

Energoprojekt Holding a.d. (EPH) is one of the leading engineering and project-investment companies in Serbia and the region, with a tradition of more than 70 years in the field of design, consulting, engineering and construction of complex infrastructure facilities. The company deals with the implementation of projects in the fields of energy, industry, construction and civil engineering, telecommunications, water management, environmental protection and other public and commercial facilities. In April 2022, in the field of sustainability reporting, EPH announced that it strives to constantly improve its operations in the field of management, control and coordination of activities, all with the aim of ensuring the satisfaction of existing and future clients. In this regard, EPH has established its own integrated management system (IMS) that includes environmental protection management, quality management and occupational health and safety management. All parts of IMS are compliant with internationally recognized ISO standards. EPH strives to regularly coordinate all its business activities in order to achieve environmental protection, as well as safety and health at work.

Metalac a.d. from Gornji Milanovac is a public joint-stock company, founded in April 1959, with almost 2,000 employees, which produces a wide range of products, which it exports to 40 countries. The last ESG report for the company Metalac refers to the year 2024 and was compiled according to the guidelines of the GRI standard. Metalac applies an integrated system of quality systems (IMS), which combines methods and instruments for compliance with requirements for quality and environ-mental protection. Since 1994, the ISO 9001 quality management system has been applied (refers to the quality management system in a business organization), and since 2002 the company has been certified for the environmental protection system ISO 14001:201 (refers to the field of environmental management and helps companies minimize the negative impact of their activities and processes on the environment). The company's top management, as well as its subsidiaries, actively implement the quality and environmental protection policy, by setting quality and environmental protection goals, with full commitment to preventing pollution and improving environmental performance. Metalac strives to improve its business through a positive impact on the social community and through respect for ESG principles. The goals until 2030 include investing in local community projects worth EUR 3 million, then reducing Scope 2 emissions (referring to indirect emissions of greenhouse gases resulting from the production of purchased electricity, heat, steam or cooling that the company uses in its operations) by 30% compared to 2021, as well as increasing the production of electricity from renewable sources by 10% compared to 2023. Such goals have their applicability considering that during 2024 the company consumed 15,785,262 KhW of electricity, which is below the consumption of 2023 (18,428,429 KhW). Considering the nature of the company's business, the company Metalac cannot use recycled material in its primary production, but in the framework of cardboard packaging, the use of which in 2024 amounted to 467.9 tons (205.4 tons in 2023). Metalac has significant investments in the field of social responsibility. Thus, in 2024, more than RSD 11 million were set aside for employee training, which is an increase of 140% compared to 2023, but numerous employee career management projects were launched, such as “Looking to the Top” and “Knowledge is Multiplied by Sharing”.

The company Tigar a.d. was founded in 1935 as a workshop for the production of rubber products and all types of rubber footwear. Since 2007, Tigar has been part of the French company Michelin, which in 2010 became the 100% owner of the Tigar Tires factory. The Tigar company implements an environmental protection policy and a high level of environmental awareness as part of its corporate culture, and through its membership in the Michelin group it also participates in global sustainability initiatives, including the “3P” (People, Planet, Profit) program, which strives to balance profit with environmental protection and improving the quality of life of employees and the local community. In cooperation with local institutions, Tigar supports projects in education, health, culture and sports, including donations to schools, hospitals and sports organizations. The company also promotes environmental awareness and sustainable development, participating in environmental protection and recycling campaigns. Through these activities, Tigar a.d. strives to be a responsible member of society and contributes to its sustainable development.

Nikola Tesla Belgrade Airport (ANTB) was opened in 1962 and is the largest and busiest international airport in Serbia, named after the scientist Nikola Tesla. In December 2018, VINCI Airports, the French leader in airport management, took over the concession for a period of 25 years, with planned investments of over EUR 730 million, to improve the capacity and operational efficiency of the airport. The goal is to increase the number of passengers to 15 million annually by 2043. In the field of sustainable development, Nikola Tesla Belgrade Airport adheres to the principles and goals defined by the VINCI Airports group, to which it belongs. The company operates in accordance with national legislation and international environmental protection standards, implementing appropriate management systems. Within its activities, the airport focuses on reducing carbon dioxide emissions, efficient use of resources, waste management and biodiversity conservation. It also engages in social projects and transparently reports to stakeholders about its sustainability efforts and achievements. In line with the global strategy of VINCI Airports, ANTB has set ambitious targets for reducing carbon dioxide emis-sions, including reducing emissions by 10% by 2030 and achieving net zero emissions by 2050. Among the key initiatives are the installation of a photovoltaic power plant, the replacement of the lighting system with LED technology, as well as the installation of electric chargers.

Fintel Energija ad was founded in 2016 and is a leading independent producer of electricity from renewable sources in Serbia, specializing in wind-based energy projects. Fintel Energy currently manages a capacity of 86 MW through three operational wind farms, and by 2030 plans to install an additional 1 GW of capacity through 13 new projects, with total investments of around one billion euros. The company is majority owned by the Italian group Fintel Energia Group S.p.A., which is the leader in the renewable energy sector in Italy. Fintel Energija is also known for conducting the first initial public offer (IPO) on the Belgrade Stock Exchange in 2018 after almost 80 years, which represents a significant step in the development of the capital market in Serbia. The company's mission is to become a leader in the production of clean energy, maintaining the highest standards of quality, safety and environmental sustainability. The company adheres to the highest standards of corporate governance and operates ethically, continuously advancing the interests of its shareholders. Through these initiatives, Fintel Energy contributes to the reduction of carbon dioxide emissions in Serbia and the long-term sustainable development of the country. These results were recognized by the fact that in December 2015 the company was awarded the "Leap of the Year" award by the Serbian Association of Managers for the project to build the first wind farm in Serbia, while in September 2017 the company received the award for the most successfully realized project in the field of energy in Southeast Europe.

In the coming years, it is expected that more and more companies in Serbia will direct their strategies towards sustainability, in order to harmonize with global trends and regulations, and contribute to the sustainable development of society and the environment.

Conclusions

Sustainability reporting in the modern business environment plays a key role in connecting the economic, social and environmental dimensions of development, thus becoming the foundation of modern corporate governance. The results of the research indicate that the Republic of Serbia is in a phase of intensive institutional and regulatory transformation, in an effort to harmonize its legislation and practice with European standards defined through the Directive on Corporate Reporting on Sustainability and the accompanying regulations on sustainable financing. Analysis of the reports of leading companies in Serbia – such as NIS, Metalac, Aerodrom Nikola Tesla, Energoprojekt and Fintel Energija – shows that certain organizations have recognized the importance of sustainable reporting as a strategic tool for improving corporate reputation, transparency and relations with investors, but also as a means for long-term risk reduction and increased competitiveness. Nevertheless, the practice of reporting on sustainability in Serbia is still insufficiently developed and is dominantly present among large companies, while small and medium-sized companies still show a low level of involvement and limited capacities regarding the application of ESG standards. The key challenges relate to the lack of professional staff, uneven reporting methodology, limited verification and insufficient institutional support. In this context, it is necessary to further strengthen the regulatory framework, develop national standards, as well as systematic education of management and employees in order to increase the quality and relevance of published information.

Alignment with EU requirements and the introduction of mandatory verification mechanisms will contribute to greater public, investor and regulatory body trust, thus laying the groundwork for Serbia's stable transition to a green and sustainable economy. Therefore, it can be concluded that reporting on sustainability in the Republic of Serbia, although still in development, has the potential to become a key instrument for encouraging responsible business, strengthening institutional stability and achieving long-term goals of sustainable development in accordance with European and global standards.

Future research on sustainability reporting in Serbia should focus on a broader empirical analysis of practices in different sectors and on determining the factors that influence the quality of ESG reports. It is particularly important to examine the impact of new regulatory frameworks, as well as the role of institutions in strengthening reporting capacity. Further papers may include comparative analyses with EU countries, as well as research into the application of digital technologies in data processing and verification. In this way, it would contribute to the development of a more transparent and efficient reporting system on sustainability in Serbia.

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BLOKČEJN TEHNOLOGIJA U BANKARSKOJ REVIZIJI: ANALIZA USPEŠNIH IMPLEMENTACIJA I UTICAJA NA KVALITET REVIZIJE

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Rezime: *Ovaj rad ispituje transformativni uticaj blokčejn tehnologije na bankarsku reviziju kroz analizu implementacija u 15 velikih svetskih finansijskih institucija. Istraživanje pokazuje da blokčejn smanjuje vreme potrebno za reviziju za 40-60%, poboljšava verifikaciju integriteta podataka i omogućava kontinuiranu reviziju u realnom vremenu. Koristeći mešovite metode analize metrika performansi i studije slučaja iz JPMorgan Chase, HSBC i Deutsche Bank, nalazi ukazuju na poboljšanje od 75% u stopama otkrivanja grešaka i smanjenje troškova od 35-45%. Studija pruža sveobuhvatan okvir koji se bavi tehničkim izazovima, regulatornim razmatranjima i strategijama implementacije. Rezultati potvrđuju da nepromenljiva knjiga na blokčejnu, automatizacija pametnih ugovora i distribuirana arhitektura fundamentalno poboljšavaju dimenzije kvaliteta revizije, uključujući brzinu verifikacije podataka, praćenje transakcija i tačnost usklađenosti sa propisima. Istraživanje iznosi empirijske dokaze koji podržavaju usvajanje blokčejna kao ključni faktor za modernizaciju infrastrukture bankarske revizije i ispunjavanje regulatornih zahteva koji se razvijaju.*

Ključne reči: blokčejn tehnologija, bankarska revizija, tehnologija distribuirane glavne knjige, kvalitet revizije, pametni ugovori, kontinuirana revizija

JEL klasifikacija: G21, M42, O33.

Uvod

Bankarski sektor se suočava sa nesvakidašnjim izazovima u održavanju robusnih sistema revizije koji mogu efikasno upravljati sve većim regulatornim zahtevima, složenim finansijskim transakcijama i razvijajućim sajber pretnjama. Tradicionalne metodologije revizije, koje karakterišu ručni procesi, periodični pregledi i centralizovano upravljanje podacima, bore se da obezbede sigurnost u realnom vremenu i sveobuhvatnu pokrivenost koju zahtevaju moderne bankarske operacije (Zhang, Vang i Liu, 2023). Pojava blokčejn tehnologije predstavlja promenu paradigme u načinu na koji finansijske institucije pristupaju reviziji, nudeći nepromenljive evidencije transakcija, poboljšanu transparentnost i automatizovane mehanizme za verifikaciju usklađenosti.

Nedavni razvoj tehnologije distribuirane glavne knjige pokazao je značajan potencijal za revoluciju u praksi bankarske revizije. Velike finansijske institucije širom sveta pokrenule su blokčejn pilot programe, a institucije kao što su JPMorgan Chase, HSBC i Deutsche Bank izveštavaju o značajnim poboljšanjima u efikasnosti i tačnosti revizije (Thompson i Kumar, 2023). Inherentne karakteristike tehnologije – decentralizacija, nepromenljivost i kriptografska bezbednost – direktno se bave osnovnim izazovima u bankarskim revizijama, uključujući rizike od manipulacije podacima, fragmentaciju revizijskog traga i odloženo otkrivanje grešaka.

Ovo istraživanje ima za cilj da pruži sveobuhvatnu analizu uticaja blokčejn tehnologije na kvalitet bankarske revizije: ispitivanje uspešne implementacije, kvantifikaciju poboljšanja performansi, kao i identifikovanje kritičnih faktora za uspešno usvajanje. Studija doprinosi postojećoj literaturi nudeći empirijske dokaze iz stvarnih implementacija, razvijajući praktični okvir za integraciju blokčejna u procesima revizije i rešavanje izazova implementacije koji su specifični za bankarski sektor.

Teorijski okvir i pregled literature

Teorijski osnov za primenu blokčejna u bankarskim revizijama proističe iz više disciplina, uključujući teoriju informacionih sistema, standarde revizije i kriptografske bezbednosne principe. Model prihvatanja tehnologije (Technology Acceptance Model) pruža uvid u faktore koji utiču na usvajanje blokčejna među profesionalnim revizorima, dok agencijska teorija objašnjava kako blokčejn smanjuje asimetriju informacija između banaka, revizora i regulatora (Anderson i Smith, 2023).

Savremena istraživanja o blokčejnu u finansijskoj reviziji su značajno evoluirala od 2020. godine. Rane studije su se prvenstveno fokusirale na tehničku izvodljivost i konceptualne okvire, dok skorija istraživanja pružaju empirijske dokaze o ishodima implementacije. Liu i Peterson (2023) su sproveli meta-analizu 47 implementacija blokčejn revizije, pronašavši prosečan dobitak od efikasnosti od 45% i stopu smanjenja grešaka od 78% u poređenju sa tradicionalnim metodama. Slično tome, Rodriguez, Peterson i Chang (2024) su pokazali da kontinuirana revizija uz pomoć blokčejna smanjuje troškove komplajansa za 35-50% uz poboljšanje tačnosti regulatornog izveštavanja.

Integracija pametnih ugovora u bankarske revizije predstavlja novinu koja je posebno obećavajuća. Pametni ugovori automatizuju verifikaciju usklađenosti, validaciju transakcija i izveštavanje o izuzecima, fundamentalno transformišući proces revizije od periodičnih pregleda do kontinuiranog praćenja (Villiams and Chen, 2023). Ova promena je u skladu sa regulatornim očekivanjima za upravljanje rizicima u realnom vremenu i proaktivno praćenje usklađenosti u bankarskom sektoru.

Metodologija i prikupljanje podataka

Ovo istraživanje koristi pristup mešovitih metoda, kombinujući kvantitativnu analizu metrika performansi iz implementacija blokčejna sa kvalitativnom procenom organizacionih i tehničkih faktora. Prikupljanje podataka obuhvatilo je 15 velikih banaka širom Severne Amerike, Evrope i Azije koje su implementirale blokčejn tehnologiju u svojim procesima revizije između 2021. i 2024. godine. Primarni izvori podataka uključuju strukturirane intervjue sa glavnim revizorima, pregled tehničke dokumentacije i analizu metrike učinka revizije pre i posle implementacije blokčejna.

Kvantitativna analiza fokusirana je na ključne pokazatelje učinka, uključujući trajanje ciklusa revizije, stope otkrivanja grešaka, tačnost izveštavanja o usklađenosti i operativne troškove. Statistička analiza koristila je uparene t-testove za procenu značaja poboljšanja performansi, dok je regresiona analiza identifikovala faktore koji doprinose uspehu implementacije. Kvalitativna analiza podataka koristila je tematsko kodiranje za identifikaciju zajedničkih izazova, faktora uspeha i strategija implementacije u institucijama obuhvaćenim istraživanjem.

Analiza uspešnih implementacija

Ovaj odeljak predstavlja odabrane primere implementacije blokčejna u velikim bankama. Tabela 1 sumira ključne rezultate performansi između 2021. i 2024. godine, naglašavajući poboljšanja u efikasnosti revizije, smanjenje troškova i otkrivanje grešaka koje su rezultat usvajanja blokčejn tehnologije.

Tabela 1 - Rezultati implementacije blokčejn tehnologije u velikim bankama (2021-2024)

Bankarska institucija	Regija	Godina implementacije	Smanjenje trajanja revizije (%)	Ušteda troškova (%)	Poboljšanje otkrivanja grešaka (%)
JPMorgan Chase	Severna Amerika	2021.	52	41	83
HSBC	Evropa	2022.	48	38	76
Deutsche Bank	Evropa	2022.	45	35	71
Bank of China	Azija	2023.	58	44	88
Santander	Evropa	2023.	43	32	69
Standard Chartered	Azija	2023.	51	39	79
BNP Paribas	Evropa	2024.	47	36	74
Mizuho Bank	Azija	2024.	55	42	85

Izvor - Sastavljen od godišnjih izveštaja banaka i regulatornih podnesaka (2021-2024)

Analiza implementacije otkriva konzistentna poboljšanja u svim merenim parametrima, pri čemu azijske banke pokazuju nešto veće dobitke u performansama, što se potencijalno pripisuje novijim implementacijama koje nose benefite tehnološke zrelosti i učenja na greškama ranijih procesa usvajanja tehnologije. Podaci ukazuju na to da blokčejn tehnologija donosi značajna operativna poboljšanja bez obzira na geografsku lokaciju ili veličinu institucije.

Analiza studije slučaja Liink platforme JPMorgan Chase banke pokazuje transformativni potencijal blokčejna u bankarskim revizijama. Platforma, izgrađena na tehnologiji zasnovanoj na Ethereum-u, omogućava verifikaciju transakcija u realnom vremenu, u preko 400 finansijskih institucija, smanjujući vreme usklađivanja revizije sa nekoliko dana na nekoliko minuta (Morgan i Davis, 2023). Funkcionalnost pametnog ugovora u okviru ovog sistema automatski označava anomalije, generiše izveštaje o usklađenosti i održava nepromenljive revizijske tragove dostupnim, kako internim revizorima, tako i regulatorima.

HSBC-ova implementacija blokčejn tehnologije u reviziji trgovinskih finansija predstavlja još jedan ubedljiv primer. Sistem banke zasnovan je na blokčejnu i obrađuje preko 250.000 trgovinskih transakcija mesečno, a automatskom verifikacijom smanjuje ručne procedure revizije za 70% (Harrison i Lee, 2024). Distribuirana arhitektura sistema osigurava da sve strane – uključujući banke, klijente i revizore – pristupaju identičnim zapisima o transakcijama, eliminišući neslaganja koja tradicionalno komplikuju procese revizije.

Uticaj na dimenzije kvaliteta revizije

Implementacija blokčejn tehnologije pokazuje merljiva poboljšanja u više dimenzija kvaliteta revizije. Integritet podataka, kao osnovna briga kod bankarskih revizija, može se značajno unaprediti uz pomoć nepromenljive strukture glavne knjige u blokčejnu. Jednom snimljene, transakcije se ne mogu menjati ili brisati, pružajući revizorima apsolutno poverenje u autentičnost podataka (Martinez i Brown, 2023). Ova karakteristika se pokazala posebno značajnom u otkrivanju prevara i forenzičkoj reviziji, gde je utvrđivanje tačnosti istorije transakcija najvažnije.

Mogućnosti revizije u realnom vremenu koju pruža blokčejn tehnologija predstavlja promenu paradigme od tradicionalnih periodičnih pregleda. Kontinuirano praćenje omogućava revizorima da odmah identifikuju izuzetke, smanjujući prozor za rizike lažne aktivnosti ili kršenja usklađenosti. Banke koje sprovode kontinuiranu reviziju zasnovanu na blokčejn tehnologiji izveštavaju 65% brže otkrivanje prevara i skraćivanje trajanja kršenja usklađenosti od 80% (Tailor i Johnson, 2024) .

Tabela 2 - Poboljšanje kvaliteta revizije kroz implementaciju blokčejn tehnologije

Dimenzija kvaliteta revizije	Tradicionalna revizija	Revizija uz blokčejn tehnologiju	Faktor poboljšanja
Vreme verifikacije podataka	48-72 sati	2-4 sata	12-18x brže
Sledljivost transakcija	60-70% kompletna	100% kompletna	Potpuna pokrivenost
Brzina otkrivanja prevara	15-30 dana	1-2 dana	15x brže

Tačnost regulatornog izveštavanja	92-95%	99,5-99,9%	Skoro savršena
Potpunost revizijskog traga	85-90%	100%	Kompletna pokrivenost
Pomirenje više strana	5-7 dana	U realnom vremenu	Trenutno

Izvor: Institut za istraživanje bankarskih tehnologija (2024)

Poboljšana transparentnost koju obezbeđuje blokčejn tehnologija fundamentalno menja odnos revizora i klijenata. Sve strane pristupaju identičnim podacima u realnom vremenu, tako da se tradicionalna asimetrija informacija između banaka i revizora značajno smanjuje. Ova transparentnost se proteže i na regulatorna tela, omogućavajući efikasniji nadzor i smanjenje tereta regulatornog izveštavanja (White i Thompson, 2024).

Tehnička arhitektura i razmatranja implementacije

Uspešna implementacija blokčejna u bankarskim revizijama zahteva pažljivo razmatranje tehničke arhitekture, integracija sa postojećim sistemima i zahteva skalabilnosti. Izbor između javnih, privatnih ili konzorcijumskih blokčejn mreža značajno utiče na performanse, bezbednost i usklađenost sa propisima. Većina bankarskih institucija odlučuje se za konzorcijumske mreže sa dozvolama koje balansiraju transparentnost sa zahtevima privatnosti, omogućavajući kontrolisani pristup uz održavanje poverljivosti podataka (Roberts i Singh, 2023).

Integracija blokčejn tehnologije sa postojećim bankarskim sistemima predstavlja i tehničke i organizacione izazove. Nasleđena kompatibilnost sistema zahteva razvoj interfejsa za programiranje aplikacija i *middleware* rešenja koja omogućavaju besprekoran protok podataka između tradicionalnih baza podataka i blokčejn mreža. Banke navode da složenost integracije predstavlja primarni tehnički izazov koji zahteva prosečne periode implementacije od 18-24 meseci (Kim i Park, 2024).

Razmatranja skalabilnosti pokazuju se ključnim za velike bankarske operacije koje obrađuju milione dnevnih transakcija. Trenutne blokčejn mreže suočavaju se sa ograničenjima propusnosti, gde Bitcoin obrađuje 7 transakcija u sekundi, a Ethereum upravljanje sa 15-30 transakcija u sekundi. Bankarske implementacije se bave ovim ograničenjima kroz različite pristupe, uključujući *sharding*, *off-chain* obradu, i hibridne arhitekture koje kombinuju blokčejn sa tradicionalnim bazama podataka za različite tipove transakcija (Anderson i Williams, 2023).

