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UVODNIK

Vladimir Vasić

Urednik časopisa Bankarstvo

U vremenu brzih promena i velikih izazova raste potreba da pred sobom imamo jasne putokaze – i mi bankari, i naši klijenti. U takvim uslovima, više nego ikad važne su nam edukacija i komunikacija.

Za Udruženje banaka edukacija je jedna od najznačajnijih uloga od osnivanja UBS, pre više od 100 godina. Funkcija učenja ostaje ista, ali se menjaju metodi, instrumenti i programi sa kojima radimo. Danas kada rastu globalne neizvesnosti, kada je tehnološki napredak nikad brži, nužno je da razvijamo edukaciju u dva pravca. Sa jedne strane to je obuka samih banaka; na drugoj strani to je edukacija bankarskih klijenata, sadašnjih i potencijalnih i to kako u sektoru stanovništva, tako i u korporativnom sektoru.

Dva pravca edukacije

Uloga edukacije je jedna od najznačajnijih uloga Udruženja banaka Srbije, u sada već preko 100 godina dugoj istoriji postojanja. Prateći razvoj ove funkcije kroz vreme možemo jasno uočiti da načini, instrumenti, programi edukacije koje je UBS razvijalo odražavaju karakter ekonomskog sistema i potrebe učesnika na tržištu. Tako je i danas. Savremeni ekonomski i finansijski odnosi i aktuelni problemi sa kojima se suočavamo od ekonomskih, finansijskih, energetske, itd., zahtevaju adekvatan odgovor i nas kao Udruženja banaka.

Danas u vreme rastućih globalnih neizvesnosti ne samo na finansijskim tržištima, istovremeno jača i potreba za finansijskom edukacijom. Ona se danas razvija u dva najvažnija pravca, kroz edukaciju bankara i kroz edukaciju sadašnjih i potencijalnih bankarskih klijenata, u sektoru stanovništva, tako i u korporativnom sektoru.

Nove usluge....

Da usvajamo novaznanja teraju nas sa jedne strane nove usluge. Finansijsko tržište se ubrzano razvija, sve je veći broj različitih finansijskih posrednika, koji su vezani za tržište kapitala, ili za digitalnu imovinu, na primer. Digitalne inovacije stvaraju nove proizvode na dnevnom nivou i sve to rađa dodatnu potrebu za finansijskom edukacijom. Ona je potrebna nama bankarima kako bismo ne samo dobro vladali svojom ponudom, već i umeli da je na najbolji način predstavimo, pa i prodamo svojim klijentima. Obuka je još više potrebna korisnicima usluga, zato je noviteti u digitalnom bankarstvu predstavljaju potpuno iznenađenje.

... i novi uslovi

Na edukaciju nas teraju i novi uslovi na tržištu. Svedoci smo velikih promena na globalnom nivou, mnoge od njih već možemo nazvati potresima. To su oblasti u kojima trenutno najveći ekonomski umovi sveta traže i ne nalaze pouzdane odgovore, dok naši klijenti traže upravo to: da im jasno, nedvosmisleno i ubedljivo kažemo šta ih čeka u narednom periodu u njihovom poslovanju sa bankama. Zato se komunikacija javlja se kao ogroman izazov za sve nas.

Iskustvo klijenta

Imajući na umu sve navedeno, a znajući i ulogu skiciranu našim aktima, Udruženje banaka je u prethodnom periodu preuzelo na sebe veliki deo obaveza u vezi sa komunikacijom zbivanja na bankarskom tržištu. Jednim delom bila je to savetodavna uloga po pitanju novih tehnologija, proizvoda i usluga. Često je to bila i posrednička uloga u situacijama kada nastane nerazumevanje između klijenata i banaka. Šta nam je pokazalo iskustvo komunikacije iz prethodnog perioda?