Regulatorni okvir i komplajans

Regulatorni pejzaž za implementaciju blokčejna u bankarskim revizijama nastavlja da se razvija, a regulatorna tela širom sveta razvijaju okvire za rešavanje rizika specifičnih za tehnologiju uz podsticanje inovacija. Bazelski komitet za nadzor banaka objavio je smernice u 2023. godini naglašavajući važnost održavanja nezavisnosti revizije, obezbeđivanja privatnosti podataka i upravljanja operativnim rizicima povezanim sa blokčejn tehnologijom (Bazelski komitet, 2023).

Regulatorno prihvatanje dokaza revizije preko blokčejna varira u različitim jurisdikcijama. Neki regulatori u potpunosti prihvataju blokčejn evidencije, dok drugi zahtevaju dodatne procedure verifikacije. Evropski organ za bankarstvo (*European Banking Authority*) priznaje blokčejn evidenciju kao validni dokaz revizije, pod uslovom da institucije pokažu adekvatno upravljanje, bezbednosne kontrole i mere integriteta podataka (*European Banking Authority,* 2024). Evropska unija smatra blokčejn ključnom tehnologijom za unapređenje inovacija, povećanje efikasnosti i jačanje transparentnosti u finansijskim transakcijama i upravljanju podacima (Matejić et al., 2025). Slično tome, Federalne rezerve su izdale smernice koje podržavaju usvajanje blokčejna, naglašavajući potrebu za robusnim okvirima za upravljanje rizicima.

Propisi o privatnosti podataka, posebno Opšta uredba o zaštiti podataka Evropske unije, predstavljaju jedinstvene izazove za implementaciju blokčejna. Nepromenljiva priroda blokčejna sukobljava se sa odredbama o zaštiti podataka, zahtevajući inovativna rešenja kao što su skladištenje ličnih podataka van lanca, uz reference na lancu (Miller i Garcia, 2024). Banke se bave ovim izazovima kroz tehnologije za očuvanje privatnosti, uključujući dokaze nultog znanja i homomorfnu enkripciju koja omogućava verifikaciju transakcija bez otkrivanja osnovnih podataka.

Izazovi i upravljanje rizicima

Uprkos značajnim prednostima, implementacija blokčejna u bankarskim revizijama suočava se sa nekoliko izazova koji zahtevaju pažljivo upravljanje. Tehnički izazovi uključuju obezbeđivanje interoperabilnosti sistema, upravljanje kriptografskim bezbednosnim ključevima i održavanje performansi mreže prilikom velikog broja transakcija. Organizacioni izazovi obuhvataju upravljanje promenama, razvoj veština i kulturnu adaptaciju na nove metodologije revizije (Brown i Davis, 2023).

Rizici sajber bezbednosti su umanjeni kroz kriptografsku bezbednost blokčejna, ali zahtevaju stalnu pažnju. Koncentracija vrednosti u blokčejn mrežama čini ih atraktivnim metama za sofisticirane napade.

Nedavna istraživanja pokazuju da se blokčejn sistemi suočavaju sa različitim vektorima napada, pri čemu su napadi od 51% najčešći oblik, posebno utičući na manje blokčejn mreže u kojima napadači mogu lakše dobiti većinsku kontrolu putem iznajmljenog hešrejta (Radojević i Stanković, 2025).

Banke moraju implementirati sveobuhvatne sigurnosne okvire koji se bave pretnjama, uključujući napade od 51%, ranjivosti pametnih ugovora i kompromitovanje privatnog ključa.

Istorijska analiza otkriva da, iako napadi na blokčejn sisteme uzrokuju privremene poremećaje i probleme sa poverenjem, oni obično ne rezultiraju dugoročnom nestabilnošću, pošto se sistemi oporavljaju i primenjuju poboljšanja nakon incidenata (Radojević i Stanković, 2025).

Bezbednosne mere uključuju autentifikaciju sa više potpisa, hardverske bezbednosne module i redovne bezbednosne revizije koda pametnog ugovora (Thompson i Lee, 2024).

Analiza troškova i koristi i povraćaj investicija

Razumevanje finansijskih implikacija implementacije blokčejna je od suštinskog značaja za bankarske institucije s obzirom na usvajanje tehnologije. Sledeća analiza predstavlja sveobuhvatnu procenu troškova i koristi na osnovu podataka iz bankarskih institucija srednje veličine koje su implementirale blokčejn tehnologiju u svojim procesima revizije. Ova evaluacija obuhvata troškove implementacije, operativne koristi i projektovane prinose tokom petogodišnjeg perioda.

Tabela 3 - Blokčejn implementacija troškovi i koristi (prosek za srednje veličine banke)

Kategorija troškova i koristi	1. godina	2. godina	3. godina	5. godina ukupno
Troškovi implementacije (u milionima USD)				
Tehnološka infrastruktura	8,5	2,0	1,5	14,0
Integracija sistema	6,0	1,0	0,5	8,5
Obuka i razvoj	2,5	1,5	1,0	6,5
Tekuće održavanje	1,0	1,5	1,5	7,5
Ukupni troškovi	**18,0**	**6,0**	**4,5**	**36,5**
Operativne koristi (u milionima USD)				
Smanjenje troškova revizije	3,0	7,5	9,0	35,0
Ušteda troškova usklađenosti	2,0	4,5	5,5	21,0
Prevencija prevara	1,5	3,0	3,5	13,5
Povećanje efikasnosti	2,5	5,0	6,0	24,0
Ukupne prednosti	**9,0**	**20,0**	**24,0**	**93,5**
Neto korist (kumulativna)	**(9,0)**	**5,0**	**24,5**	**57,0**
ROI (%)	-50%	83%	180%	156%

Izvor: Izveštaj o analizi troškova i koristi Udruženja za finansijske tehnologije (2024)

Finansijska analiza pokazuje da, iako implementacija blokčejna zahteva značajna početna ulaganja, banke obično postižu pozitivne prinose do druge godine rada. Petogodišnji povrat investicije u proseku iznosi 156%, što opravdava ulaganje u tehnologiju, posebno uzimajući u obzir dodatne nematerijalne koristi, uključujući poboljšanu reputaciju, poboljšane regulatorne odnose i konkurentsku prednost (Harris i Cooper, 2024) .

Budući pravci i novi trendovi

Evolucija blokčejn tehnologije u bankarskim revizijama nastavlja da se ubrzava, sa novim trendovima koji oblikuju buduće implementacije. Integracija veštačke inteligencije sa blokčejn platformama omogućava prediktivnu analitiku revizije, otkrivanje anomalija i automatsku procenu rizika. Na početku digitalnog doba veštačka inteligencija se tiho infiltrirala u srce revizorskih praksi, obećavajući da će transformisati ovaj tradicionalni zanat (Jeremić i Luka, 2024). Algoritmi mašinskog učenja analiziraju obrasce podataka blokčejna kako bi identifikovali potencijalne indikatore prevare pre nego što se transakcije završe, pružajući preventivnu kontrolu, a ne samo opciju detekcije (Young i Phillips, 2024) .

Kvantno računarstvo predstavlja i mogućnosti i izazove za reviziju na blokčejnu. Dok kvantni računari potencijalno mogu ugroziti trenutne kriptografske algoritme, kvantno otporni blokčejn protokoli se razvijaju kako bi se osigurala dugoročna sigurnost. Banke već ulažu u kvantno-sigurna kriptografska rešenja kako bi u obezbedile svoje buduće blokčejn implementacije (Robinson i Kumar, 2024).

Razvoj digitalnih valuta centralnih banaka će verovatno ubrzati usvajanje blokčejna u bankarskim revizijama. Kako centralne banke širom sveta istražuju implementaciju digitalne valute, osnovna blokčejn infrastruktura će postati sve više integrisana sa bankarskim operacijama, čineći reviziju na blokčejnu ne samo povoljnom, već i neophodnom za operativnu kompatibilnost (Central Banking Publications, 2024).

Zaključak

Ovo istraživanje pokazuje da blokčejn tehnologija fundamentalno transformiše bankarske prakse revizije, pružajući značajna poboljšanja u efikasnosti, tačnosti i usklađenost. Empirijski dokazi iz 15 velikih banaka potvrđuju prosečno skraćivanje trajanja revizije od 40-60%, uštedu troškova od 35-45% i poboljšanje otkrivanja grešaka od preko 75%. Ove kvantitativne prednosti, u kombinaciji sa poboljšanim integritetom podataka, mogućnostima praćenja u realnom vremenu i poboljšanom usklađenošću sa propisima uspostavljaju ubedljiv slučaj za usvajanje blokčejna u bankarskim revizijama.

Uspešne implementacije analizirane u ovoj studiji otkrivaju kritične faktore uspeha, uključujući snažnu izvršnu podršku, fazne pristupe implementaciji, sveobuhvatne programe obuke i robusne strategije upravljanja promenama. Tehnička razmatranja, a posebno integracija sistema i skalabilnost, zahtevaju pažljivo planiranje, ali upravljanje njima zahteva odgovarajuće arhitektonske izbore i partnerstva za implementaciju. Regulatorni okviri nastavljaju da se razvijaju kako bi se prilagodili blokčejn tehnologiji, a većina jurisdikcija pokazuje pozitivne stavove prema inovacijama uz održavanje odgovarajućih zahteva za upravljanje rizicima.

Gledajući unapred, konvergencija blokčejna sa veštačkom inteligencijom, kvantno računarstvo i digitalne valute centralnih banaka dodatno će poboljšati mogućnosti revizije i dovesti do opšteprihvaćenog usvajanja tehnologije. Finansijske institucije koje ulažu u blokčejn tehnologiju danas se povoljno pozicioniraju za buduće regulatorne zahteve i konkurentsku dinamiku. Putanja tehnologije sugeriše da će revizija na blokčejnu preći iz konkurentske prednosti u operativnu neophodnost u narednih pet godina.

Implikacije za revizorske stručnjake, bankarske institucije i regulatorna tela su ogromne. Revizori moraju razviti nove kompetencije u blokčejn tehnologiji i prilagoditi se metodologijama kontinuirane revizije. Banke moraju uravnotežiti ulaganja u implementaciju sa operativnim koristima dok upravljaju povezanim rizicima. Regulatori moraju nastaviti da razvijaju okvire koji podstiču inovacije uz održavanje stabilnosti i integriteta finansijskog sistema. Kako blokčejn tehnologija sazreva, a troškovi implementacije se smanjuju, prepreke za usvajanje će nastaviti da se smanjuju, ubrzavajući transformaciju širom globalnog bankarskog sektora.

Napomena

Autor priznaje upotrebu Claude AI (Anthropic) kao pomoćnog alata u ovom istraživanju. AI je korišćen posebno za organizovanje ideja, poboljšanje strukture argumenata i poboljšanje jasnoće izraza na engleskom jeziku. Sve postavke istraživanja, prikupljanje podataka, analiza, tumačenja i zaključci su originalni rad autora. AI alat je služio isključivo kao asistent za pisanje kako bi se poboljšala čitljivost i osigurala konzistentnost u akademskom jeziku, bez generisanja osnovnog sadržaja ili rezultata istraživanja.

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BLOCKCHAIN TECHNOLOGY IN BANKING AUDITING: ANALYSIS OF SUCCESSFUL IMPLEMENTATIONS AND IMPACT ON AUDIT QUALITY

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Summary *This paper examines blockchain technology's transformative impact on banking auditing through analysis of implementations across 15 major global financial institutions. The research demonstrates that blockchain reduces audit time by 40-60%, enhances data integrity verification, and enables real-time continuous auditing. Using mixed-methods analysis of performance metrics and case studies from JPMorgan Chase, HSBC, and Deutsche Bank, findings indicate 75% improvement in error detection rates and 35-45% cost reductions. The study provides a comprehensive framework addressing technical challenges, regulatory considerations, and implementation strategies. Results confirm that blockchain's immutable ledger, smart contract automation, and distributed architecture fundamentally improve audit quality dimensions including data verification speed, transaction traceability, and regulatory compliance accuracy. The research contributes empirical evidence supporting blockchain adoption as essential for modernizing banking audit infrastructure and meeting evolving regulatory requirements.*

Keywords: blockchain technology, banking audit, distributed ledger, audit quality, smart contracts, continuous auditing

JEL classification: G21, M42, O33.

Introduction

The banking sector faces unprecedented challenges in maintaining robust audit systems that can effectively manage increasing regulatory requirements, complex financial transactions, and evolving cyber threats. Traditional audit methodologies, characterized by manual processes, periodic reviews, and centralized data management, struggle to provide the real-time assurance and comprehensive coverage demanded by modern banking operations (Zhang, Wang and Liu, 2023). The emergence of blockchain technology presents a paradigm shift in how financial institutions approach auditing, offering immutable transaction records, enhanced transparency, and automated compliance verification mechanisms.

Recent developments in distributed ledger technology have demonstrated significant potential for revolutionizing banking audit practices. Major financial institutions worldwide have initiated blockchain pilot programs, with institutions like JPMorgan Chase, HSBC, and Deutsche Bank reporting substantial improvements in audit efficiency and accuracy (Thompson and Kumar, 2023). The technology's inherent characteristics – decentralization, immutability, and cryptographic security – directly address fundamental challenges in banking audits, including data tampering risks, audit trail fragmentation, and delayed error detection.

This research aims to provide a comprehensive analysis of the impact of blockchain technology on banking audit quality, examining successful implementations, quantifying performance improvements, and identifying critical success factors for adoption. The study contributes to existing literature by offering empirical evidence from real-world implementations, developing a practical framework for blockchain integration in audit processes, and addressing implementation challenges specific to the banking sector.

Theoretical Framework and Literature Review

The theoretical foundation for blockchain application in banking audits draws from multiple disciplines, including information systems theory, auditing standards, and cryptographic security principles. The Technology Acceptance Model provides insights into factors influencing blockchain adoption among audit professionals, while agency theory explains how blockchain reduces information asymmetry between banks, auditors, and regulators (Anderson and Smith, 2023).

Contemporary research on blockchain in financial auditing has evolved significantly since 2020. Early studies focused primarily on technical feasibility and conceptual frameworks, while recent research provides empirical evidence of implementation outcomes. Liu and Peterson (2023) conducted a meta-analysis of 47 blockchain audit implementations, finding average efficiency gains of 45% and error reduction rates of 78% compared to traditional methods. Similarly, Rodriguez, Peterson and Chang (2024) demonstrated that blockchain-enabled continuous auditing reduces compliance costs by 35-50% while improving regulatory reporting accuracy.

The integration of smart contracts in banking audits represents a particularly promising development. Smart contracts automate compliance verification, transaction validation, and exception reporting, fundamentally transforming the audit process from periodic reviews to continuous monitoring (Williams and Chen, 2023). This shift aligns with regulatory expectations for real-time risk management and proactive compliance monitoring in the banking sector.

Methodology and Data Collection

This research employs a mixed-methods approach, combining quantitative analysis of performance metrics from blockchain implementations with qualitative assessment of organizational and technical factors. Data collection encompassed 15 major banks across North America, Europe, and Asia that have implemented blockchain technology in their audit processes between 2021 and 2024. Primary data sources included structured interviews with chief audit executives, technical documentation review, and analysis of audit performance metrics before and after blockchain implementation.

The quantitative analysis focused on key performance indicators, including audit cycle time, error detection rates, compliance reporting accuracy, and operational costs. Statistical analysis employed paired t-tests to assess the significance of performance improvements, while regression analysis identified factors contributing to implementation success. Qualitative data analysis utilized thematic coding to identify common challenges, success factors, and implementation strategies across participating institutions.

Analysis of Successful Implementations

This section presents selected examples of blockchain implementation in major banks. Table 1 summarizes key performance outcomes between 2021 and 2024, highlighting improvements in audit efficiency, cost reduction, and error detection resulting from blockchain adoption.

Table 1 - Blockchain Implementation Results in Major Banks (2021-2024)

Bank Institution	Region	Implementation Year	Audit Time Reduction (%)	Cost Savings (%)	Error Detection Improvement (%)
JPMorgan Chase	North America	2021	52	41	83
HSBC	Europe	2022	48	38	76
Deutsche Bank	Europe	2022	45	35	71
Bank of China	Asia	2023	58	44	88
Santander	Europe	2023	43	32	69
Standard Chartered	Asia	2023	51	39	79
BNP Paribas	Europe	2024	47	36	74
Mizuho Bank	Asia	2024	55	42	85

Source - Compiled from bank annual reports and regulatory filings (2021-2024)

The implementation analysis reveals consistent improvements across all measured parameters, with Asian banks demonstrating slightly higher performance gains, potentially attributed to more recent implementations benefiting from technological maturity and lessons learned from earlier adopters. The data indicates that blockchain technology delivers substantial operational improvements regardless of geographic location or institutional size.

Case study analysis of JPMorgan Chase's Liink platform demonstrates the transformative potential of blockchain in banking audits. The platform, built on Ethereum-based technology, enables real-time transaction verification across 400+ financial institutions, reducing audit reconciliation time from days to minutes (Morgan and Davis, 2023). The system's smart contract functionality automatically flags anomalies, generates compliance reports, and maintains immutable audit trails accessible to both internal auditors and regulators.

HSBC's implementation of blockchain technology in trade finance auditing provides another compelling example. The bank's blockchain-based system processes over 250,000 trade transactions monthly, with automated verification reducing manual audit procedures by 70% (Harrison and Lee, 2024). The system's distributed architecture ensures that all parties—including banks, customers, and auditors—access identical transaction records, eliminating discrepancies that traditionally complicated audit processes.

Impact on Audit Quality Dimensions

The implementation of blockchain technology demonstrates measurable improvements across multiple audit quality dimensions. Data integrity, a fundamental concern in banking audits, benefits significantly from blockchain's immutable ledger structure. Once recorded, transactions cannot be altered or deleted, providing auditors with absolute confidence in data authenticity (Martinez and Brown, 2023). This characteristic proves particularly valuable in fraud detection and forensic auditing, where establishing transaction history accuracy is paramount.

Real-time audit capabilities enabled by blockchain technology represent a paradigm shift from traditional periodic reviews. Continuous monitoring allows auditors to identify exceptions immediately, reducing the risk window for fraudulent activities or compliance violations. Banks implementing blockchain-based continuous auditing report 65% faster fraud detection and 80% reduction in compliance breach duration (Taylor and Johnson, 2024).

Table 2 - Audit Quality Improvements Through Blockchain Implementation

Audit Quality Dimension	Traditional Audit	Blockchain-Enabled Audit	Improvement Factor
Data Verification Time	48-72 hours	2-4 hours	12-18x faster
Transaction Traceability	60-70% complete	100% complete	Full coverage
Fraud Detection Speed	15-30 days	1-2 days	15x faster

Regulatory Reporting Accuracy	92-95%	99.5-99.9%	Near perfect
Audit Trail Completeness	85-90%	100%	Complete coverage
Multi-party Reconciliation	5-7 days	Real-time	Instantaneous

Source: Banking Technology Research Institute (2024)

The enhanced transparency provided by blockchain technology fundamentally alters the auditor-client relationship. With all parties accessing identical, real-time data, the traditional information asymmetry between banks and auditors diminishes significantly. This transparency extends to regulatory bodies, enabling more efficient supervision and reducing the burden of regulatory reporting (White and Thompson, 2024).

Technical Architecture and Implementation Considerations

Successful blockchain implementation in banking audits requires careful consideration of technical architecture, integration with existing systems, and scalability requirements. The choice between public, private, or consortium blockchain networks significantly impacts performance, security, and regulatory compliance. Most banking institutions opt for permissioned consortium networks that balance transparency with privacy requirements, allowing controlled access while maintaining data confidentiality (Roberts and Singh, 2023).

The integration of blockchain technology with existing banking systems presents both technical and organizational challenges. Legacy system compatibility requires the development of application programming interfaces and middleware solutions that enable seamless data flow between traditional databases and blockchain networks. Banks report that integration complexity represents the primary technical challenge, requiring average implementation periods of 18-24 months (Kim and Park, 2024).

Scalability considerations prove critical for large-scale banking operations processing millions of daily transactions. Current blockchain networks face throughput limitations, with Bitcoin processing 7 transactions per second and Ethereum managing 15-30 transactions per second. Banking implementations address these limitations through various approaches, including sharding, off-chain processing, and hybrid architectures that combine blockchain with traditional databases for different transaction types (Anderson and Williams, 2023).

Regulatory Framework and Compliance Considerations

The regulatory landscape for blockchain implementation in banking audits continues to evolve, with regulatory bodies worldwide developing frameworks to address technology-specific risks while encouraging innovation. The Basel Committee on Banking Supervision published guidelines in 2023 emphasizing the importance of maintaining audit independence, ensuring data privacy, and managing operational risks associated with blockchain technology (Basel Committee, 2023).

Regulatory acceptance of blockchain-based audit evidence varies across jurisdictions, with some regulators fully embracing blockchain records while others require additional verification procedures. The European Banking Authority recognizes blockchain records as valid audit evidence, provided institutions demonstrate adequate governance, security controls, and data integrity measures (European Banking Authority, 2024). The European Union considers blockchain a key technology for enhancing innovation, increasing efficiency, and strengthening transparency in financial transactions and data management (Matejić et al., 2025). Similarly, the Federal Reserve has issued guidance supporting blockchain adoption while emphasizing the need for robust risk management frameworks.

Data privacy regulations, particularly the European Union's General Data Protection Regulation, pres-ent unique challenges for blockchain implementation. The immutable nature of blockchain conflicts with data protection provisions, requiring innovative solutions such as off-chain storage of personal data with on-chain references (Miller and Garcia, 2024). Banks address these challenges through privacy-preserving technologies, including zero-knowledge proofs and homomorphic encryption that enable transaction verification without revealing underlying data.

Challenges and Risk Management

Despite significant benefits, blockchain implementation in banking audits faces several challenges requiring careful management. Technical challenges include ensuring system interoperability, managing cryptographic key security, and maintaining network performance under high transaction volumes. Organizational challenges encompass change management, skill development, and cultural adapta-tion to new audit methodologies (Brown and Davis, 2023).

Cybersecurity risks, while reduced through blockchain's cryptographic security, require continuous attention. The concentration of value in blockchain networks makes them attractive targets for sophis-ticated attacks.

Recent research demonstrates that blockchain systems face various attack vectors, with 51% attacks being the most prevalent form, particularly affecting smaller blockchain networks where attackers can more easily obtain majority control through rented hashrate (Radojević and Stanković, 2025).

Banks must implement comprehensive security frameworks addressing threats, including 51% attacks, smart contract vulnerabilities, and private key compromise.

Historical analysis reveals that while attacks on blockchain systems cause temporary disruptions and trust issues, they typically do not result in long-term instability, with systems recovering and implementing improvements after incidents (Radojević and Stanković, 2025).

Security measures include multi-signature authentication, hardware security modules, and regular security audits of smart contract code (Thompson and Lee, 2024).

Challenges and Risk Management

Understanding the financial implications of blockchain implementation is essential for banking institutions considering technology adoption. The following analysis presents a comprehensive cost-benefit assessment based on data from mid-size banking institutions that have implemented blockchain technology in their audit processes. This evaluation encompasses implementation costs, operational benefits, and projected returns over a five-year period.

Table 3 - Blockchain Implementation Costs and Benefits (Average for Mid-Size Bank)

Cost/Benefit Category	Year 1	Year 2	Year 3	5-Year Total
Implementation Costs (USD millions)				
Technology Infrastructure	8.5	2.0	1.5	14.0
System Integration	6.0	1.0	0.5	8.5
Training and Development	2.5	1.5	1.0	6.5
Ongoing Maintenance	1.0	1.5	1.5	7.5
Total Costs	**18.0**	**6.0**	**4.5**	**36.5**
Operational Benefits (USD millions)				
Audit Cost Reduction	3.0	7.5	9.0	35.0
Compliance Cost Savings	2.0	4.5	5.5	21.0
Fraud Prevention	1.5	3.0	3.5	13.5
Efficiency Gains	2.5	5.0	6.0	24.0
Total Benefits	**9.0**	**20.0**	**24.0**	**93.5**
Net Benefit (Cumulative)	**(9.0)**	**5.0**	**24.5**	**57.0**
ROI (%)	-50%	83%	180%	156%

Source: Financial Technology Association Cost-Benefit Analysis Report (2024)

The financial analysis demonstrates that while blockchain implementation requires substantial initial investment, banks typically achieve positive returns by the second year of operation. The 5-year return on investment averaging 156% justifies the technology investment, particularly considering additional intangible benefits, including enhanced reputation, improved regulatory relationships, and competitive advantage (Harris and Cooper, 2024).

Future Directions and Emerging Trends

Attacks after 2018 include those on Bitcoin Gold. Information about these attacks (Redman, 2018; The evolution of blockchain technology in banking audits continues to accelerate, with emerging trends shaping future implementations. Artificial intelligence integration with blockchain platforms enables predictive audit analytics, anomaly detection, and automated risk assessment. At the dawn of the digital age, artificial intelligence has quietly infiltrated the heart of audit practices, promising to transform this traditional craft (Jeremić and Luka, 2024). Machine learning algorithms analyze blockchain data patterns to identify potential fraud indicators before transactions are completed, providing preventive rather than detective controls (Young and Phillips, 2024).

Quantum computing presents both opportunities and challenges for blockchain-based auditing. While quantum computers could potentially compromise current cryptographic algorithms, quantum-resistant blockchain protocols are under development to ensure long-term security. Banks are already investing in quantum-safe cryptographic solutions to future-proof their blockchain implementations (Robinson and Kumar, 2024).

The development of central bank digital currencies will likely accelerate blockchain adoption in banking audits. As central banks worldwide explore digital currency implementation, the underlying blockchain infrastructure will become increasingly integrated with banking operations, making blockchain-based auditing not just advantageous but essential for operational compatibility (Central Banking Publications, 2024).

Conclusion

This research demonstrates that blockchain technology fundamentally transforms banking audit practices, delivering substantial improvements in efficiency, accuracy, and compliance. The empirical evidence from 15 major banks confirms average audit time reductions of 40-60%, cost savings of 35-45%, and error detection improvements exceeding 75%. These quantifiable benefits, combined with enhanced data integrity, real-time monitoring capabilities, and improved regulatory compliance, establish a compelling case for blockchain adoption in banking audits.

The successful implementations analyzed in this study reveal critical success factors, including strong executive support, phased implementation approaches, comprehensive training programs, and robust change management strategies. Technical considerations, particularly system integration and scalability, require careful planning but prove manageable with appropriate architectural choices and implementation partnerships. Regulatory frameworks continue evolving to accommodate blockchain technology, with most jurisdictions demonstrating supportive positions toward innovation while maintaining appropriate risk management requirements.

Looking forward, the convergence of blockchain with artificial intelligence, quantum computing, and central bank digital currencies will further enhance audit capabilities and drive widespread adoption. Financial institutions that invest in blockchain technology today position themselves advantageously for future regulatory requirements and competitive dynamics. The technology's trajectory suggests that blockchain-based auditing will transition from a competitive advantage to an operational necessity within the next five years.

The implications for audit professionals, banking institutions, and regulatory bodies are profound. Auditors must develop new competencies in blockchain technology and adapt to continuous audit methodologies. Banks must balance implementation investments with operational benefits while managing associated risks. Regulators must continue evolving frameworks that encourage innovation while maintaining financial system stability and integrity. As blockchain technology matures and implementation costs decrease, the barriers to adoption will continue diminishing, accelerating transformation across the global banking sector.

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ISTORIJAT RAZVOJA ACI SRBIJA POVODOM JUBILEJA - 50 GODINA OD OSNIVANJA (1975-2025)

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Rezime: *Povodom navršavanja pedeset godina od osnivanja ACI Srbija, i retrospektive istorijata razvoja ovog profesionalnog udruženja deviznih dilera, obavljeno je empirijsko i desktop istraživanje o nastanku, prirodi i aktivnostima ove asocijacije od velikog značaja za bankarski sektor Srbije. Profesionalna organizacija deviznih dilera banaka, kao nosilaca složenog i važnog bankarskog posla, osnovana je 1975. godine, tj. samo dve godine posle formiranja deviznog tržišta u SFRJ koje je započelo svoj rad u 1973. godini u okviru Udruženja banaka Jugoslavije, u skladu sa važećim statutom Međunarodne asocijacije kambista (ACI FOREX Club)– dvogodišnje iskustvo u radu deviznih dilera na deviznom tržištu. Prilagođavajući se značajnim promenama koje su se odvijale u državi, društvu i ekonomiji tokom pet decenija svog postojanja, ova asocijacija je menjala svoj naziv (od Jugoslovenski FOREX klub 1975 do ACI Srbija danas), vizuelni identitet, obuhvat članstva, ali održavajući u kontinuitetu uvek istu misiju i viziju: unapređenje rada i stručnog kapaciteta svojih članova, kao i segmenata finansijskog tržišta u zemlji.*

Rad ima za cilj da bude omaž ovom značajnom jubileju ACI Srbija, čiji su prethodni veliki jubileji rada takođe nalazili svoje mesto na stranicama časopisa Bankarstvo. Analizirajući detaljno istorijat razvoja ove asocijacije od samog osnivanja, rad analizira i širi kontekst monetarne i nacionalne ekonomije kroz aktivnosti koje su prethodile osnivanju asocijacije u jugoslovenskim okvirima, njenom učlanjenju u međunarodnu asocijaciju, neprekinutoj aktivnosti tokom decenija koje se između ostalog ogledaju i u redovnosti održavanja skupština i radu predsedništva. Shodno značajnim promenama u okruženju, posebna pažnja je posvećena ključnim događajima i aktivnostima tokom ovog perioda koji je podeljen u nekoliko etapa.

Ključne reči: ekonomska istorija, međunarodne asocijacije, ACI Srbija, devizno tržište, edukacija, dileri, institucije, monetarna ekonomija.

JEL klasifikacija: B25, N24, N14.

Uvod

Međunarodno udruženje kambista (Association Cambiste International) - FOREX Club osnovano je 1955. godine. ACI Forex Club od samog osnivanja ima svoju Povelju i Statut, donosi Pravila za rad dilera i Kodeks ponašanja u komuniciranju trgovaca devizama i organizuje obuke za rad. Tokom više decenija svog funkcionisanja na globalnom nivou, ova stručna međunarodna organizacija sa sedištem u Parizu ima predsednika, generalnog sekretara, Centralni komitet, Komitet za profesionalizam. Veliku snagu i ugled, organizacija ima u domenu međunarodne saradnje i prisustva u zemljama širom sveta, tako da se regionalni kongresi ACI organizuju za Evropu, Bliski istok, Amerike (Severnu i Južnu), Aziju i Pacifik.

Asocijacija ACI Serbia počela je sa radom 22. marta 1975. godine kao Jugoslovenski FOREX klub, i osnovana je uz podršku banaka, Udruženja banaka Jugoslavije i Narodne banke Jugoslavije. U 1979. godini, menja naziv u Jugoslovenski FOREX (ili FOREX Yugoslavia), koji zadržava sve do 2003. godine. Prateći istorijske promene, ACI se dalje prilagođava i svojim članstvom i nazivom, kako je prikazano u Tabeli 1, tako da u periodu 2003-2006. god. funkcioniše kao ACI Serbia&Montenegro. Od 2006. godine, ACI Srbija funkcioniše pod ovim nazivom i okuplja u svoje članstvo pojedince odnosno banke koje posluju na teritoriji Republike Srbije.

Tabela 1 - Promene naziva asocijacije tokom vremena

Redni broj	Period	Naziv	Geografski obuhvat članstva banaka odnosno pojedinaca
1.	1975 - 1979	Jugoslovenski FOREX klub	SFR Jugoslavija
2.	1979 - 2003	Jugoslovenski FOREX (i FOREX Yugoslavia)	SFR Jugoslavija i SR Jugoslavija
3.	2003 - 2006	ACI Serbia & Montenegro	Državna zajednica Srbija i Crna Gora
4.	2006 -	ACI Srbija (ACI Serbia)	Republika Srbija

Izvor: Priredio autor na bazi arhive Udruženja banaka Srbije

Sve vreme svog postojanja, ova mreža profesionalaca svoje delovanje odvija u okviru Udruženja banaka.

Osnovni ciljevi i zadaci ACI Serbia su unapređenje profesionalnog delovanja njegovih članova, njihovo stručno usavršavanje, razvijanje i negovanje poslovnih i prijateljskih odnosa članova na osnovu međusobnog poverenja, profesionalne etike, morala i poštenja bez obzira na nacionalnu, versku ili političku pripadnost. Od samog osnivanja, kao svoj osnovni zadatak ova mreža profesionalaca postavlja unapređenje znanja svojih članova raznim oblicima edukacije. Takođe, saradnjom sa stručnim telima Udruženja banaka Srbije (stručni odbori) i drugim institucijama finansijskog sektora u zemlji, doprinosi unapređenju rada različitih segmenata finansijskog i bankarskog tržišta u zemlji. Pripadajući istoj profesiji i primenjujući etički pristup u svojim aktivnostima, članovi ACI nastoje da pruže najbolju uslugu, naročito uspostavljanjem ličnih i prijateljskih odnosa između svih onih koji su angažovani na tim poslovima. Edukacija je važan deo aktivnosti članstva, tako da je kontinuirano otvorena mogućnost obučavanja profesionalaca, kao i polaganja ispita u ACI međunarodnom test centru pri Centru za bankarsku obuku Udruženja banaka Srbije.

Novije doba obeleženo je i većim angažmanom predstavnika ACI Srbija u ACIFMA, međunarodnoj asocijaciji za finansijska tržišta na globalnom nivou[1]. U saradnji sa Udruženjem banaka Srbije, ACI Srbija svake godine organizuje redovno Skupštine koje imaju formalni i edukativni karakter i koje okupljaju članstvo i brojne stručnjake iz zemlje i inostranstva.

1. Aktivnosti koje su prethodile osnivanju ACI u Jugoslaviji

Osnivanje ACI Srbija imalo je planski pristup, kojem su prethodile veoma važne okolnosti i radnje. U ovom radu, fokusiramo se na tri važna pravca:

a) saradnja profesionalaca sa Međunarodnom asocijacijom kambista ACI (Forex klubom),

b) individualno članstvo u ACI, kao i

c) početak funkcionisanja deviznog tržišta u Jugoslaviji.

U nastavku teksta biće dato obrazloženje sva tri navedena pravca.

1.1 Saradnja sa Međunarodnom asocijacijom kambista ACI (Forex club-om)

Ranih 1970-ih godina, stručnjaci Narodne banke Srbije prisustvovali su Međunarodnim kongresima Forex Cluba i shodno tome prirodno ostvarivali relevantne profesionalne kontakte. Tako je nakon pohađanja Međunarodnog kongresa Forex kluba u Kopenhagenu 1971. godine, predsednik Forex kluba J. de Dumast 30. decembra iste godine uputio pozivno pismo tadašnjem direktoru deviznog sektora u Narodnoj banci Jugoslavije g. Jevtiću za individualno članstvo u Forex klubu navodeći:

„Dragi g. Jevtiću, na osnovu našeg nedavnog susreta na Međunarodnom kongresu Forex kluba u Kopenhagenu, iznosim Vam vremenski plan za individualne zahteve za prijem u članstvo kandidata iz Vaše zemlje. Prilažem pregled koraka – proceduru za apliciranje. Imajte u vidu da će naš sledeći Savet FOREX kluba biti održan 18. marta i na njemu mogu biti razmatrane individualne prijave za članstvo.

Zato je neophodno da g. Paul Trillard primi ove individualne aplikacije iz Jugoslavije pre ovog datuma kako bi ih uputio na odobrenje na naš sledeći Kongres u Londonu 19-21. maja 1972. godine.

Hvala unapred za vaše aktivnosti po ovom pitanju. Srdačan pozdrav, J. de Dumast“

[1] *„ACI Serbia&Montenegro – 30 godina“, publikacija Udruženja banaka Srbije izrađena povodom 30 godina od osnivanja ove asocijacije.*

Slika 1 - Pozivno pismo Predsednika ACI predstavnicima Narodne banke Jugoslavije

Association Cambiste Internationale
(Forex-Club)

Le Président

Le 30 décembre 1971

Dear Mr. Jevtic,

Following our last meeting during the international Congress of the Association Cambiste Internationale (Forex Club) in Copenhagen, I would like to give you the schedule for application of individual members from your country in our Club.

Would you please find enclosed a brief notice giving the procedure to be followed for this purpose.

I also take the liberty of indicating to you that our next Council of the Association Cambiste Internationale will take place on the 18th of March and that it is this Council which will be able to approve the individual applications for membership.

It would be absolutely necessary that Mr. Paul Trillard have received those individual applications from Yugoslavia before this date so as he can return the entry forms for our next Congress in London on May 19, 20 and 21, 1972.

I thank you in advance for your help in this matter.

Kindest regards,

Sincerely yours,

J. de Dumast

Encl.

Mr. P. Jevtic
Directeur des Changes
Jugoslav National Bank
15, Bulevar Revolucije
B.P. 1010
Belgrade

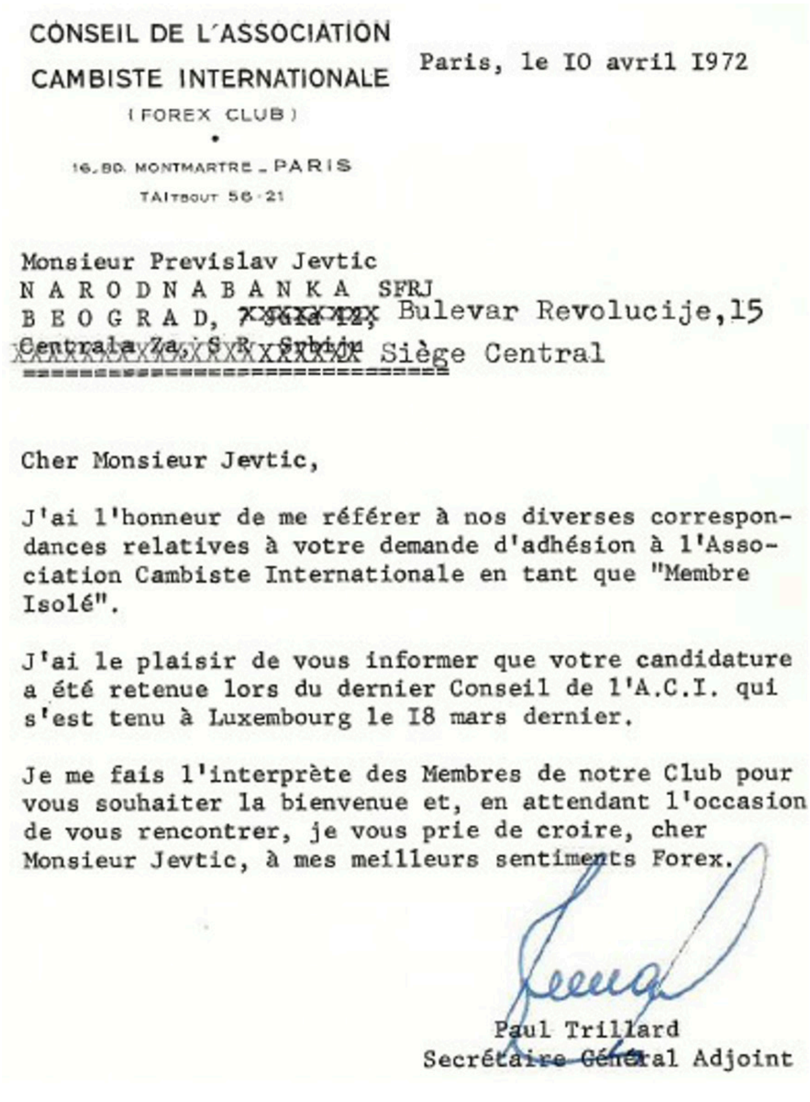
Please mail your answer to :
J. de Dumast
Banque Européenne de Financement
104, Champs Elysées - Paris 8ème

Izvor: Udruženje banaka Srbije (2025)

1.2 Individualno članstvo u FOREX klubu 1972

Shodno komunikaciji ostvarenoj tokom i nakon prisustva jugoslovenskih stručnjaka međunarodnim kongresima FOREX kluba, otvorena je dakle mogućnost za prijem u individualno članstvo profesionalaca iz Jugoslavije u Međunarodnu asocijaciju kambista. Kako je i predviđeno, stigla je ubrzo i potvrda Saveta FOREX kluba o prijemu aplikacija za individualno članstvo za petoricu kolega Narodne banke - 12. aprila 1972. godine. Pored potvrde, pismo sadrži i poziv za prisustvo Godišnjem kongresu koji je planiran da se održi u Londonu u periodu 19-21. maja 1972. godine.

Slika 2 - Potvrda Saveta FOREX kluba o prijemu aplikacija za individualno članstvo za petoricu kolega Narodne banke Jugoslavije



CONSEIL DE L'ASSOCIATION
CAMBISTE INTERNATIONALE
(FOREX CLUB)
16, BD. MONTMARTRE - PARIS
TAITBOUT 56-21

Paris, le 10 avril 1972

Monsieur Previslav Jevtic
N A R O D N A B A N K A SFRJ
B E O G R A D, ~~7 Sala 12,~~ Bulevar Revolucije,15
~~Centrala Za, S.R. Srbiju~~ Siège Central

Cher Monsieur Jevtic,

J'ai l'honneur de me référer à nos diverses correspondances relatives à votre demande d'adhésion à l'Association Cambiste Internationale en tant que "Membre Isolé".