U više situacija pokazalo se da kod klijenata nema dovoljno poznavanja bankarskih usluga, prava, ali i obaveza koje iz njih proizilaze. Sa nedostatkom kvalitetnih informacija, klijenti, a posebno građani, češće zapadaju u zabludu ili bivaju izmanipulisani od trećih lica, potencijalno i nedobronamernih. Iz loših informacija, nekada nastaje nerazumevanje, a nekada nesporazum, povremeno pogrešne, ili preterane reakcije.

Vreme velikih turbulencija u svim sferama života upravo naglašava potrebu veće okrenutosti ka klijentu, boljem razumevanju njegovih potreba, ili kako se često kaže: posmatranje sveta iz njegovih cipela. Danas u doba digitalne komunikacije naš klijent nije više pasivni slušalac, on aktivno učestvuje i traži odgovor. Zbog toga je njegovo korisničko iskustvo presudno za izbegavanje potencijalnih novih nerazumevanja, neslaganja i nesporazuma.

Idemo dalje!

Po svim navedenim pitanjima, Udruženje banaka nastavlja posvećeno da radi u interesu banaka, a ono što je veoma važno je kontinuitet u tom radu. Naše upravo završeno savetovanje BankInfo je 30. po redu, što govori o već uspostavljenoj tradiciji; njegov naziv „Budućnost digitalnog tržišta“ govori upravo o tome da se edukujemo u pravcu koji je za poslovanje banaka danas najvažniji.

Kontinuitet se ogleda i u radu samog Udruženja banaka, koje je upravo obnovilo mandat dosadašnjem predsedniku Upravnog odbora Predragu Mihajloviću. U sastavu u kome smo u prethodnom periodu postigli značajne rezultate, uvereni smo da u budućnosti možemo postići i mnogo više, bez obzira na uslove koji su puni turbulencija i izazova.



EDITORIAL

Vladimir Vasić
Editor of Bankarstvo Journal

In a time of rapid changes and great challenges, the need to have clear road signs in front of us is growing - both for us bankers and our clients. In such conditions, education and communication are more important than ever.

For the Association of Serbian Banks, education has been one of the most important roles since the founding of the ASB, more than 100 years ago. The education function remains the same, but the methods, instruments and programs we work with change. Today, when global uncertainties are growing, when technological progress has never been faster, it is necessary to develop education in two directions. On the one hand, it covers the training of the banks themselves; on the other hand, it concerns the education of banking clients, current and potential, both in the private sector, and in the corporate sector.

Two Directions of Education

The role of education is one of the most important roles of the Association of Serbian Banks, in its century-long history. Following the development of this function over time, we can clearly see that the methods, instruments, and education programs developed by the ASB reflect the character of the economic system and the needs of market participants. It is the same today. Contemporary economic and financial relations and the current problems we face from the economic, financial, energy, etc., require an adequate response from us as the Association of Banks. Today, at a time of growing global uncertainty, not limited to the financial markets, the need for financial education is also growing. Today, it is developing in two most important directions, through the education of bankers and through the education of current and potential banking clients, both in the retail and corporate segments.

New Services....

On the one hand, new services force us to adopt new knowledge. The financial market is developing rapidly, there is an increasing number of different financial intermediaries, which are related to the capital market, or to digital assets, for example. Digital innovations create new products on a daily basis, which further creates an additional need for financial education. We bankers need it not only in order to manage our offer well, but also to be able to present it in the best way and sell it to our clients. Training is even more necessary for service users, for whom the innovations in digital banking are a complete surprise.

... and New Conditions

New conditions on the market force us to educate ourselves. We are witnessing big changes on a global level, many of them we can already call earthquakes. These are the areas in which the world's greatest economic minds are currently searching and not finding reliable answers, while our clients are looking for exactly that: to be told clearly, unambiguously, and convincingly what awaits them in the coming period in their dealings with banks. That is why communication presents a huge challenge for all of us.

Client Experience

Bearing in mind all of the above, and knowing the role outlined in our acts, the Association of Banks in the previous period took upon itself a large part of the obligations related to the communication of events on the banking market. In part, it was an advisory role regarding new technologies, products, and services. It was often an intermediary role in situations where there was a misunderstanding between clients and banks. What did the experience of communication from the previous period show us?