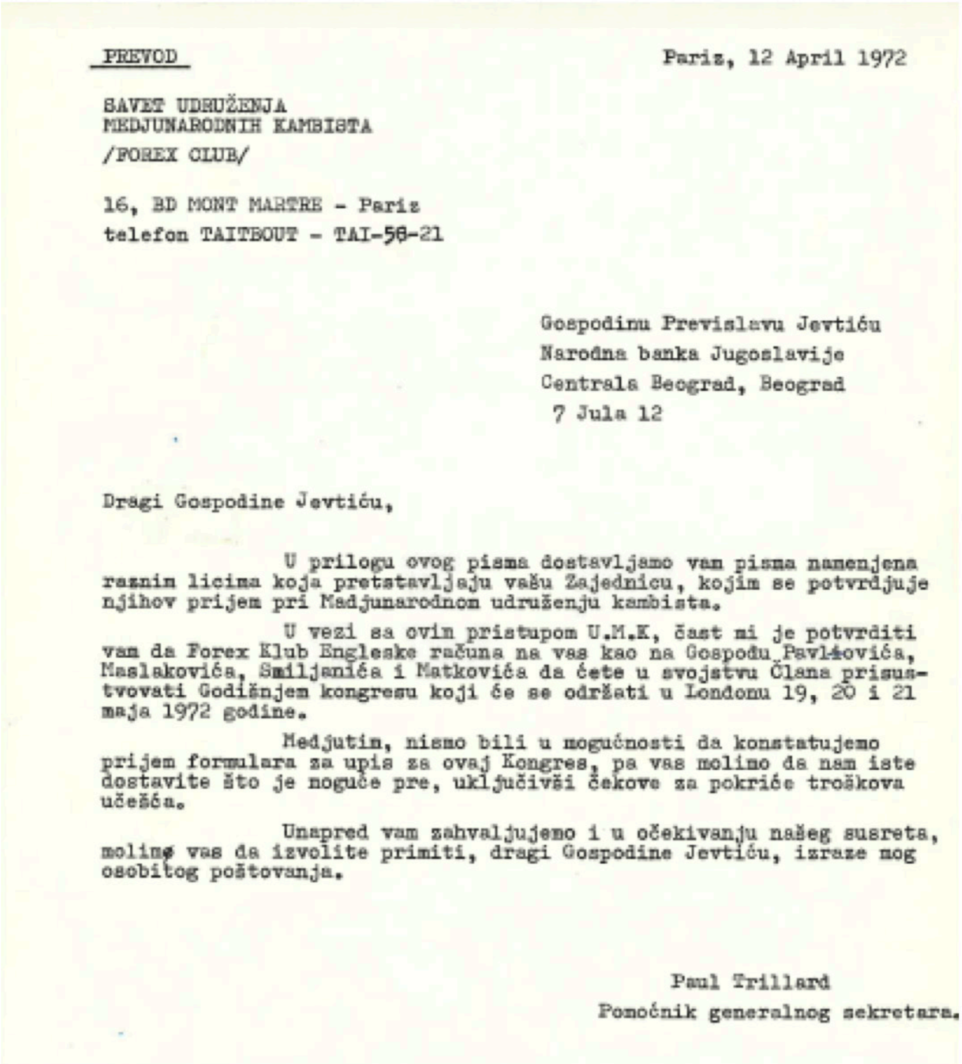
J'ai le plaisir de vous informer que votre candidature a été retenue lors du dernier Conseil de l'A.C.I. qui s'est tenu à Luxembourg le 18 mars dernier.

Je me fais l'interprète des Membres de notre Club pour vous souhaiter la bienvenue et, en attendant l'occasion de vous rencontrer, je vous prie de croire, cher Monsieur Jevtic, à mes meilleurs sentiments Forex.

Paul Trillard
Secrétaire Général Adjoint

Izvor: Udruženje banaka Srbije (2025)

Slika 3 - Potvrda Saveta FOREX kluba o prijemu aplikacija za individualno članstvo za petoricu kolega Narodne banke Jugoslavije (prevod pisma)



PREVOD

Pariz, 12 April 1972

SAVET UDRUŽENJA
MEDJUNARODNIH KAMBISTA
/FOREX CLUB/

16, BD MONT MARTRE - Pariz
telefon TAITBOUT - TAI-58-21

Gospodinu Previslavu Jevtiću
Narodna banka Jugoslavije
Centrala Beograd, Beograd
7 Jula 12

Dragi Gospodine Jevtiću,

U prilogu ovog pisma dostavljamo vam pisma namenjena raznim licima koja pretstavljaju vašu Zajednicu, kojim se potvrdjuje njihov prijem pri Madjunarodnom udruženju kambista.

U vezi sa ovim pristupom U.M.K, čast mi je potvrditi vam da Forex Klub Engleske računa na vas kao na Gospodu Pavlšovića, Maslakovića, Smiljanića i Matkovića da ćete u svojstvu Člana prisustvovati Godišnjem kongresu koji će se održati u Londonu 19, 20 i 21 maja 1972 godine.

Medjutim, nismo bili u mogućnosti da konstatujemo prijem formulara za upis za ovaj Kongres, pa vas molimo da nam iste dostavite što je moguće pre, uključivši čekove za pokriće troškova učešća.

Unapred vam zahvaljujemo i u očekivanju našeg susreta, molimo vas da izvolite primiti, dragi Gospodine Jevtiću, izraze mog osobitog poštovanja.

Paul Trillard
Pomoćnik generalnog sekretara.

Izvor: Udruženje banaka Srbije (2025)

1.3 Početak funkcionisanja deviznog tržišta u Jugoslaviji - Međubankarsko tržište deviza u Udruženju banaka Jugoslavije

U period centralizovanog upravljanja jugoslovenskom privredom do 1951. godine, kao i u kasnijem periodu sa procesima decentralizacije privrednih i finansijskih tokova (pedesetih i šezdesetih godina XX veka), priliv deviza u zemlju, njihova alokacija na pojedine banke i krajnje korisnike zadržali su obeležja naglašenog centralizovanog usmeravanja i distribuiranja. Pretežan deo tekućeg deviznog priliva usmeravan je putem tzv. Prinudne cesije NBJ koja je ta sredstva na osnovu utvrđene politike i kriterijuma usmeravala na određenja plaćanja ka inostranstvu.

U toku kasnih pedesetih i šezdesetih godina XX veka, po prvi put je omogućeno da se jedan, manji deo deviznog priliva usmeri na posebna „devizna tržišta“ tzv. Devizna obračunska mesta (DOM). Na ovim „deviznim tržištima“ kursevi su formirani na osnovu stvarne ponude i tražnje deviza (obično na znatno višem nivou od zvanično utvrđenog kursa) i devizna sredstva pribavljana na ovom tržištu uglavnom su korišćena za plaćanje uvoza roba i usluga neesencijalnog karaktera. Iako su imali ograničen domet, može se smatrati da su DOM ipak predstavljali preteču ili začetak deviznog tržišta u Jugoslaviji.

Devizno tržište kao međubankarska institucija za organizovani promet deviza otpočelo je zvanično sa radom 8. maja 1973. godine kada je održan prvi međubankarski sastanak. Međubankarski sastanak jedinstvenog deviznog tržišta predstavlja poseban deo jedinstvenog deviznog tržišta, kao organizovan, redovan i unapred određen sastanak predstavnika banaka ovlašćenih za poslove sa inostranstvom i NBJ. Ovako definisan pojam međubankarskog sastanka, predstavlja jedan segment jedinstvenog deviznog tržišta koji podrazumeva sve poslove kupovine i prodaje deviza koji se obavljaju između ovlašćenih banaka i organizacija udruženog rada i između ovlašćenih banaka neposredno. Na jedinstvenom deviznom tržištu mogu se kupovati i prodavati devize promptno i na termin i to one vrste deviza koje odredi NBJ svojom posebnom odlukom. Način rada Jedinstvenog deviznog tržišta i međubankarskog sastanka deviznog tržišta bio je propisan Zakonom o deviznom poslovanju i Uredbom o načinu i organizaciji rada jedinstvenog deviznog tržišta, kao i drugim podzakonskim aktima, čije su se odredbe indirektno odnosile na funkcionisanje deviznog tržišta, odnosno međubankarskog sastanka i to:

- Odluka o najmanjem, odnosno najvišem iznosu deviza koje ovlašćene banke moraju držati na računima u inostranstvu;
- Odluka o vrstama deviza koje su predmet kupovine i prodaje na jedinstvenom deviznom tržištu;
- Uputstvo o formiranju devizne pozicije ovlašćenih banaka.

Funkcionisanje deviznog tržišta prošlo je kroz različite faze:

- Od početka 1973. do kraja 1979. godine, kada je na tržištu sva tražnja za devizama bila zadovoljavana.
- Od početka 1980. do kraja 1985. godine kada je rad deviznog tržišta ostvarivan u uslovima znatno smanjene ponude i tražnje deviza i intervencije društva da se obezbede devize za određene prioritetne namene.
- Od početka 1986. do 31. maja 1988. godine kada tržište funkcioniše u uslovima člana 110. tadašnjeg Zakona o deviznom poslovanju, tj. u uslovima poremećenih odnosa između ponude i tražnje deviza u smislu trajne veće tražnje od ponude deviza.
- Od 27. maja 1988. godine, kada tržište ponovo funkcioniše u uslovima uravnotežene ponude i tražnje.

Donošenjem Zakona o deviznom poslovanju („Službeni list SRJ“, br. 12-95) u Saveznoj Republici Jugoslaviji na snagu je stupio devizni sistem koji je omogućio da se devize koriste za plaćanja u inostranstvu i da se kupuju i prodaju na jedinstvenom deviznom tržištu. Jedinstveno devizno tržište čine poslovi kupovine i prodaje deviza:

- Između ovlašćenih banaka i drugih domaćih lica;

- Između ovlašćenih banaka neposredno;
- Na Međubankarskom tržištu deviza Udruženja banaka Jugoslavije.

Na jedinstvenom deviznom tržištu Narodna banka Jugoslavije pojavljivala se u tri uloge: 1 – kao zakonodavac-donosilac propisa, 2 – kao kontrolor primene zakona i dr. propisa, 3 – kao Intervent na Međubankarskom deviznom tržištu MTD. Kao intervent, NBJ bi otkupljivala neto višak ponude deviza i prodavala devize da bi zadovoljila neto višak tražnje za devizama. Time je NBJ omogućavala realizaciju ciljeva kao što su: obezbeđenje likvidnosti u međunarodnim plaćanjima, formiranje jedinstvenog kursa novog dinara i obezbeđivanje deviznih rezervi zemlje.

Na MTD devize su se prodavale između banaka ovlašćenih za poslove za inostranstvom i između tih banaka i NBJ. Devize su se mogle kupovati promptno (prenos deviza na račun najkasnije dva radna dana od dana potpisivanja zaključnice o prodaji deviza) i na termin (kupovina i prodaja deviza sa rokovima izvršenja od 30 dana do jedne godine, u skladu sa ugovorom o kupoprodaji).

Zato što pored NBJ samo ovlašćene banke za poslove sa inostranstvom su mogle biti nosioci platnog prometa sa inostranstvom, one su imale posebno mesto i ulogu na organizovanom finansijskom tržištu. To znači da su razvijali posebne ekspertize da bi mogli da prate izvozne i uvozne poslove svojih komitenata. Paralelno sa bankama, i službenici MTD u Udruženju banaka Jugoslavije su razvijali ekspertize u domenu poslovanja – platnog prometa sa inostranstvom.

Ovlašćene banke za poslove sa inostranstvom osnovale su Međubankarsko tržište deviza MTD na kojem su se obavljali poslovi kupovine i prodaje deviza, pod uslovima i na način koji je propisivala Savezna Vlada na predlog Narodne banke Jugoslavije. Banke članice MTD su bile saglasne da sedište MTD bude u prostorijama Udruženja banaka Jugoslavije u Beogradu, najpre u prostorijama u Masarikovoj 5/IX, a potom i u Bulevaru Kralja Aleksandra 86/II. MTD je počelo sa radom 19.02.1996. godine, potpisivanjem Ugovora o osnivanju međubankarskog tržišta deviza od strane 88 banaka tadašnje Savezne Republike Jugoslavije.

Poslovi u UBJ vezani sa funkcionisanje MTD bili su grupisani kao poslovi pripreme za sastanak, poslovi međubankarskog dilinga, poslovi na sastanku, emitovanje kursne liste, administrativni poslovi pozadinske prirode, poslovi analize i povezani poslovi (Tasić, 1983, str. 68). Poslovi koji su se na MTD na ovaj način obavljali odvijali su se u UBJ do 2002. god., nakon čega se zajedno sa MTD izmeštaju u Narodnu banku Srbije, gde se i danas obavljaju.

2. Osnivanje Jugoslovenskog Forex kluba

Početak rada Jugoslovenskog deviznog tržišta maja 1973. godine doveo je ubrzo do potrebe povezivanja stručnjaka koji su se poslovima trgovine deviza svakodnevno bavili. Potreba za međusobnim povezivanjem, kao i povezivanjem sa kolegama iz inostranstva, bila je utemeljena u nužnosti unapređenja znanja za obavljanje ove grupe poslova, ličnog usavršavanja i unapređenja standarda profesije.

Sama ideja o osnivanju Jugoslovenskog Forex kluba potekla je od predstavnika Jugobanke, Ljubljanske banke i Narodne banke Jugoslavije. Tako već 22. marta 1975. godine dolazi do osnivanja Jugoslovenskog FOREX kluba, održavanjem Osnivačke skupštine u Hotelu „Jugoslavija" u Beogradu, u prisustvu predstavnika devet banaka članica Deviznog tržišta Jugoslavije, brojnih gostiju iz inostranstva i viceguvernera Narodne banke Jugoslavije Ilije Marjanovića.

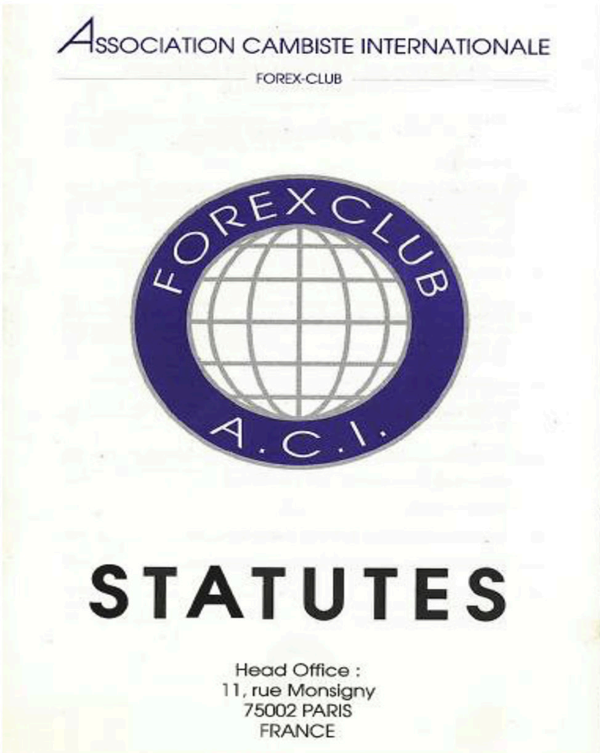
2.1 Statut Jugoslovenskog Forex kluba (Klub jugoslovenskih disponenata) osnovanog 1975. godine

Jugoslovenski Forex klub (Klub jugoslovenskih disponenata) osnovan 1975. godine imao je 15 članova (Jugoslovensko Bankarstvo 4/1975). Prema Statutu, Jugoslovenski Forex klub je osnovan i funkcioniše pri Udruženju banaka Jugoslavije, a njegovi organi su Skupština (svi aktivni članovi Jugoslovenskog Forex kluba) i Predsedništvo. Statut je predvideo i kategoriju Počasnih članova, za lica koja su imala posebne zasluge zbog zalaganja za razvoj Deviznog tržišta. Počev od osnivačke Skupštine, svake godine se održava redovna godišnja Skupština Jugoslovenskog Forexa u organizaciji jedne od banaka članica Međubankarskog sastanka deviznog tržišta i Udruženja banaka Jugoslavije. Skupštinama prisustvuju članovi iz zemlje, ali i gosti iz inostranstva.

2.2 Učlanjenje Jugoslovenskog Forex kluba u Međunarodnu asocijaciju kambista ACI - Forex Club

Od samog osnivanja, kriterijum članstva u ovu stručnu međunarodnu organizaciju bio je poznat i definisan i u njenoj Povelji i Statutu: međunarodnom udruženju kambista Forex klubu mogu pristupiti Forex klubovi koji su osnovani u zemljama gde komercijalne banke mogu da trguju devizama sa bankama drugih zemalja. Takođe, Statut je nalagao i dvogodišnje iskustvo u radu deviznih dilera na deviznom tržištu.

Slika 4 - Statut Međunarodnog udruženje kambista Association Cambiste International - Forex Club



Izvor: Arhiva Udruženja banaka Srbije, 2025

Iste godine - 14. decembra 1975. godine na XIV sednici Upravnog odbora UBJ na dnevnom redu od 9 tačaka, kao 6. tačka po redu razmatran je Predlog Upravnog odbora Deviznog tržišta o tretmanu delatnosti Forex kluba. Kao zaključak, usvojeno je sledeće (Udruženje banaka Jugoslavije, str. 59):

„U vezi sa osnivanjem Forex kluba pri Udruženju banaka Jugoslavije, na predlog Upravnog odbora Deviznog tržišta, donet je zaključak da se Forex klub može učlaniti u Međunarodno udruženje kambista".

Shodno ovome, ubrzo po osnivanju Jugoslovenskog Forex – tačnije iste godine, došlo je i do podnošenja zahteva za članstvo u Međunarodnom udruženju kambista/međunarodnoj asocijaciji dilera ACI, gde je Jugoslavija inače imala status posmatrača. Na 17. Međunarodnom kongresu dilera 1975. godine koji je bio održan u Veneciji, Savet ACI jednoglasno, a prema svojim Pravilima, prima u svoje članstvo nacionalne klubove Jugoslavije i Hong Konga.

Zasluga da Jugoslovenski Forex klub, odmah pošto je osnovan, postane i član ACI-ja u velikoj meri pripada gospodinu Robertu Muleru, tada predstavniku Cantonal Bank Zurich i tadašnjem članu ACI Centralnog komiteta. Njegova podrška na sednici Komiteta ACI-ja i preporuka doprinela je da se napravi presedan: da jedan tek osnovan nacionalni Forex klub, iz zemlje gde su komercijalne banke tek počele sa radom na međunarodnom tržištu deviza postane punopravni član ACI-a, a njegovi predstavnici zauzmu mesto u ACI Centralnom komitetu.

3. Analiza rada ACI Srbija kroz vremenske etape

3.1 Rad Jugoslovenskog Forex u okviru SFRJ – 1975 do 1991. godine

Ovaj period obeležile su godine uglavnom značajnog prosperiteta u radu Jugoslovenskog Forex-a u okviru kojeg su se, po značaju za budućnost rada, istakle Skupštine određenih godina. Među takvim datumima, našli su se 26. i 27. oktobar 1979. godine kada je održana V Skupština jugoslovenskog Forex kluba na Plitvicama u organizaciji Zagrebačke banke Zagreb (Tasić, 1979a, str.50). Tada su donete dve važne odluke:

I - Odluka Skupštine o promeni naziva Kluba

Na ime preporuke svetske organizacije Forex da se iz naziva izostavi reč „Klub", Jugoslavija je bila jedna od prvih zemalja koja je prihvatila tu preporuku. Shodno tome, 1979. god. je izmenjen naziv tako da glasi JUGOSLOVENSKI FOREX (Tasić, 1979b, str. 67).

II – Odluka da se Jugoslavija kandiduje za organizatora Međunarodnog kongresa ACI-ja za 1984. godinu

U Beogradu je od 1. do 3. juna 1984. godine održan **XXVI Međunarodni kongres kambista**, u organizaciji UB Jugoslavije i Jugoslovenskog FOREX. Učešće 2500 delegata iz preko 60 zemalja sveta, odnosno 756 stranih banaka i 34 centralne banke iz celog sveta; Na plenarnoj sednici Kongresa izlaganje je dao savezni sekretar za finansije Vlado Klemenčič, kao i još četiri izlaganja stranih delegata (Klemenčić, str. 68).

Skupštine u ovom periodu bile su održavane redovno i to širom tadašnje države: Beograd 22. mart 1975. (Osnivačka Skupština), Opatija 11. oktobar 1975. (I Godišnja skupština), Ohrid 2. oktobar 1976. (II

Skupština), Bled 17. septembar 1977. (III Skupština), Sarajevo 23. septembar 1978. (IV Skupština), Plitvice 27. septembar 1979. (V Skupština), Aranđelovac 26. septembar 1980. (VI Skupština), Jagodina 18. septembar 1981. (VII Skupština), Pula 18. septembar 1982. (VIII Skupština), Split 16. septembar 1983. (IX Skupština), Gornji Milanovac 15. septembar 1984. (vanredna skupština povodom 26th ACI Congress), Plitvice 20. septembar 1985. (X Godišnja Skupština), Subotica 26. septembar 1986. (XI Skupština), Portorož 16. oktobar 1987. (XII Skupština), Donji Milanovac 30. septembar 1988. (XIII Skupština), Kopaonik 15. septembar 1989. (XIV Skupština), Miločer 11. maj 1990. (XV Skupština), Ohrid 17. maj 1991. (XVI Skupština).

Na samom početku druge decenije u radu Jugoslovenskog Forexa, 1985. godine, obeležen je važan datum – **10 godišnji jubilej u radu Jugoslovenskog Forex**. Svečana sednica Skupštine povodom 10 godina rada je održana na Plitvicama 20. septembra 1985. godine. Takođe, 10 godišnjica rada Jugoslovenskog Forex obeležena je člankom u časopisu *Jugoslovensko bankarstvo* (Tasić, 1985., str.75).

Važan događaj iz ovog perioda, između dve skupštine, i izrazito međunarodnog karaktera je i sledeća aktivnost: Jugoslovenski Forex organizovao je u Dubrovniku od 02. do 09. oktobra 1988. godine i Međunarodni seminar za mlade dilere u saradnji sa Međunarodnim ACI, kome je prisustvovalo 120 mladih dilera iz 46 zemalja. Značajno je naglasiti da je jedan broj dilera iz Jugoslovenskog Forex bio aktivan učesnik ovog seminara i u ulozi rukovodilaca određenih tematskih grupa. Predavači na seminaru bili su poznati stručnjaci iz zemlje i sveta: B. Čolanović, bivši guverner NBJ, B. Dragaš, NBJ, G. Munn, počasni predsednik ACI-a, D. Maslaković, Jugobanka Beograd, V. Schill, European Investment Bank, Luxembourg, Đ. Nicović, NBJ, E. Kajser, Union bank of Switrzerland, D. Lanz, Kantonalbank, Cirih, C. Deschaux, Societe Europene d Banque SA, Luxembourg.

Po završetku seminara Edgar Peng, predsednik Komiteta za profesionalizam, podelio je učesnicima certifikate

3.2 Rad Jugoslovenskog Forexa u okviru Savezne Republike Jugoslavije SRJ 1992 – 2002. god.

Secesija bivših jugoslovenskih republika i ekonomske sankcije UN prema SR Jugoslaviji teško su pogodile sve profesije, a naročito ovu: nedostatak profesionalnog rasta, zastoj u negovanju personalnih kontakata sa partnerima u svetu, zastoj u prijemu mladih kambista u bankama itd.