In several situations, it has been shown that clients do not have sufficient knowledge of banking services, rights, and obligations arising from them. With a lack of quality information, clients, and especially citizens, are more often misled or manipulated by potentially malicious third parties. Bad information can sometimes cause misunderstandings and disputes, and sometimes they can provoke wrong or exaggerated reactions. The time of great turbulence in all spheres of life emphasises the need for a greater focus on the client, a better understanding of their needs, or as it is often said: walking a mile in their shoes. Today, in the age of digital communication, our client is no longer a passive listener, they actively participate and seek answers. Therefore, their user experience is crucial to avoid potential new misunderstandings, disagreements, and misinterpretations.

Onwards!

On all the mentioned issues, the Association of Serbian Banks continues to work dedicatedly in the interest of banks, and what is very important to note is our continuity in that work. Our BankInfo Conference, which was recently held, was the 30th in a row, which speaks of an already established tradition; its title „The Future of the Digital Market“ speaks precisely of the fact that we are educating ourselves in the direction that is the most important for bank operations today. Our continuity of operations is also reflected in the very work of the Association itself, which has just renewed the mandate of the former President of the Board of Directors, Mr Predrag Mihajlović. We continue to operate in the composition in which we have achieved significant results in the previous period, and we are convinced that we can achieve much more in the future, regardless of the general conditions that bring turbulence and challenges.

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EVALUACIJA EFIKASNOSTI BANAKA U SRBIJI KORIŠĆENJEM MABAC METODE

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Rezime

U novije vreme, kao što je poznato, sve se više u cilju što tačnije evaluacije efikasnosti finansijskih institucija koriste različite metode višekriterijumske analize. Jedna od njih je i MABAC (Multi-Attributive Border Approximation area Comparison) metoda. Imajući to u vidu, u ovom radu se analizira efikasnost banaka u Srbiji na bazi ove metode. Dobijeni rezultati istraživanja efikasnosti banaka u Srbiji na bazi MABAC metode pokazuju da je na prvom mestu Banca Intesa a.d. Beograd. Na rangiranje banaka u Srbiji prema MABAC metode uticali su brojni makro i mikro faktori (ekonomska klima, strane direktne investicije, devizni kurs, inflacija, zaposlenost, životni standard stanovništva, finansiranje infrastrukturnih projekata i drugi). Negativan je uticaj pandemije korona virusa Covid-19 na efikasnost banaka u Srbiji. Zabeležen je smanjeni broj zaposlenih i „zamrznute” su kreditne aktivnosti. To se i te kako odrazilo na efikasnost banaka u Srbiji. U cilju poboljšanja efikasnosti banaka u Srbiji u budućnosti neophodno je što efikasnije upravljati ljudskim resursima, aktivom, kapitalom, prihodima i profitom.

Ključne reči: efikasnost, banke, Srbija, determinante, MABAC metoda

Jel klasifikacija: D40, G21

Uvod

U poslednje vreme u cilju što realnije evaluacije efikasnosti preduzeća / finansijskih institucija razvijene su različite metode višekriterijumske analize (Mathew, 2018; Timiryanova, 2020; Okwu, 2020; Singh, 2020; Pachar, 2021; Brezović, 2021; Tsai, 2021; Wang, 2021; Hezer, 2021). Jedna od njih je i MABAC metoda (Pamućar, 2015; Božanić, 2016; Boyanic, 2019, 2020; Işik, 2020; Nedeljković, 2021; Stanujkic, 2021). U ovom radu se, kao predmet istraživanja, vrši analiza efikasnosti banaka u Srbiji na bazi MABAC metode. Cilj i svrha toga je da se utvrdi što realnija situacija kao osnova i pretpostavka za preduzimanje odgovarajućih eksternih i internih mera u funkciji unapređenja efikasnosti banaka Srbije u budućnosti (Lukić, 2020a, b, c, 2021a, b, c, d, e).