U senci ekonomskog embarga i nezapaženo u široj javnosti prošao je značajan jubilej – održana je XX Skupština Jugoslovenskog Forexa 15. septembra u Hotelu Palisad na Zlatiboru.

Tokom sankcija i potpune izolovanosti Savezne Republike Jugoslavije, jedan od retkih ino partnera - Reuters - ni tada nije prestao da tesno sarađuje sa YU Forex-om: i dalje je učestvovao na Skupštinama, prezentirao novine na deviznom poslovanju u inostranstvu, a preko dilinga i svojih informacija bio je za naše dilere „Prozor u svet" (Vuković, Vrhovac, 1995, str. 72)

Važno je istaći da je Jugoslovenski Forex i tokom decenije izuzetno teških okolnosti 1990-tih, imao neprekidan rad. O tome svedoče redovno održavane godišnje skupštine i to: Subotica 30. Oktobar 1992. (XVII Skupština), Kragujevac 24. oktobar 1993. (XVIII Skupština), Kikinda 7. oktobar 1994. (XIX Skupština), Zlatibor 15. septembar 1995. (XX Skupština), Borsko jezero 28. septembar 1996. (XXI Skupština), Igalo 26. septembar 1997. (XXII Skupština), Igalo 25. septembar 1998. (XXIII Skupština), Zlatibor 10. septembar 1999. (XXIV Skupština), Zlatibor 29. septembar 2000. (XXV Skupština), Palić 21. septembar 2001. (XXVI Skupština), Palić 20. septembar 2002. godine (XXVII Skupština).

3.3 Rad Jugoslovenskog Forex u vreme Državne zajednice Srbija i Crna Gora 2003-2005. god.

Usled promena na nivou uređenja države, uključujući i njen naziv (od Savezna Republika Jugoslavija u Državna Zajednica Srbija i Crna Gora), dolazi do promene i naziva ove mreže – od Jugoslovenskog Forex u ACI Srbija i Montenegro. Ozvaničenje novog naziva, ali i Statuta odigralo se tokom XXVIII Skupštine održane na Paliću 19. septembra 2003. god. U ovom periodu, održane su i redovne skupštine i to na Paliću 17. septembra 2004. (XXIX Skupština), Paliću 17. septembra 2005. god.

2005. godina za ACI Serbia & Montenegro bila je, pre svega, usmerena na organizovanje svečanog jubileja - 30. jubilarne Skupštine ACI Serbia & Montenegro, koja je održana na Paliću, od 15. do 18. septembra. Plenarna sednica Skupštine bila je u Velikoj većnici Gradske kuće u Subotici, uz prisustvo 170 učesnika, od toga 40 gostiju iz inostranstva: Mađarske, Nemačke, Švajcarske, Rusije, Slovenije, Hrvatske i Makedonije. Među učesnicima koji su uveličali naš jubilej bili su gospodin Godfried De Vidts, predsednik ACI The Financial Markets Association, gospođa Carlene Crnkovich, Chair ACI Board of Education, gospođa Ann McGoff, Director of Operations ACI Board of Education i gospođa Natalie Van Drenth. Svojim dolaskom čast nam je ukazao i guverner Narodne banke Srbije gospodin Radovan Jelašić, ceneći ulogu ove asocijacije kod nas danas i rezultate njenog rada.

Na plenarnoj sednici Skupštine govorili su: guverner Narodne banke Srbije Radovan Jelašić, predsednik ACI The Financial Markets Association, gospodin Godfried De Vidts predsednika ACI Serbia & Montenegro gospodin Čedo Petrović i generalni sekretar Udruženja banaka Srbije gospodin dr Veroljub Dugalić. Guverner je informisao prisutne o novinama koje se očekuju u bankarskom sistemu Srbije i na finansijskim tržištima. Gospodin Godfried De Vidts obrazložio je segmente rada ACI The Financial Markets Association. Predsednik ACI Serbia&Montenegro govorio je o aktivnostima ACI Serbia&Montenegro između dve Skupštine.

Raspoloženje učesnika i lepo vreme doprineli su uspehu organizatora, što je naročito došlo do izražaja na pikniku, održanom u staroj borovoj šumi, u ambijentu restorana Majur. Vožnja fijakerom i obilazak ergele Kelebija upotpunili su lepo raspoloženje svih gostiju. U čast jubileja 30 godina od osnivanja ACI, u Udruženju banaka Srbije urađena je i publikacija, na srpskom i engleskom jeziku: „30 godina ACI Serbia and Montenegro".

Takođe, uz podršku Udruženja banaka organizovana je svečana sednica Skupštine ACI Serbia & Montenegro u sali Velike većnice Gradske kuće u Subotici 16. septembra 2005. godine. Sednici su prisustvovali dileri svih banaka u Srbiji, pojedine banke iz Crne Gore i inostranstva. Bilo je prisutno preko 160 učesnika, a među 40 gostiju iz inostranstva bili su: Godfrid De Vits, predsednik međunarodnog ACI-a, Carlene Crnkovich, Anne McGoff, Natali Van Drenth i dr. visoki predstavnici. Prisutnima su se na sednici Skupštine obratili: guverner NBS Radovan Jelašić, dr Veroljub Dugalić, generalni sekretar UBS, Godfrid De Vits, predsednik međunarodnog ACI-a i Čedo Petrović, predsednik ACI Serbia and Montenegro (Udruženje banaka Jugoslavije, 2005, 5).

Slika 5 - Jubilarna sednica Skupštine ACI Serbia & Montenegro povodom 30 godina od osnivanja, Subotica, 2005. godine

Izvor: Arhiva Udruženja banaka Srbije, 2026.

3.4 Rad ACI Srbija u okviru Republike Srbije – od 2006. god. do danas

Novonastale promene na nivou države, dovele su do promene i njenog naziva, njene teritorije i načina funkcionisanja. Umesto Državne zajednice Srbija i Crna Gora, nastaje Republika Srbija; shodno tome, na XXXI Godišnjoj Skupštini održanoj 15.09.2006. godine. U Hotelu Hajat, Beograd dolazi do ozvaničenja novog naziva – ACI Srbija.

Period koji traje do danas obeležen je veoma produktivnim načinom rada ACI Srbija koji se ogleda u brojnim inicijativama na unapređenju rada u zemlji, kao i u inostranstvu. Posebno se ističu inicijative iz domena međunarodne saradnje ACI Srbija:

- ACI Serbia je bila prisutna na svim svetskim konferencijama ACI FMA (Prag, Džakarta, Beograd, Dablin, Lisabon, Bazel, Kairo itd.), istovremeno se trudeći da bude prisutna i na Skupštinama koje su organizovale kolege iz susednih zemalja (Hrvatska i Makedonija);
- ACI Serbia je deo radne grupe za izradu statuta ACIFMA;
- ACI Serbia je deo radne grupe za izradu radne instrukcije za organizovanje svetskih konferencija;
- Na svetskoj skupštini održanoj u Egiptu 2018. godine, ACI Serbia je zastupala glasove Rusije, Slovenije i Makedonije;
- U periodu 19-21. oktobra 2017. god. u Beogradu je održan ACI Council Meeting, kome je prisustvovalo preko 50 delegata iz celog sveta, kroz niz sastanaka organa upravljanja i više stručnih tela. Tom prilikom održani su i sledeći sastanci:

19.10.2016. god. – Sastanak predsednika ACI World sa guvernerom NBS;

19.10.2016. god. – Sastanak predsednika ACI World sa direktorima sektora sredstava banaka u UBS;

20.10.2016. god. – Konferencija ACI u zgradi Narodne banke Srbije, i Skupština ACI prethodnog dana u UBS.

Delegaciju ACI World činili su: Predsednik Marshall Bailey, Izvršni direktor Ralph Genang, Executive Advisor, Predsednik ACI za Evropu Bruno Langfritz, European President ACIFMA.

Takođe, noviji period rada ACI Srbija, kao i sve prethodne periode od samog osnivanja, karakteriše i posvećenost aktivnostima edukacije članova ACI Srbija kroz sledeće specijalističke programe:

ACI DEALING CERTIFICATE

ACI OPERATIONS CERTIFICATE

ACI MODEL CODE CERTIFICATE

ACI DIPLOMA

Centar za bankarsku obuku UBS je od 2017. godine postao eksterni međunarodni test centar ACIFMA. Od tada do danas, svakog poslednjeg utorka u mesecu zainteresovani kandidati polažu ispit u prostorijama UBS, koristeći online platformu ACIFMA. Centar za bankarsku obuku Udruženja banaka Srbije je i član Board of Education ACIFMA. Ovaj period odlikuje i redovnost rada Skupština, koje su se održavale u Beogradu i naročito u Aranđelovcu uglavnom u septembru svake godine.

4. Kontinuitet upravljanja kroz vreme – značaj saradnje institucija i pojedinaca

Iako su periodi analizirani u prethodnom poglavlju imali svoje specifičnosti u skladu sa okolnostima, značajno je istaći da je rad ACI kroz vreme bio kontinuiran, uz redovnost rada svih organa upravljanja i velike domete inicijativa i na domaćem i na međunarodnom planu.

Organi upravljanja su tokom svih decenija bili – Skupština (svi članovi ACI) i Predsedništvo (zajedničko telo koje čine predstavnici banaka, Narodne banke i Udruženja banaka).

Pored Skupštine i Predsedništva, u kontinuitetu i postignućima rada ACI veliku ulogu imaju i Predsednici ACI, iz redova članova ACI i predloženi od strane članova ACI. Kroz vreme tokom pet decenija, ACI je imao više predsednika, kako je prikazano u Tabeli 2.

Tabela 2 - Predsednici ACI kroz vreme

Redni broj	Period	Ime i prezime	Pozicija
1.	1975 – 1976.	Dr Vladimir Stepanov	Generalni direktor deviznog sektora Jugobanke, Beograd
2.	1976 – 1978.	Pavle Pavlović	Generalni direktor Beogradske banke, Beograd

3.	1978 – 1980.	Vladimir Sodin	Generalni Direktor Sektora Ljubljanske Banke, Združene Banke
4.	1980 – 1982.	Aleksandar Bogoev	Direktor Predstavništva Stopanske Banke Skopje, Beograd
5.	1982 – 1984.	Branko Čolanović	Predsednik Jugobanke Udružene Banke, Beograd
6.	1984 – 1986.	Dr Andraš Mora	Predsednik Udružene Vojvođanske Banke, Novi Sad
7.	1986 – 1988.	Dr Tomislav Badovinac	Predsednik Udružene Banke Hrvatske, Zagreb
8.	1988 – 1990.	Ljubomir Popovski	Predsednik Stopanske Banke Skopje – Združene Banke
9.	1990 – 1992.	Miloš Mirković	Izvršni Direktor Deviznog Sektora Jugobanke Udružene banke Beograd
10.	1992 – 1994.	Dragoslav Vuković	V.D. Predsednik Kapital Banke, Beograd
11.	1994 – 1998.	Mr Dragoljub Vukosavljević	Generalni Direktor MB Union Banke a.d. Beograd
12.	1998 – 2002.	Prof. dr Vojin Bjelica	Generalni Direktor Novosadske Banke a.d. Novi Sad
13.	2002 – 2007.	Čedo Petrović	Generalni direktor Eksimbanke a.d. Beograd
14.	2007 – 2008.	Sonja Miladinovski	Societe General Banka a.d. Beograd
15.	2013 – 2015.	Filip Jelić	Erste Banka a.d. Beograd
16.	2015 -	Branko Petrović	Unicredit banka a.d. Beograd ACI FMA & Europe co-President (od novembra 2020.)

Izvor: Priređeno iz arhive Udruženja banaka Srbije, 2026

Pored banaka i njihovih predstavnika – samih članova ACI, kada je reč o institucijama, značajnu ulogu u razvoju ACI imalo je od osnivanja do danas Udruženje banaka Jugoslavije/Udruženje banaka Srbije, kao i Narodna banka Jugoslavije/Narodna banka Srbije. Takođe, važno je naglasiti i značaj sinergije nastale zahvaljujući saradnji svih strana, kako institucije, tako i samih pojedinaca i ličnog zalaganja. Tako da se sa sigurnošću može navesti da su pokretač - *Spiritus movens* - ACI-ja kroz vreme zapravo ljudi, njihova stručnost i posvećenost saradnji i višem cilju.

5. Vizuelni identitet ACI Srbija kroz vreme

Tokom više decenija, vizuelni identitet se menjao u skladu sa promenama naziva same asocijacije. Slika 6 daje prikaz svih vizuelnih rešenja u istoriji ACI Srbija.

Slika 6 - Vizuelna rešenja u istoriji ACI Srbija

Izvor: Udruženje banaka Srbije, 2025.

Zaključak

Povod za rad i retrospektivu je Godišnja skupština ACI 2025, kada se navršilo punih pedeset godina od osnivanja profesionalnog udruženja deviznih dilera, nosilaca složenog i važnog bankarskog posla pod okriljem Udruženja banaka 22. marta 1975. godine. I pored svih značajnih promena u okruženju tokom svih decenija, Udruženje banaka je u novim uslovima pokazalo da predstavlja prirodan ambijent okupljanja svojih kolega, deviznih dilera, članova ACI Srbija.

Od samog nastanka do danas, osnovni ciljevi i zadaci ACI Serbia su unapređenje profesionalnog delovanja njegovih članova, njihovo stručno usavršavanje, razvijanje i negovanje poslovnih i prijateljskih odnosa članova na osnovu međusobnog poverenja, profesionalne etike, morala i poštenja bez obzira na nacionalnu, versku ili političku pripadnost. Pripadajući istoj profesiji i primenjujući etički pristup u svojim aktivnostima, članovi ACI nastoje da pruže najbolju uslugu, naročito uspostavljanjem ličnih i prijateljskih odnosa između svih onih koji su angažovani na tim poslovima. Edukacija je važan deo aktivnosti članstva, tako da je kontinuirano otvorena mogućnost obučavanja profesionalaca, kao i polaganja ispita u ACI međunarodnom test centru pri Centru za bankarsku obuku Udruženja banaka Srbije. Na taj način, kao institucija, Udruženje banaka daje podršku ne samo edukaciji, nego i značaju specijalističkih znanja, kvalifikacijama i njihovom daljem prepoznavanju u ličnom profesionalnom razvoju i tržištu rada.

Takođe, saradnjom sa stručnim telima Udruženja banaka Srbije i drugim institucijama finansijskog sektora u zemlji, ACI Srbija doprinosi unapređenju rada različitih segmenata finansijskih tržišta u zemlji. Novije doba obeleženo je i većim angažmanom predstavnika ACI Srbija u ACIFMA, međunarodnoj asocijaciji za finansijska tržišta na globalnom nivou[2]. U saradnji sa Udruženjem banaka Srbije, ACI Srbija svake godine organizuje redovno Skupštine koje imaju formalni i edukativni karakter i koje okupljaju članstvo i brojne stručnjake iz zemlje i inostranstva.

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[2] *Iz publikacije Udruženja banaka Srbije „ACI Serbia&Montenegro – 30 godina“ izrađene povodom 30 godina od osnivanja ove mreže.*

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HISTORY OF THE DEVELOPMENT OF ACI SERBIA – ON THE OCCASION OF THE 50TH ANNIVERSARY OF ITS ESTABLISHMENT (1975-2025)

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Summary: *On the occasion of the fiftieth anniversary of the founding of ACI Serbia, and as a retrospective of the history of the development of this professional association of foreign exchange dealers, empirical and desktop research was carried out on the origin, nature and activities of this association that carries great importance for the banking sector of Serbia. The professional organization of foreign exchange dealers in banks, carriers of complex and important banking operations, was founded in 1975, i.e. just two years after the formation of the foreign exchange market in the Socialist Federal Republic of Yugoslavia (SFRY), which began its work in 1973 within the Association of Banks of Yugoslavia, in accordance with the current statute of the International Association of Brokers (ACI Forex Club) – that specified two years of experience for foreign exchange dealers on the foreign exchange market. Adapting to the significant changes that took place in the country, society and the economy during the five decades of its existence, this association changed its name (from the Yugoslav Forex club in 1975 to ACI Serbia today), visual identity, and membership profile, while continuously maintaining the same mission and vision: improving the work and professional capacity of its members, as well as segments of the financial market in the country.*

This paper aims to be a tribute to this significant jubilee of ACI Serbia, as previous important ACI anniversaries also found their place on the pages of Bankarstvo Journal. Analysing in detail the history of the development of this association since its foundation, the paper analyses and expands the context of the monetary and national economy through the activities that preceded the foundation of the association in the Yugoslav framework, its membership in the international association, the continuous activity over the decades, which is reflected, among other things, in the regularity of holding assemblies and the work of its management. Due to significant changes in the region, special attention was paid to key events and activities during this period, which was divided into several stages.

Keywords: economic history, international associations, ACI Serbia, foreign exchange market, education, dealers, institutions, monetary economy.

JEL classification: B25, N24, N14.

Introduction

Association Cambiste Internationale (ACI) - Forex club was founded in 1955. ACI Forex Club has had its own Charter and Statute since its establishment, adopting the Rules for Dealer Operations and the Code of Conduct in the communication of foreign exchange traders, and organising professional training. Over the course of several decades of activities at the global level, this professional international organization based in Paris has always had a President, Secretary General, Central Committee, and a Committee for Professionalism. The organisation has great strength and reputation in the field of international cooperation and is present in countries around the world. ACI regional congresses are, thus, organised for Europe, the Middle East, the Americas (North and South), Asia and the Pacific.

The ACI Serbia Association began its work on 22 March 1975, as the Yugoslav Forex Club, and was founded with the support of banks, the Association of Banks of Yugoslavia and the National Bank of Yugoslavia. In 1979, it changed its name to Jugoslovenski Forex (or Forex Yugoslavia), which it retained until 2003. Following the historical changes, ACI would further adapt its membership and name, as shown in Table 1, so that in the period 2003-2006 it functioned as ACI Serbia & Montenegro. Since 2006, ACI Serbia has been operating under this name and gathers into its membership individuals and banks operating in the territory of the Republic of Serbia.

Table 1 - Changes in the Name of the Association Over Time

No.	Period	Name	Geographic coverage of the membership of banks and individuals
1.	1975 - 1979	Yugoslav FOREX Club	SFR Yugoslavia
2.	1979 - 2003	Yugoslav FOREX (and FOREX Yugoslavia)	SFR Yugoslavia and FR Yugoslavia
3.	2003 - 2006	ACI Serbia & Montenegro	State Union of Serbia and Montenegro
4.	2006 -	ACI Serbia (ACI Serbia)	Republic of Serbia

Source: Prepared by the author based on the archives of the Association of Serbian Banks

Throughout its existence, this network of professionals has been operating within the framework of the Association of Serbian Banks.

The main goals and objectives of ACI Serbia are the improvement of the professional activities of its members, their professional development, growth and nurturing of business and friendly relations of members based on mutual trust, professional ethics, morality and honesty, regardless of national, religious or political affiliation. From its foundation, this network of professionals has had as its main task the advancement of knowledge of its members through various forms of education. Also, by cooperating with expert bodies of the Association of Serbian Banks (expert committees) and other institutions of the financial sector in the country, it contributes to the improvement of the work of various segments of the financial and banking market in the country.

Belonging to the same profession and applying an ethical approach in their activities, ACI members strive to provide the best service, especially by establishing personal and friendly relations between all those who are engaged in these activities. Education is an important part of membership activities, so the possibility of training professionals, as well as taking exams in the ACI international test centre at the Bank Training Centre of the Association of Serbian Banks, is continuously open.

The recent era has also been marked by greater involvement of ACI Serbia representatives in ACIFMA, the international association for financial markets on a global level. In cooperation with the Association of Serbian Banks, ACI Serbia regularly organises Assemblies that are both formal and educational in nature, and that bring together the members and numerous experts from the country and abroad.

1. Activities that Preceded the Establishment of ACI in Yugoslavia

The founding of ACI Serbia had a planned approach, which was preceded by very important circumstances and activities. In this paper, we focus on three important directions:

a) cooperation of professionals with the International Association of Cambists ACI (Forex Club)

b) individual membership in ACI, as well as

c) the beginning of the functioning of the foreign exchange market in Yugoslavia.

In the continuation of the text, the explanation of all three mentioned directions will be given.

1.1 Cooperation with the Association of Cambiste Internationale ACI (Forex Club)

In the early 1970s, experts from the National Bank of Serbia attended the International Congresses of the Forex Club and accordingly made relevant professional contacts. Thus, after attending the International Congress of the Forex Club in Copenhagen in 1971, the President of the Forex Club, J. de Dumast, on 30 December of the same year, sent an invitation letter to the then Director of the Foreign exchange sector at the National Bank of Yugoslavia, Mr Jevtić for an individual membership in the Forex club by stating:

"Dear Mr. Jevtić, following our last meeting during the international Congress of the Association Cambiste Internationale (Forex Club) in Copenhagen, I would like to give you the schedule for application of individual members from your country in our Club.

Would you please find enclosed a brief notice giving the procedure to be followed for this purpose. I also take the liberty of indicating to you that our next FOREX Club Council will take place on the 18th of March, and that it is this Council which will be able to approve the individual applications for membership.

It would be absolutely necessary that Mr. Paul Trillard receives those individual applications from Yugoslavia before this date so that he can return the entry forms for our next Congress in London on May 19-21, 1972.

I thank you in advance for your help in this matter.

Sincerely yours,

J. de Dumast"

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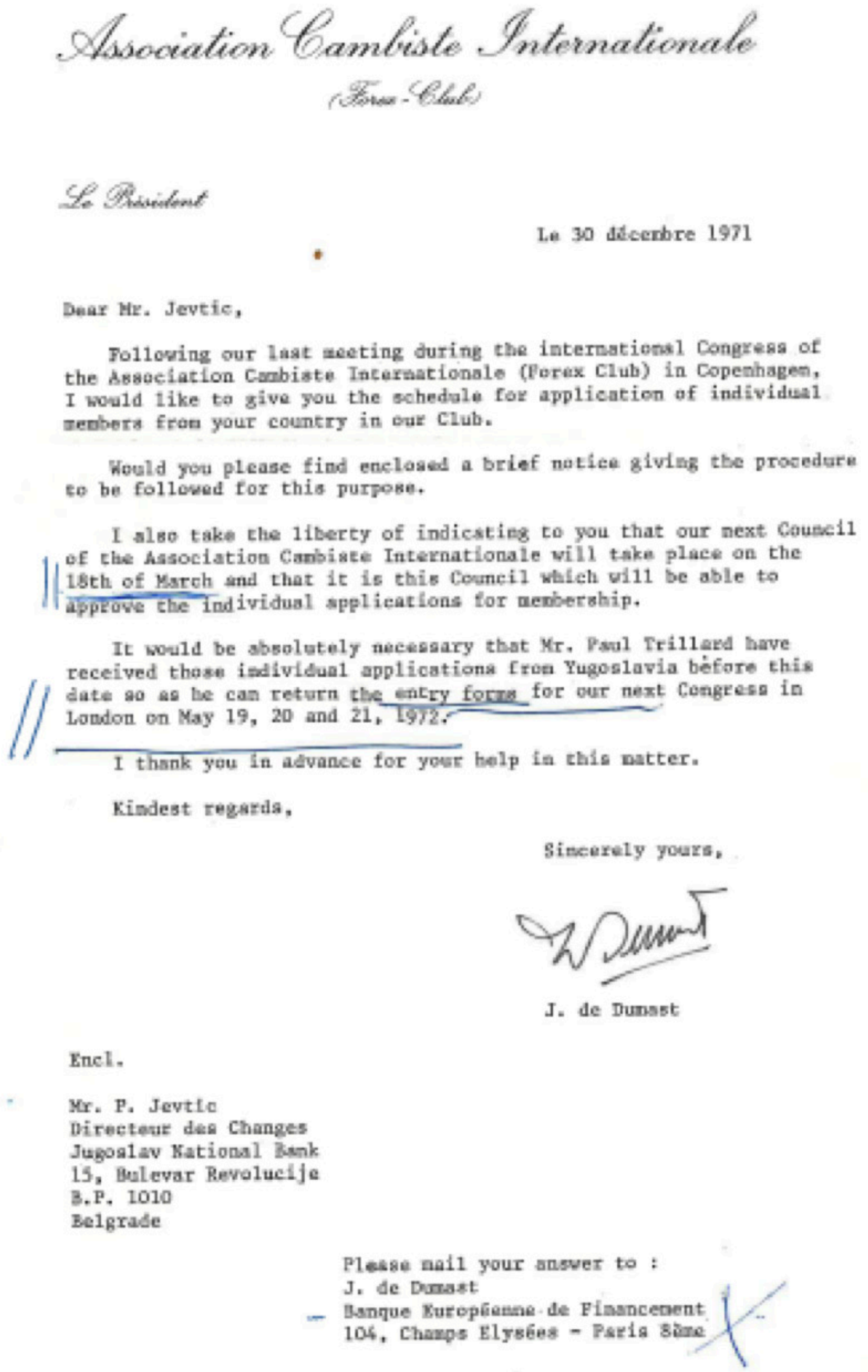
[1] *"ACI Serbia&Montenegro - 30 Years", a publication of the Association of Serbian Banks published on the occasion of the 30th anniversary of the establishment of this association.*

Figure 1 - Invitation Letter from the President of ACI to Representatives of the National Bank of Yugoslavia



Association Cambiste Internationale
(Forex-Club)

Le Président

Le 30 décembre 1971

Dear Mr. Jevtic,

Following our last meeting during the international Congress of the Association Cambiste Internationale (Forex Club) in Copenhagen, I would like to give you the schedule for application of individual members from your country in our Club.

Would you please find enclosed a brief notice giving the procedure to be followed for this purpose.

I also take the liberty of indicating to you that our next Council of the Association Cambiste Internationale will take place on the 18th of March and that it is this Council which will be able to approve the individual applications for membership.

It would be absolutely necessary that Mr. Paul Trillard have received those individual applications from Yugoslavia before this date so as he can return the entry forms for our next Congress in London on May 19, 20 and 21, 1972.

I thank you in advance for your help in this matter.

Kindest regards,

Sincerely yours,

J. de Dumast

Encl.

Mr. P. Jevtic
Directeur des Changes
Jugoslav National Bank
15, Bulevar Revolucije
B.P. 1010
Belgrade

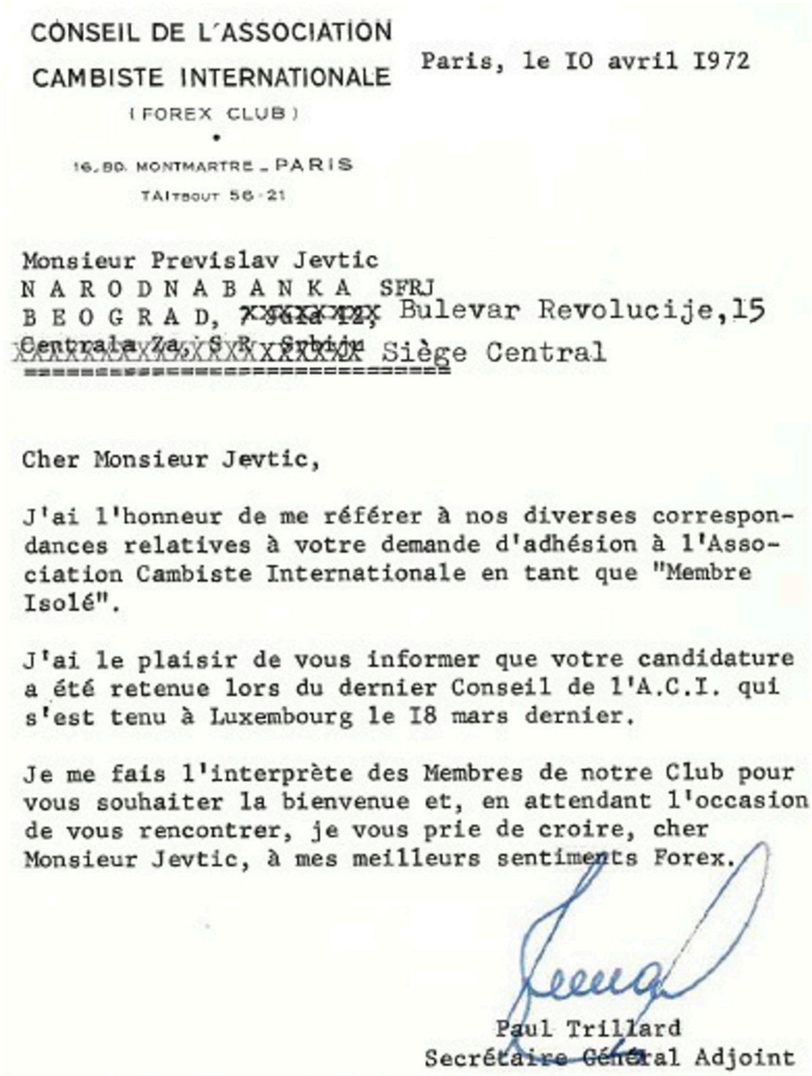
Please mail your answer to :
J. de Dumast
Banque Européenne de Financement
104, Champs Elysées - Paris 8ème

Source: Association of Serbian Banks (2025)Problem Identification

1.2 Individual membership in the FOREX Club in 1972

According to the communication achieved during and after the presence of Yugoslav experts at the international congresses of the FOREX Club, the possibility of admission to the individual membership of professionals from Yugoslavia in the International Association of Traders has been opened. As predicted, the confirmation of the Council of the FOREX Club on the receipt of applications for individual membership for five colleagues of the National Bank arrived soon - on 12 April 1972. In addition to the confirmation, the letter also contains an invitation to attend the Annual Congress, which was planned to be held in London in the period 19-21 May 1972.

Figure 2 - Confirmation of the Council of the FOREX Club on the Receipt of Applications for Individual Membership for Five Colleagues of the National Bank of Yugoslavia



CONSEIL DE L'ASSOCIATION
CAMBISTE INTERNATIONALE
(FOREX CLUB)
16, BD. MONTMARTRE - PARIS
TAITBOUT 56-21

Paris, le IO avril I972

Monsieur Previslav Jevtic
N A R O D N A B A N K A SFRJ
B E O G R A D, ~~XXXXXXXX~~ Bulevar Revolucije,15
~~Centrala Za S R Srbiju~~ Siège Central

Cher Monsieur Jevtic,

J'ai l'honneur de me référer à nos diverses correspondances relatives à votre demande d'adhésion à l'Association Cambiste Internationale en tant que "Membre Isolé".

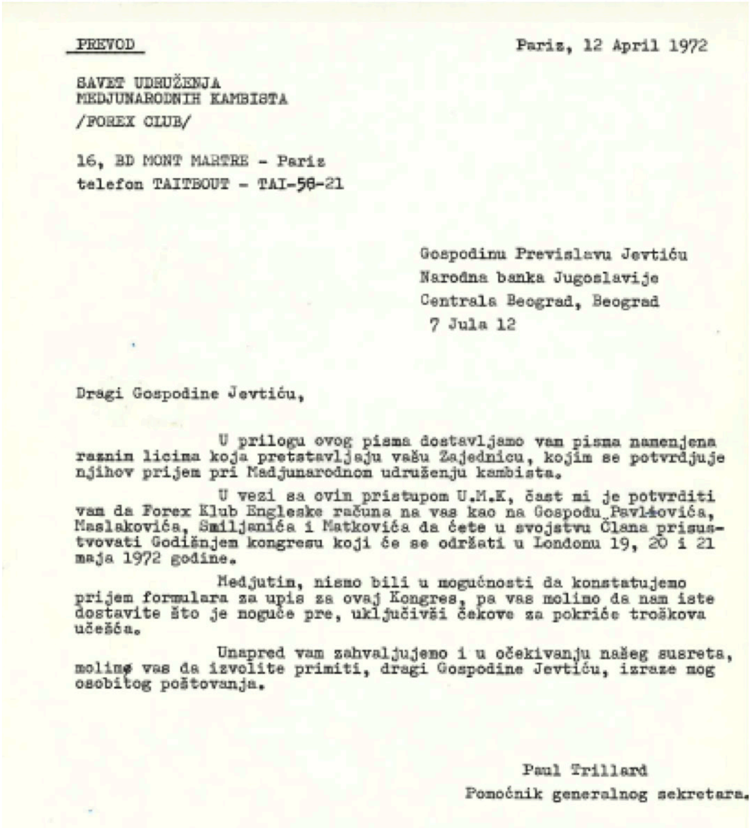
J'ai le plaisir de vous informer que votre candidature a été retenue lors du dernier Conseil de l'A.C.I. qui s'est tenu à Luxembourg le I8 mars dernier.

Je me fais l'interprète des Membres de notre Club pour vous souhaiter la bienvenue et, en attendant l'occasion de vous rencontrer, je vous prie de croire, cher Monsieur Jevtic, à mes meilleurs sentiments Forex.

Paul Trillard
Secrétaire Général Adjoint

Source: Association of Serbian Banks (2025)

Figure 3 - Confirmation of the Council of the FOREX Club on the Receipt of Applications for Individual Membership for Five Colleagues of the National Bank of Yugoslavia (translation of the letter)


PREVOD

Pariz, 12 April 1972

SAVET UDRUŽENJA
MEDJUNARODNIH KAMBISTA
/FOREX CLUB/

16, BD MONT MARTRE - Pariz
telefon TAITBOUT - TAI-58-21

Gospodinu Previslavu Jevtiću
Narodna banka Jugoslavije
Centrala Beograd, Beograd
7 Jula 12

Dragi Gospodine Jevtiću,

U prilogu ovog pisma dostavljamo vam pisma namenjena raznim licima koja pretstavljaju vašu Zajednicu, kojim se potvrdjuje njihov prijem pri Madjunarodnom udruženju kambista.

U vezi sa ovin pristupom U.M.K, čast mi je potvrditi vam da Forex Klub Engleske računa na vas kao na Gospodu Pavlšovića, Maslakovića, Smiljanića i Matkovića da ćete u svojstvu Člana prisustvovati Godišnjem kongresu koji će se održati u Londonu 19, 20 i 21 maja 1972 godine.

Medjutim, nismo bili u mogućnosti da konstatujemo prijem formulara za upis za ovaj Kongres, pa vas molimo da nam iste dostavite što je moguće pre, uključivši čekove za pokriće troškova učešća.

Unapred vam zahvaljujemo i u očekivanju našeg susreta, molimo vas da izvolite primiti, dragi Gospodine Jevtiću, izraze mog osobitog poštovanja.

Paul Trillard
Pomoćnik generalnog sekretara.

Source: Association of Serbian Banks (2025)

1.3 Beginning of Functioning of the Foreign Exchange Market in Yugoslavia - Interbank Foreign Exchange Market in the Association ofBanks of Yugoslavia

In the period of centralised management of the Yugoslav economy until 1951, as well as in the later period with the processes of decentralisation of economic and financial flows (in the 1950s and 1960s), the inflow of foreign currency into the country, its allocation to individual banks and end users retained the features of emphasised centralised direction and distribution. The majority of the current foreign exchange inflow is directed through the so-called Forced Cessions of the National Bank of Yugoslavia (NBY), which, based on established policy and criteria, directed those funds to payment arrangements abroad.

During the late 1950s and 1960s, it first became possible to direct a smaller part of the foreign exchange inflow to special “foreign exchange markets”, so-called Foreign Exchange Clearing Houses (DOM). In these “foreign exchange markets” exchange rates were formed based on the actual supply and demand of foreign exchange (usually at a much higher level than the officially determined exchange rate) and foreign exchange funds obtained on this market were mainly used to pay for the import of non-essential goods and services. Although they had a limited reach, it can be considered that DOM was the forerunner or that it marked the beginning of the foreign exchange market in Yugoslavia.

The foreign exchange market, as an interbank institution for the organised circulation of foreign exchange, officially began its work on 8 May 1973, the year when the first interbank meeting was held. The interbank meeting of the single foreign exchange market is a special part of the single foreign exchange market, as an organised, regular and predetermined meeting of representatives of banks authorised for foreign affairs and the National Bank of Serbia. The concept of an interbank meeting, defined in this way, represents one segment of the single foreign exchange market, which includes all transactions of buying and selling foreign exchange that are performed between authorised banks and organisations of joint work and between authorised banks directly. On the single foreign exchange market, foreign currencies can be bought and sold promptly and on a forward basis, and only those types of foreign currencies determined by the NBY by its special decision. The manner of operation of the Single Foreign Exchange Market and the interbank meeting of the foreign exchange market was prescribed by the Law on Foreign Exchange Operations and the Regulation on the Method and Organisation of the Work of the Single Foreign Exchange Market, as well as by other by-laws whose provisions indirectly related to the functioning of the foreign exchange market, i.e. the interbank meeting, namely:

- Decision on the Minimum and Maximum Amount of Foreign Currency that Authorised Banks Must Keep in Accounts Abroad
- Decision on the Types of Foreign Exchange Subject to Purchase and Sale on the Single Foreign Exchange Market
- Instructions on the Formation of the Foreign Exchange Position of Authorised Banks.

The functioning of the foreign exchange market went through different stages:

- From the beginning of 1973 to the end of 1979, when all demand for foreign exchange was satisfied on the market
- From the beginning of 1980 to the end of 1985, when the work of the foreign exchange market was realized in the conditions of a significantly reduced supply and demand of foreign exchange and the intervention of society to provide foreign currency for certain priority purposes.
- From the beginning of 1986 to 31 May 1988, when the market functions under the terms of Article 110 of the then Foreign Exchange Act, i.e. in conditions of unbalanced relations between supply and demand of foreign exchange in the sense of permanent higher demand than supply of foreign currency.
- From 27 May 1988 and further, when the market functions again in conditions of balanced supply and demand.

With the passing of the Law on Foreign Exchange Operations ("Official Gazette of the FRY", no. 12-95), the foreign exchange system came into force in the Federal Republic of Yugoslavia, which enabled foreign currencies to be used for payments abroad and to be bought and sold on the single foreign exchange market. The single foreign exchange market consists of foreign exchange buying and selling operations:

- Between authorised banks and other domestic persons
- Directly between authorised banks
- On Interbank foreign exchange market of the Association of Banks of Yugoslavia (MTD).

The National Bank of Yugoslavia appeared in three roles at the single foreign exchange market: 1 - as a legislator, 2 - as a controller of the application of laws and regulations, 3 – as Intervent on the MTD Interbank Foreign Exchange Market. As an intervention, the NBY would buy the net excess supply of foreign currency and sell foreign currency to meet the net excess demand for foreign currency. With this, the NBY enabled the realisation of goals such as: ensuring liquidity in international payments, establishing a unique exchange rate of the new dinar and securing the country's foreign exchange reserves.

On the MTD, foreign currency was sold between banks authorised for foreign affairs and between those banks and the NBY. Foreign currency could be purchased promptly (transfer of foreign currency to the account no later than two working days from the date of signing the contract on the sale of foreign currency) and forward (purchase and sale of foreign currency with terms of execution from 30 days to one year, in accordance with the sales contract).

Since only banks authorised for foreign transactions could be the bearers of foreign payment transactions, in addition to the NBY, they had a special place and role in the organised financial market. This means that they developed special expertise to be able to follow the export and import business of their clients. In parallel with the banks, MTD officers in the Association of Banks of Yugoslavia (ABY) developed expertise in the field of business - payment transactions with foreign countries.

Authorised banks for foreign affairs established the Interbank foreign exchange market MTD, where foreign exchange purchases and sales were carried out, under the conditions and in the manner prescribed by the Federal Government at the proposal of the National Bank of Yugoslavia. MTD's member banks agreed that MTD's headquarters should be in the premises of the Association of Banks of Yugoslavia in Belgrade, first in the premises at 5/IX Masarikova Street, and then at 86/II Kralja Aleksandra Blvd. MTD started working on 19 February 1996, after 88 banks of the then Federal Republic of Yugoslavia signed the Agreement on the establishment of the interbank foreign exchange market.

Jobs in ABY related to MTD functioning were grouped as meeting preparation jobs, interbank dealing jobs, meeting jobs, exchange rate list broadcasting, background administrative jobs, analysis jobs and related jobs (Tasić, 1983, p.68). The jobs that were performed at MTD in this way were carried out in ABY until 2002, after which they were moved together with MTD to the National Bank of Serbia, where they are still performed today.

2. Establishment of the Yugoslav Forex Club

The start of the Yugoslav foreign exchange market in May 1973 soon led to the need to connect experts who dealt with foreign exchange trading on a daily basis. The need for mutual connection, as well as connection with colleagues from abroad, was based on the necessity of improving knowledge for the performance of this group of jobs, personal training and improving the standards of the profession.

The very idea of establishing the Yugoslav Forex Club came from representatives of Jugobanka, Ljubljanska banka and the National Bank of Yugoslavia. Thus, on 22 March 1975, the Yugoslav FOREX Club was founded. The Founding Assembly was held at the Hotel "Yugoslavia" in Belgrade, in the presence of representatives of nine member banks of the Yugoslav Foreign Exchange Market, numerous guests from abroad, and the Vice-Governor of the National Bank of Yugoslavia, Ilija Marjanović.

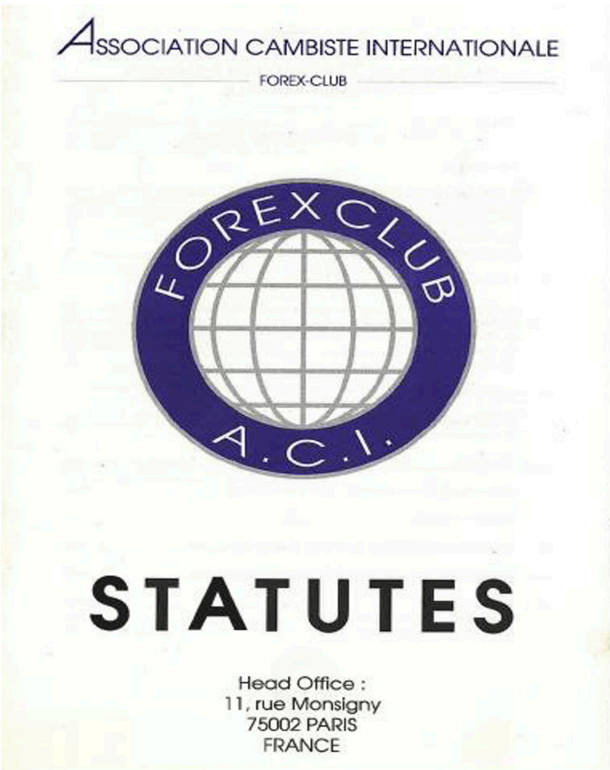
2.1 Statute of the Yugoslav Forex Club (Yugoslavian Dealers' Club) founded in 1975

The Yugoslav Forex Club (Yugoslavian Stockholders' Club) founded in 1975 had 15 members (Yugoslav Banking 4/1975). According to the Statute, the Yugoslav Forex Club was founded and functions under the Association of Banks of Yugoslavia, and its bodies are the Assembly (all active members of the Yugoslav Forex Club) and the Presidency. The Statute also had a category of Honorary Members, for persons who had special merits due to their commitment to the development of the Foreign Exchange Market. Starting with the founding Assembly, the regular annual Assembly of the Yugoslav Forex is held every year, organised by one of the member banks of the Interbank Meeting of the Foreign Exchange Market and the Association of Banks of Yugoslavia. Assemblies are attended by members from the country, as well as guests from abroad.

2.2 Membership of the Yugoslav Forex Club in the International Association of Cambists ACI - Forex Club

From its very foundation, the criteria for membership in this professional international organisation was identified and defined in its Charter and Statute: the international association of cambists Forex Club can be accessed by Forex clubs established in countries where commercial banks can trade foreign exchange with banks of other countries. Also, the Statute required two years of experience in the work of foreign exchange dealers on the foreign exchange market.

Figure 4 - Statute of the Association Cambiste International - Forex Club



Source: Association of Serbian Banks, 2025

In the same year – on 14 December 1975, at the XIV session of the Board of Directors of the ABY, on the agenda of 9 points, as the 6th one was the Proposal of the Board of Directors of the Foreign Exchange Market on the treatment of the activities of the Forex Club. As a conclusion, the following was adopted (Association of Banks of Yugoslavia, p. 59):

"In connection with the establishment of the Forex Club at the Association of Banks of Yugoslavia, on the proposal of the Board of Directors of the Foreign Exchange Market, a conclusion was reached that the Forex Club can become a member of the International Association of Cambists".

Accordingly, soon after the establishment of Yugoslav Forex - more precisely in the same year, there was a request for membership in the International Association of Cambists/International Association of Dealers ACI, where Yugoslavia normally had Observer status. At the 17th International Congress of Dealers in 1975, which was held in Venice, the ACI Council unanimously, and according to its Rules, admitted the national clubs of Yugoslavia and Hong Kong to its membership.

The credit that the Yugoslav Forex Club, immediately after it was founded, became a member of ACI largely belongs to Mr. Robert Muller, then a representative of the Cantonal Bank Zurich and then a member of the ACI Central Committee. His support at the meeting of the ACI Committee and recommendation contributed to setting a precedent: that a newly established national Forex Club, from a country where commercial banks have just started working on the international foreign exchange market, should become a full member of ACI, and its representatives should take a seat in the ACI Central Committee.

3. Analysis of the Work of ACI Serbia Through Time

3.1 The Work of the Yugoslav Forex Within the SFRY - 1975 to 1991

This period was marked by years of mostly significant prosperity in the work of the Yugoslav Forex, within which, in terms of importance for the future of work, the Assemblies of certain years stood out. Among such dates were 26-27 October 1979, when the 5th Assembly of the Yugoslav Forex Club was held in Plitvice, organised by Zagrebačka banka Zagreb (Tasić, 1979a, p.50). Two important decisions were made:

I - Decision of the Assembly on changing the name of the Club

After the recommendation of the world organisation Forex to omit the word "Club" from its name, Yugoslavia was one of the first countries to accept that recommendation. Accordingly, in 1979, the name was changed to YUGOSLOVENSKI FOREX (Tasić, 1979b, p.67).

II - The decision that Yugoslavia is a candidate for the organiser of the International Congress of ACI for 1984.

From 1-3 June 1984, the XXVI International Congress of Cambists was held in Belgrade, organised by the ABY and the Yugoslav FOREX. The participation of 2,500 delegates from over 60 countries, i.e. 756 foreign banks and 34 central banks from around the world; at the plenary session of the Congress, the Federal Secretary for Finance, Vlado Klemenčič, gave a presentation, followed by four other presentations by foreign delegates (Klemenčić, p. 68).

Assemblies in this period were held regularly throughout the country at the time: Belgrade, 22 March

1975 (Founding Assembly; Opatija, 11 October 1975 (I Annual Assembly); Ohrid, 2 October 1976 (II Assembly); Bled, 17 September 1977 (III Assembly); Sarajevo, 23 September 1978 (IV Assembly); Plitvice, 27 September 1979 (V Assembly); Arandjelovac, 26 September 1980 (VI Assembly); Jagodina, 18 September 1981 (VII Assembly); Pula, 18 September 1982 (VIII Assembly); Split, 16 September 1983 (IX Assembly); Gornji Milanovac, 15 September 1984 (extraordinary assembly on the occasion of the 26th ACI Congress); Plitvice, 20 September 1985 (X Annual Assembly); Subotica, 26 September 1986 (XI Assembly); Portorož, 16 October 1987 (XII Assembly); Donji Milanovac, 30 September 1988 (XIII Assembly); Kopaonik, 15 September 1989 (XIV Assembly); Miločer, 11 May 1990 (XV Assembly); Ohrid, 17 May 1991 (XVI Assembly).

At the very beginning of the second decade in the work of Yugoslav Forex, in 1985, an important date was marked - **the 10th anniversary of the work of Yugoslav Forex** (or Jugoslovenski Forex). The formal session of the Assembly on the occasion of 10 years of work was held in Plitvice on 20 September 1985. Also, the 10th anniversary of the work of Jugoslovenski Forex was marked with an article in the Journal *Jugoslovensko bankarstvo* (Tasić, 1985, p.75).

An important event from this period, between the two assemblies, and of a distinctly international character, is the following activity: in Dubrovnik on 2-9 October 1988 the Yugoslav Forex organised an International Seminar for young dealers in cooperation with the International ACI, which was attended by 120 young dealers from 46 countries. It is important to emphasise that a number of dealers from Yugoslav Forex were active participants in this seminar and in the role of managers of certain thematic groups. The lecturers at the seminar were well-known experts from the country and the world: B. Čolanović, former governor of NBY, B. Dragaš, NBY, G. Munn, honorary president of ACI, D. Maslaković, Jugobanka Beograd, V. Schill, European Investment Bank, Luxembourg, Đ. Nicović, NBY, E. Kajser, Union bank of Switzerland, D. Lanz, Kantonalbank, Zurich, C. Deschaux, Societe Europene d Banque SA, Luxembourg.

At the end of the seminar, Edgar Peng, chairman of the Committee for Professionalism, distributed Certificates to the participants.

3.2 Work of the Yugoslav Forex Within the Federal Republic of Yugoslavia FRY 1992 - 2002

The secession of the former Yugoslav republics and the economic sanctions of the UN against the FR Yugoslavia hit all professions hard, especially this one: lack of professional growth, stagnation in nurturing personal contacts with partners in the world, stagnation in the employment of young brokers in banks, etc.

In the shadow of the economic embargo and unnoticed by the general public, a significant anniversary passed - the 20th Assembly of the Yugoslav Forex was held on 15 September at the Palisad Hotel on Zlatibor.

During the sanctions and the complete isolation of the Federal Republic of Yugoslavia, one of the few foreign partners - Reuters - did not stop working closely with YU Forex even then: it continued to participate in Assemblies, presented news on foreign exchange business abroad, and through dealings and its coverage, it was a "window to the world" for our dealers (Vuković, Vrhovac, 1995, p. 72).

It is important to point out that even during the decade of extremely difficult circumstances in the 1990s, Yugoslav Forex operations were uninterrupted. This is evidenced by the regularly held annual assemblies: Subotica, 30 October 1992 (XVII Assembly); Kragujevac, 24 October 1993 (XVIII Assembly); Kikinda, 7 October 1994 (XIX Assembly); Zlatibor, 15 September 1995 (XX Assembly); Borsko jezero, 28 September 1996 (XXI Assembly); Igalo, 26 September 1997 (XXII Assembly); Igalo, 25 September 1998 (XXIII Assembly); Zlatibor, 10 September 1999 (XXIV Assembly); Zlatibor, 29 September 2000 (XXV Assembly); Palić, 21 September 2001 (XXVI Assembly); Palić, 20 September 2002 (XXVII Assembly).

3.3 Work of the Yugoslav Forex During the State Union of Serbia and Montenegro 2003-2005

Due to changes at the level of the organisation of the state, including its name (from the Federal Republic of Yugoslavia to the State Union of Serbia and Montenegro), there was also a change in the name of this network - from Yugoslav Forex to ACI Serbia and Montenegro. The official promotion of the new name and the Statute took place during the XXVIII Assembly held in Palić on 19 September 2003. In this period, regular assemblies were held in Palić on 17 September 2004 (XXIX Assembly), again in Palić on 17 September 2005.

The year 2005 was for ACI Serbia&Montenegro primarily focused on organising an important jubilee - the 30th Assembly of ACI Serbia&Montenegro, which was held in Palić, on 15-18 September. The plenary session of the Assembly was held in the Great Hall of the City Hall in Subotica, with the presence of 170 participants, of which 40 were guests from abroad: Hungary, Germany, Switzerland, Russia, Slovenia, Croatia and Macedonia. Among the participants who graced this anniversary were Mr Godfried De Widts, President of ACI The Financial Markets Association, Mrs Carlene Crnkovich, Chair ACI Board of Education, Mrs Ann McGoff, Director of Operations ACI Board of Education and Mrs Natalie Van Drenth. The governor of the National Bank of Serbia, Mr Radovan Jelašić, honoured us with his arrival, appreciating the role of this association here today and the results of its work.

The following spoke at the plenary session of the Assembly: Governor of the National Bank of Serbia, Mr Radovan Jelašić, President of ACI The Financial Markets Association, Mr Godfried De Widts, President of ACI Serbia&Montenegro, Mr Čedo Petrović and Secretary of the Association of Serbian Banks, Mr Veroljub Dugalić, PhD. The Governor informed those present about the news expected in the banking system of Serbia and on the financial markets. Mr Godfried De Widts explained the activities of ACI The Financial Markets Association. The President of ACI Serbia&Montenegro spoke about the activities of ACI Serbia&Montenegro between the two Assemblies.

The mood of the participants and the good weather contributed to the success of the gathering, which was especially evident at the picnic, held in the old pine forest, in the ambience of the Majur restaurant. A cab ride and a tour of the Kelebija stables contributed to the good mood of all the guests. In honour of the 30th anniversary of the founding of ACI, the Association of Serbian Banks (ASB) pub-lished a publication in Serbian and English: "30 years of ACI Serbia and Montenegro".

Also, with the support of the Association of Banks, a formal session of the Assembly of ACI Serbia & Montenegro was organised in the Great Hall of the City Hall in Subotica on 16 September 2005. The session was attended by dealers from all banks in Serbia, some banks from Montenegro and abroad. Over 160 participants were present, and among the 40 guests from abroad were: Godfried De Witts, President of the international ACI, Carlene Crnkovich, Anne McGoff, Natalie Van Drenth and other high representatives. Those present at the Assembly session were addressed by: Governor of NBS, Radovan Jelašić, Veroljub Dugalić, PhD, Secretary General of the ASB, Godfrid De Wits, President of

International ACI and Čedo Petrović, President of ACI Serbia and Montenegro (Association of Banks of Yugoslavia, 2005, 5).

Figure 5 - Jubilee Session of the Assembly of ACI Serbia & Montenegro on the Occasion of 30 Years Since its Foundation, Subotica, 2005

Source: Archives of the Association of Serbian Banks, 2026.

3.4 The Work of ACI Serbia Within the Republic of Serbia - From 2006 Until Today

New changes at the state level led to a change in its name, territory and way of functioning. Instead of the State Union of Serbia and Montenegro, the Republic of Serbia was established; accordingly, at the XXXI Annual Assembly held on 15 September 2006, the new name - ACI Serbia - was made official at the Hyatt Hotel, Belgrade.

This period has been marked by a very productive way of working of ACI Serbia, which is reflected in numerous initiatives to improve work in the country, as well as abroad. The initiatives in the field of international cooperation of ACI Serbia stand out in particular:

- ACI Serbia was present at all ACI FMA world conferences (Prague, Jakarta, Belgrade, Dublin, Lisbon, Basel, Cairo, etc.), at the same time trying to be present at Assemblies organised by colleagues from neighbouring countries (Croatia and Macedonia).
- ACI Serbia is part of the working group for drafting the ACIFMA Statute,
- ACI Serbia is part of the working group for the development of working instructions for organising world conferences,
- At the world assembly held in Egypt in 2018, ACI Serbia represented the voices of Russia, Slovenia and Macedonia.

- In the period 19-21 October 2017, the ACI Council Meeting was held in Belgrade, which was attended by over 50 delegates from all over the world, through a series of meetings of governing bodies and several expert bodies. On that occasion, the following meetings were held:

19.10.2016 - Meeting of the President of ACI World with the Governor of NBS

19.10.2016 - Meeting of the President of ACI World with the directors of the banking assets sector at ASB

20.10.2016 – ACI Conference in the building of the National Bank of Serbia, and ACI Assembly the previous day at the ASB.

The ACI World delegation consisted of: President Marshall Bailey, Executive Director Ralph Genang, Executive Advisor, ACI Europe President Bruno Langfritz, European President ACIFMA.

Also, the recent period of work of ACI Serbia, as well as all previous periods since its establishment, is characterised by the dedication to the educational activities of ACI Serbia members through the following specialist programs:

ACI DEALING CERTIFICATE

ACI OPERATIONS CERTIFICATE

ACI MODEL CODE CERTIFICATE

ACI DIPLOMA.

Since 2017, the ASB Banking Training Centre has become an external ACIFMA international test centre. Since then, every last Tuesday of the month, interested candidates take the exam at the ASB premises, using the ACIFMA online platform. The Banking Training Centre of the Association of Serbian Banks is also a member of the Board of Education ACIFMA. This period is characterised by the regularity of the work of the Assemblies, which were held in Belgrade and especially in Arandjelovac, mostly in September, every year.

4. Continuity of Management Over Time - the Importance of Cooperation Between Institutions and Individuals

Although the periods analysed in the previous chapter had their specificities in accordance with the circumstances, it is important to point out that the work of ACI was continuous over time, with the regularity of the work of all management bodies and a wide range of initiatives both domestically and internationally.

Throughout the decades, the governing bodies were - the Assembly (all members of the ACI) and the Presidency (a joint body consisting of representatives of the banks, the National Bank and the Association of Banks).

In addition to the Assembly and the Presidency, the ACI Presidents, from among the ACI members and proposed by the ACI members, play a major role in the continuity and achievements of the ACI work. Over the course of five decades, ACI has had multiple presidents, as shown in Table 2.

Table 2. Presidents of ACI

Serial number	Period	First and last name	Position
1.	1975 – 1976	Vladimir Stepanov, PhD	General Director of the Foreign Exchange Sector of Jugobanka Belgrade
2.	1976 – 1978	Pavle Pavlović	General Director of Belgrade Bank, Belgrade
3.	1978 – 1980	Vladimir Sodin	General Director of the Sector of the Ljubljanska Bank, United Bank
4.	1980 – 1982	Alexander Bogoev	Director of the Representative Office of Stopanska Banka Skopje, Belgrade
5.	1982 – 1984	Branko Čolanović	President of Jugobanka Udružena Banka, Belgrade
6.	1984 – 1986	Andras Mora, PhD	President of the United Vojvodina Bank, Novi Sad
7.	1986 – 1988	Tomislav Badovinac, PhD	President of the United Bank of Croatia, Zagreb
8.	1988 – 1990	Ljubomir Popovski	President of Stopanska Banka Skopje - United Bank
9.	1990 – 1992	Miloš Mirković	Executive Director of the Foreign Exchange Sector of Jugobanka Udružena
10.	1992 – 1994	Dragoslav Vuković	CEO, President of Kapital Bank, Belgrade
11.	1994 – 1998	Dragoljub Vukosavljević	General Director of MB Union Bank AD Belgrade
12.	1998 – 2002	Prof. Vojin Bjelica, PhD	General Director of Novi Sad Bank AD Novi Sad
13.	2002 – 2007	Čedo Petrović	General Director of Eximbanka ad Belgrade
14.	2007 – 2008	Sonja Miladinovski	Societe General Bank ad Belgrade
15.	2013 – 2015	Filip Jelić	Erste Bank ad Belgrade
16.	2015 -	Branko Petrović	Unicredit banka ad Beograd ACI FMA & Europe co-President (from November 2020)

Source: Prepared from the Archives of the Association of Serbian Banks, 2026

In addition to the banks and their representatives - ACI members themselves, when it comes to institutions, the Association of Banks of Yugoslavia/Association of Serbian Banks and the National Bank of Yugoslavia/National Bank of Serbia have played a significant role in the development of ACI since its foundation. Also, it is important to emphasise the importance of the synergy created thanks to the cooperation of all parties, both the institution and the individuals themselves and personal efforts. So, it can be stated with certainty that the driver - *Spiritus movens* of ACI through time is actually the people, their expertise and commitment to cooperation and a higher goal.

5. Visual Identity of ACI Serbia Through Time

Over several decades, the visual identity changed in accordance with the changes in the name of the association itself. Figure 6 shows all visual solutions in the history of ACI Serbia.

Figure 6. Visual Solutions in the History of ACI Serbia

Source: Association of Serbian Banks, 2025.

Conclusion

The occasion for the work and retrospective is the annual assembly of ACI 2025, on the 50th anniversary of the establishment of the professional association of foreign exchange dealers, holders of complex and important banking work under the umbrella of the Association of Banks on 22 March 1975. Despite all the significant changes in the environment throughout the decades, the Association of Banks has shown in the new conditions that it represents a natural environment for the gathering of its colleagues, foreign exchange dealers, and members of ACI Serbia.

From the very beginning until today, the main goals and tasks of ACI Serbia have been the improvement of the professional activities of its members, their professional development, growth and nurturing of business and friendly relations of members based on mutual trust, professional ethics, morals and honesty, regardless of national, religious or political affiliation. Belonging to the same profession and applying an ethical approach in their activities, ACI members strive to provide the best service, especially by establishing personal and friendly relations between all those who are engaged in these activities. Education is an important part of membership activities, so the possibility of training professionals, as well as taking exams in the ACI international test centre at the Bank Training Centre of the Association of Serbian Banks, is continuously open. In this way, as an institution, the Association of Serbian Banks supports not only education, but also the importance of specialist knowledge, qualifications and their further recognition in personal professional development and the labour market.

Also, by cooperating with professional bodies of the Association of Serbian Banks and other institutions of the financial sector in the country, ACI Serbia contributes to the improvement of the work of various segments of the financial markets in the country. The recent era has also been marked by great-er involvement of ACI Serbia representatives in ACIFMA, the international association for financial markets on a global level . In cooperation with the Association of Serbian Banks, ACI Serbia regularly organises Assemblies that have both formal and educational character and that bring together the ACI members, as well as numerous experts from the country and abroad.

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AML I USAGLAŠENOST: ORIJENTISAN KA UPRAVLJANJU SLUČAJEVIMA I TROŠKOVNO EFIKASAN PRISTUP ZA MODERNE BANKE

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Rezime *Borba protiv pranja novca prolazi kroz transformaciju. Stroža regulativa, rastući troškovi usaglašenosti i potražnja za AML praćenjem u realnom vremenu vrše pritisak na finansijske institucije da preispitaju svoje strategije za borbu protiv pranja novca. Ovaj članak istražuje evoluciju AML tehnologije, naglašavajući pomak ka modularnim rešenjima zasnovanim na slučajevima koja smanjuju lažno pozitivne rezultate i regulatorni rizik, uz optimizaciju operativnih troškova. Predstavlja se praktičan pristup koji je zauzela kompanija Natech, koji trenutno pokriva preko 15 institucija sa svojim AML rešenjem, uključujući i njegovu implementaciju u okviru Pošte Grčke (Hellenic Post). Ovo ilustruje kako banke mogu istovremeno postići izvrsnost u usklađenosti i operativnu efikasnost. Članak se zaključuje naglašavajući potrebu za agilnošću, automatizacijom i modularnošću u AML sistemima koji mogu da se skaliraju sa složenošću i rastom institucije.*

Ključne reči: AML, sprečavanje pranja novca, tehnologija usklađenosti, lažno pozitivni rezultati, AML zasnovan na slučajevima, Natech, Hellenic Post, modularno bankarstvo, operativna efikasnost, Regtech

AML u 2026. godini: snalaženje sa promenama u propisima i operacijama

Zašto toliko institucija i dalje zaboravlja najkritičnije aspekte svoje AML odbrane, uprkos tome što regulatorni nadzor i kazne postaju sve strože?

U današnjem finansijskom okruženju, komplajans se ne odnosi samo na zadovoljavanje regulatornih kontrolnih lista. To je osnovni stub poverenja i institucionalne otpornosti. Sa implementacijom paketa EU za sprečavanje pranja novca, finansijske institucije se sada obavezuju višim standardima praćenja u realnom vremenu, pri čemu se lična i krivična odgovornost sve više povezuje sa propustima u nadzoru.

Razmotrite red veličina: Starling banka je kažnjena sa 35 miliona evra u 2024. godini zbog nedostataka u svojim operacijama AML-a; Klarna se iste godine suočila sa kaznom od 43 miliona evra. Polovina svih troškova usklađenosti sa finansijskim kriminalom (FCC) sada je povezana sa AML, a mnoge banke prijavljuju porast troškova osoblja za komplajans od 72% u proteklih 12 meseci.

Ovaj odnos rizika i troškova ubrzava prelazak na pametnije AML sisteme - sisteme koji ne samo da vrše monitoring, već i razmišljaju, smanjuju konfuziju i prilagođavaju se u realnom vremenu.

AML sistem zasnovan na slučajevima

Pravi izazov u AML danas nije samo uočavanje jednokratnih anomalija; pravi izazov je smisleno analizirati ponašanja i kontekste koji stoje iza anomalija i upućuju na njihov značaj.

Tradicionalne AML platforme često se oslanjaju na statične metode koje uključuju samo listu pravila, koje, iako su funkcionalne, imaju tendenciju da generišu velike količine lažno pozitivnih rezultata, što dovodi do slabljenja reakcije na upozorenja, izgubljenog vremena na istrage i na kraju, do propuštanja stvarnih pretnji. Natech-ovo AML rešenje ima drugačiji pristup uvođenjem AML obrade zasnovane na slučajevima, gde su upozorenja kontekstualizovana, povezana, eskalirana i rešena u jedinstvenom okruženju.

Umesto da izoluje svako upozorenje, Natech-ov sistem stvara i povezuje slučajeve, primenjujući logiku praga i omogućuje revizijske tragove koji omogućavaju istražiteljima da se fokusiraju na sumnjivo ponašanje, a ne na „buku“. Višeslojne kontrole, protokoli eskalacije i automatizovano izveštavanje omogućavaju AML timovima da smanje ručne intervencije uz povećanje sledljivosti i spremnosti na regulatorne revizije.

Ova promena rezultira značajnim smanjenjem lažno pozitivnih rezultata i ubrzava proces trijaže upozorenja, oslobađajući oskudne resurse usklađenosti i minimizirajući institucionalnu izloženost riziku.

Integracija i automatizacija: osnove, a ne opcionalne karakteristike

Kritični izazov u modernizaciji AML-a danas leži u postojanju silosa podataka i lošoj interoperabilnosti raznorodnih sistema. Natech-ova platforma je unapred integrisana sa osnovnim listama praćenja i dizajnirana je da neprimetno radi sa postojećim osnovnim informacionim i bankarskim sistemima za klijente (CID). Ova platforma pruža podršku u realnom vremenu, skoro uživo, i omogućuje serijsko bodovanje kupaca, ugovornih strana i grupa.

Ovaj dizajn je posebno relevantan za male i srednje banke, od kojih mnoge posluju sa malim timovima i ne mogu priuštiti složenost više dobavljača. Ugradnjom unapred definisanih pravila i korišćenjem više pragova odlučivanja, sistem povećava efikasnost i kvalitet FCC operacija.

Ono što dodatno razlikuje Natech je njegov fleksibilan model primene. Institucije mogu vršiti korisničko testiranje, predprodukcijska i proizvodna okruženja na virtuelnim jedinicama, u oblaku ili na fizičkoj infrastrukturi, osiguravajući kontrolu nad suverenitetom podataka uz održavanje visoke dostupnosti.

Studija slučaja: Hellenic Post Credit

Istaknuti primer Natech-ovog pristupa u praksi je primer Pošte Grčke - Hellenic Post Credit. Suočena sa rastućim troškovima usklađenosti i potrebom za modernizacijom nasleđenih sistema, ova institucija je implementirala Natech-ovu AML platformu sa ciljem postizanja regulatorne robusnosti uz primerenu efikasnost.

U roku od nekoliko nedelja od implementacije, banka je izvestila o sledećem:

- Merljivo smanjenje lažno pozitivnih rezultata, olakšavanje istražnih radnji;
- Poboljšano vreme rešavanja slučajeva zahvaljujući pojednostavljenim funkcijama upravljanja predmetima;
- Besprekorna integracija sa nasleđem osnovnog (core) sistema institucije, bez poremećaja;
- Snažne pozitivne povratne informacije tokom internih i eksternih revizija.

Ova primena ilustruje kako čak i tradicionalno strukturirane finansijske institucije mogu usvojiti AML sistem koji je najbolji u klasi.

Prilagodljivost u doba regulacije i rizika

Jedan od najčešće citiranih izazova među bankama u regionu je sposobnost da budu usklađene sa pravilima koja se razvijaju bez zaključavanja u velike, monolitne sisteme. Natech-ovo AML rešenje izdvaja se zbog svoje modularne strukture zasnovane na pravilima koja omogućava bankama da se postepeno prilagode.

Na primer, pored svog sistema pravila, Natech-ov AML sistem omogućava autonomni skrining transakcija i skoring zasnovan na profilu. AML liste nisu samo statički integrisane, već banke mogu lako priključiti nacionalne, regionalne ili specifične liste institucija na zahtev.

Štaviše, kompatibilnost platforme sa ISO 27001: 2022 i podrška za više protokola za autentifikaciju pružaju sigurnost IT službenicima i službenicima za rizike koji se nose sa sve većim očekivanjima privatnosti podataka i sajber sigurnosti.

Pogled unapred: AML kao strateška infrastruktura

AML više nije samo izolovana briga o usklađenosti, već postaje temeljni element strategije upravljanja rizikom i agilnosti poslovanja. Pošto se finansijski kriminal razvija, institucije moraju da se razvijaju brže.

Budućnost će nagraditi banke koje usvajaju AML sisteme zasnovane na automatizaciji sa modularnom arhitekturom, tj. sisteme koji razmišljaju u smislu nivoa eskalacije, a ne samo upozorenja, i koji koriste podatke u realnom vremenu, a ne retrospektivne izveštaje o usklađenosti. Sistemi moraju biti dovoljno fleksibilni da se skaliraju, ali dovoljno robusni da podrže regulatorne zahteve bez ometanja poslovanja.

Natech-ov AML pristup, potvrđen kroz implementaciju u Hellenic Post Credit, na primer, i ugrađen u institucije sledeće generacije kao što je Snappi banka, pokazuje da je moguće ispuniti nove AML standarde bez preopterećenja internih resursa ili ugrožavanja performansi.

Zaključak

Dok se finansijske institucije na Balkanu i širom južne Evrope pripremaju za još strožije regulatorne zahteve i povećane operativne izazove, unapređenje AML-a nije opciono, već je strateško pitanje. AML rešenja zasnovana na slučajevima (case based), kao što je Natech, nude opipljiv put ka usklađenosti, efikasnosti i dugoročnoj otpornosti na ove rizike.

Za banke koje ne žele samo da prate ambicije, već i budu predvodnici u poverenju, transparentnosti i isplativosti – budućnost počinje modernizacijom načina na koji se bore protiv finansijskog kriminala.

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AML BEYOND COMPLIANCE: A CASE-BASED, COST-EFFICIENT APPROACH FOR MODERN BANKS

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Summary *The fight against money laundering is undergoing a transformation. Stricter regulation, rising compliance costs, and the demand for real-time AML monitoring are putting pressure on financial institutions to rethink their anti-money laundering strategies. This article explores the evolution of AML technology, highlighting the shift towards modular, case-based solutions that reduce false positives and regulatory risk while optimizing operating costs. The practical approach taken by Natech is presented, which currently covers over 15 institutions with its AML solution, including its implementation within the Hellenic Post. This illustrates how banks can achieve compliance excellence and operational efficiency at the same time. The article concludes by emphasizing the need for agility, automation, and modularity in AML systems that can scale with the complexity and growth of the institution.*

Keywords: AML, Anti-Money Laundering, Compliance Technology, False Positives, Case-Based AML, Natech, Hellenic Post, Modular Banking, Operational Efficiency, Regtech

AML in 2026: Navigating Shifting Regulations and Operations

Why do so many institutions continue to overlook the most critical aspects of their AML defenses, even as regulatory scrutiny grows tighter and penalties become more severe?

In today's financial environment, compliance is not only about satisfying regulatory checklists. It is a core pillar of trust and institutional resilience. With the implementation of the EU AML Package, financial institutions are now held to higher standards of real-time monitoring, with personal and criminal liability increasingly linked to oversight failures.

Consider the magnitude: Starling Bank was fined €35 million in 2024 for deficiencies in its AML operations; Klarna faced a €43 million penalty the same year. Half of all financial crime compliance (FCC) costs are now labor-related, with many banks reporting a 72% rise in compliance staffing expenses over the past 12 months.

This confluence of risk and cost is accelerating the shift toward smarter AML systems – systems that do not just monitor, but reason, reduce noise, and adapt in real time.

The Case for Case-Based AML

The true challenge in AML today is not just spotting one-off anomalies; but making sense of the behaviors and context behind them that reveal their significance.

Traditional AML platforms often rely on static, rules-only engines, which, while functional, tend to gen-erate high volumes of false positives, leading to alert fatigue, wasted investigation time, and ultimately, missed threats. Natech's AML solution takes a different approach by introducing case-based AML pro-cessing, where alerts are contextualized, linked, escalated, and resolved within a unified environment.

Rather than isolating each alert, Natech's system creates and links cases, applying threshold logic and audit trails that allow investigators to focus on suspicious behavior rather than noise. Multi-level drill-downs, escalation protocols, and automated reporting enable teams to reduce manual interventions while increasing traceability and regulatory audit readiness.

This shift results in a significant reduction of false positives and accelerates the alert triage process, freeing up scarce compliance resources and minimizing institutional exposure to risk.

Integration and Automation: Essentials, Not Features

A critical challenge in AML modernization lies in data silos and poor system interoperability. Natech's platform is pre-integrated with essential watchlists and designed to work seamlessly with existing Core Banking and Customer Information Systems (CID). It supports real-time, near-live, and batch scoring across customers, counterparties, and groups.

This design is particularly relevant for small and mid-sized banks, many of which operate with lean teams and cannot afford multi-vendor complexity. By embedding pre-defined rules and leveraging multiple decision thresholds, the system enhances both the efficiency and quality of FCC operations.

What differentiates Natech further is its flexible deployment model. Institutions can host UAT, pre-production, and production environments on VMs, in the cloud, or on physical infrastructure, ensuring control over data sovereignty while maintaining high availability.

Case Study: Hellenic Post Credit

A prominent example of this approach in action is Hellenic Post Credit. Facing rising compliance costs and the need to modernize legacy systems, the institution deployed Natech's AML platform with the aim of achieving both regulatory robustness and cost-efficiency.

Within weeks of deployment, the bank reported:

- A measurable reduction in false positives, easing investigative workloads
- Improved case resolution times due to streamlined case management features
- Seamless integration with the institution's legacy core system, avoiding disruption
- Strong positive feedback during supervisory audits

This deployment illustrates how even traditionally structured financial institutions can adopt a best-in-class AML posture without engaging in a risky or disruptive transformation process.

Adaptability in the Age of Regulation and Risk

One of the most cited challenges among regional and cooperative banks is the ability to remain compliant with evolving rules without locking into large, monolithic systems. Natech's AML solution stands out because of its modular, rule-based structure that allows banks to incrementally adapt.

For example, in addition to its rule engine, the system enables autonomous transaction screening and profile-based scoring. Watchlists are not static integrations; banks can easily plug in national, regional, or institution-specific lists on demand.

Furthermore, the platform's compatibility with ISO 27001:2022 and support for multiple authentication protocols provide assurance to IT and risk officers navigating increasing data privacy and cybersecurity expectations.

Looking Ahead: AML as Strategic Infrastructure

AML is no longer an isolated compliance concern; it's becoming a foundational element of operational risk strategy and business agility. As financial crime evolves, institutions must evolve faster.

The future will reward banks that adopt case-based, automation-driven AML systems with modular architecture – i.e., systems that think in terms of escalation paths, not alerts, and that leverage real-time data, not retrospective compliance reports. Systems must be flexible enough to scale, yet robust enough to support regulatory audits without disruption.

The Natech AML approach, validated through deployments like Hellenic Post Credit and embedded into next-generation institutions such as Snappi Bank, demonstrates that it is possible to meet the new AML standard without overburdening internal resources or compromising on performance.

Conclusion

As financial institutions in the Balkans and across Southern Europe prepare for stricter regulatory landscapes and heightened operational demands, rethinking AML is not optional, it is strategic. Case-based AML solutions, such as Natech's, offer a tangible pathway to compliance, efficiency, and longterm resilience.

For banks seeking to do more than just keep up with ambitions to lead in trust, transparency, and cost efficiency – the future starts by modernizing the way financial crime is fought.

BEOGRADSKA BERZA
BELGRADE STOCK EXCHANGE

BAROMETAR / BAROMETER

Novembar 2025 – Januar 2026.
November 2025 – January 2026.

1. PROMET / TURNOVER

Mesec/ Month	Listing	Open Market	Regulisano tržište/ Regulated market	MTP/ MTF	Ukupno/ Total	Broj transakcija/ Number of transactions
Novembar 2025./ November , 2025	806.067.320	87.065.337	893.132.657	0	893.132.657	632
Decembar 2025./ December , 2025	6.176.509.892	74.284.248	6.250.794.140	0	6.250.794.140	673
Januar 2025./ January, 2025	1.646.470.494	42.247.210	1.688.717.704	0	1.688.717.704	505
Ukupno 3 meseca/ 3-Month Total	8.629.047.706	203.596.795	8.832.644.501	0	8.832.644.501	1810

*RSD

2. INDEKSI / INDICES

Novembar 2025 – Januar 2026/ November 2025 – January 2026		BELEX15	BELEXline
	Poslednja vrednost / Last value	1.278,45	2.849,98
	Promena (abs) / Change (abs)	36,55	-7,78
	Promena (%) / Change (%)	2,94%	-0,27%
	Najviša vrednost / Maximum value	1.293,92	2.874,21
	Najniža vrednost / Minimum value	1.227,78	2434,78
	Istorijski max / History maximum value	3.335,2	5007,34
	Istorijski min / History minimum value	347,46	841,99
	Vrednost prometa / Value of turnover	224.277.463	240.577.037

3. TRŽIŠNA KAPITALIZACIJA – AKCIJE / MARKET CAPITALIZATION – SHARES

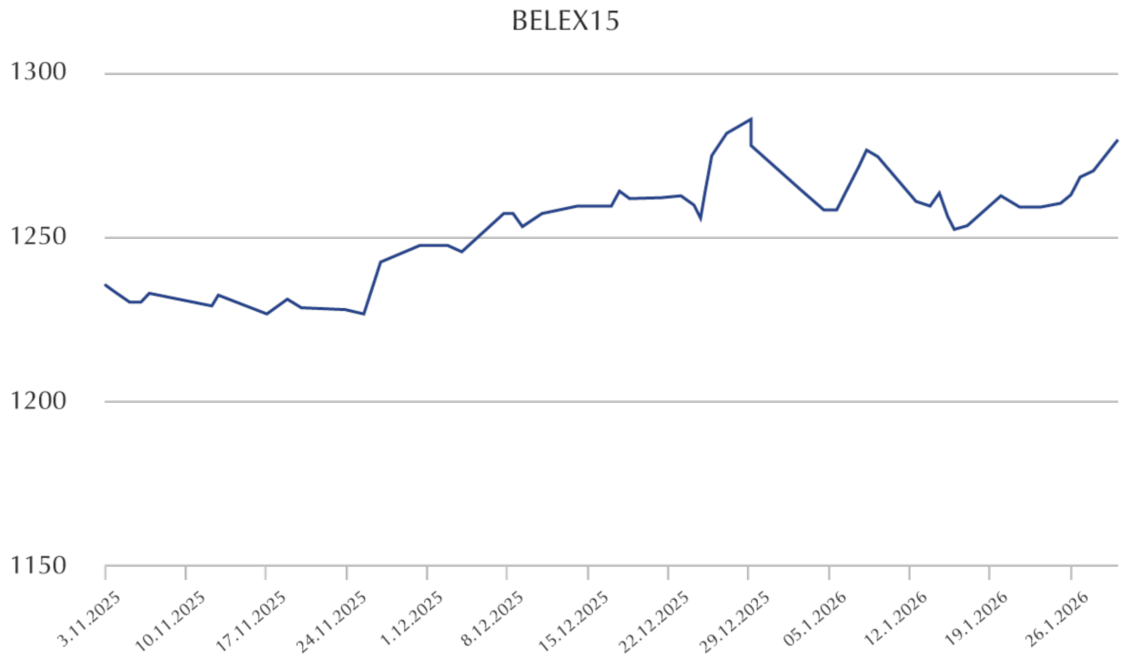
	Novembar/ November	Decembar/ December	Januar/January
Ukupna tržišna kapitalizacija/ Total market capitalisation	508.972.580.932	508.168.419.573	507.520.805.775
Regulisano tržište/ Regulated Market	500.826.982.295	500.023.937.680	499.376.323.882
Prime Listing	220.995.943.155	223.684.570.025	223.311.870.370
Open Market	279.831.039.140	276.339.367.655	276.064.453.512
MTP/MTF	8.145.598.637	8.144.481.893	8.144.481.893
BELEX15	297.692.744.931	302.365.825.212	303.242.972.948
BELEXline	325.414.406.964	329.943.367.725	330.732.282.881

*u hiljadama RSD / in RSD thousands

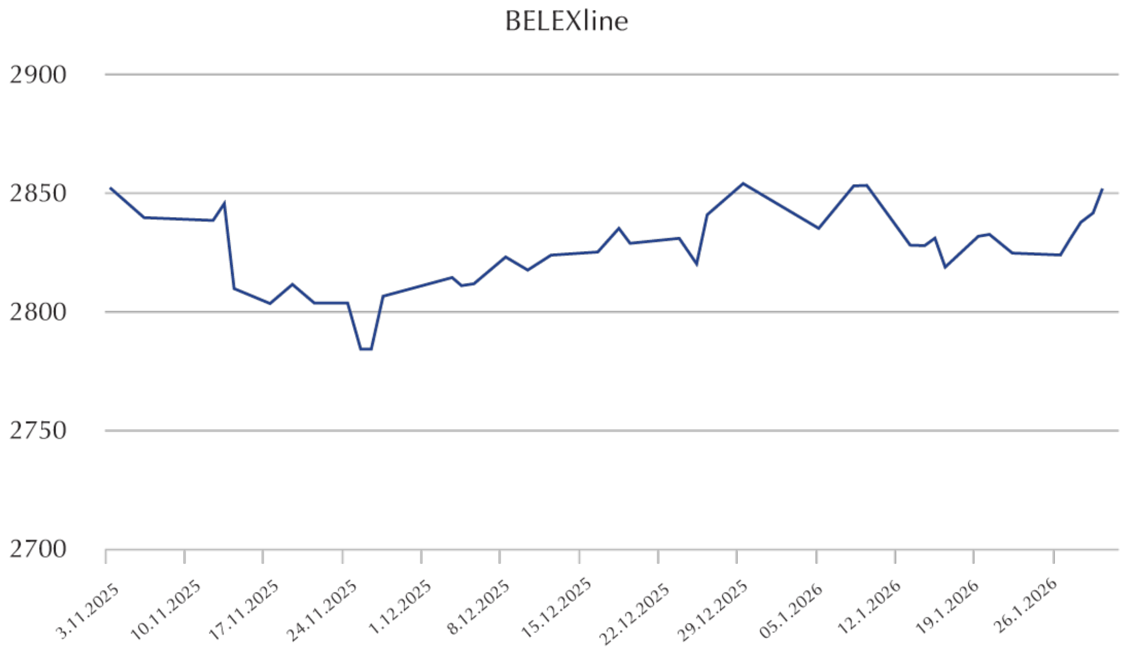
4. UČEŠĆE STRANIH INVESTITORA / FOREIGN INVESTORS PARTICIPATION

November 2025 – Januar 2026/ November 2025 – January 2026	Učešće stranih investitora / Foreign Investors Participation		
	FIS	total	1,80%
		b-FIS	2,54%
		s-FIS	1,05%
	FIB		0,04%
	FIT		0,10%

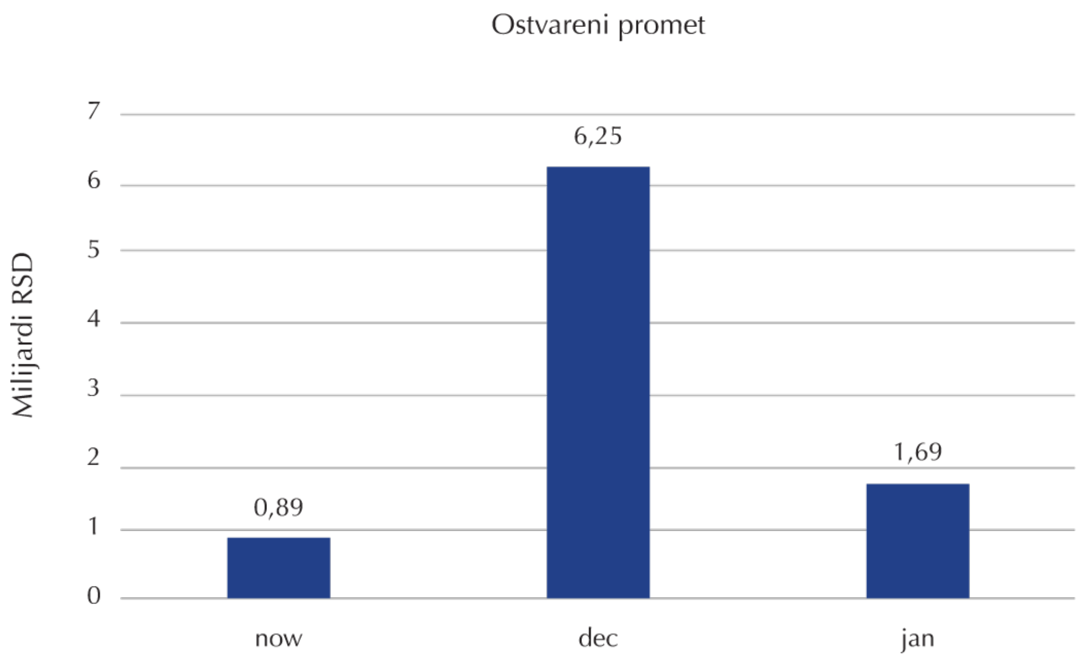
BELEX 15 kretanje novembar 2025 – januar 2026



BELEXline kretanje nov 2025 – jan 2026



Prometi novembar 2025 – januar 2026



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