U svetu sve je bogatija literatura posvećena analizi efikasnosti preduzeća, odnosno finansijskih institucija na bazi različitih metoda višekriterijumske analize (Ersoy, 2017). To je slučaj i sa literaturom u Srbiji (Cvetkoska, 2021; Lukić, 2010, 2011a, b, 2017, 2018a, b, c, d, 2019a, b, 2020a, b, c, d, e, 2021a, b, c). Međutim, u relevantnoj literaturi ne postoji, koliko je nama poznato, nijedan celoviti rad posvećen evaluaciji efikasnosti banaka u Srbiji primenom MABAC metode (Lukić, 2020a, b, c, 2021a, b, c, d; Liu, 2021). Tu prazninu donekle popunjava ovaj rad, i u tome se, pored ostalog, ogleda njegov naučno-stručni doprinos.

Primarna hipoteza istraživanja analiziranog problema u ovom radu je bazirana na činjenici da je kontinuirana evaluacija u cilju utvrđivanja što realnije situacije polazna osnova i pretpostavka za unapređenje efikasnosti banaka (u konkretnom slučaju Srbije) u budućnosti efikasnijom kontrolom kritičnih faktora i efekata primene preduzetih relevantnih eksternih i internih mera.

Poznavanje realne pozicije konkretne banke na bankarskom tržištu je bitna pretpostavka za unapređenje njene efikasnosti u budućnosti. Značajno je u tom cilju uporediti se sa najboljim bankama (prvih pet) u pogledu efikasnosti poslovanja.

U tome značajnu ulogu ima, pored racio analize, primena različitih metoda višekriterijumske analize, uključujući i MABAC metodu. Ona obezbeđuje u odnosu na racio analizu potpunije sagledavanje realnije situacije u pogledu efikasnosti banaka u Srbiji iz razloga što istovremeno integriše sve izabrane varijable. Na osnovu toga mogu se preduzeti relevantne eksterne i interne mere (ekonomske, organizacione, tehničke prirode; na primer, nova organizaciona struktura banke, digitalizacija celokupnog poslovanja, efikasnija eksterna i interna revizija u funkciji ublažavanja potencijalnih rizika svih vrsta, itd.) u funkciji unapređenja efikasnosti banaka Srbije u budućnosti (Lukić, 2020a, b, c, 2021a, b, c, d; Liu, 2021).

Za potrebe istraživanja tretiranog problema u ovom radu (tj. efikasnost banaka Srbije) empirijski – računovodstveni podaci su dobijeni od Narodne banke Srbije. Računovodstvene informacije (tj. podaci) su „proizvedeni“ u skladu sa relevantnim međunarodnim standardima (Lukic, 2010, 2011a, b, 2016, 2017, 2018a, b, 2019a, b, 2020a, b, c, 2021a, b, c, d). S obzirom na to, ne postoje nikakva ograničenja u pogledu uporedivosti efikasnosti banaka u Srbiji i drugih zemalja, pre svega Evropske unije.

MABAC metoda

MABAC (Multi-Attributive Border Approximation area Comparison) je novija metoda višekriterijumskog odlučivanja koju su razvili Pamučar i Čirović (2015). Osnovna odlika ove metode je u definisanju udaljenosti kriterijumske funkcije svake posmatrane alternative od granične aproksimativne vrednosti. Matematička formulacija MABAC metode sastoji se iz sledećih koraka (Pamućar, 2015; Lukic, 2021c):

Korak 1: Formiranje početne matrice odlučivanja (X).

U ovoj fazi vrši se evaluacija m alternativa po n kriterijuma.

Alternative su prikazane vektorima $A_i = (x_{i1}, x_{i2}, \dots, x_{in})$, gde je x_{ij} vrednost i-te alternative po j-tom kriterijumu ($i = 1, 2, \dots, m; j = 1, 2, \dots, n$).

$$X = \begin{matrix} & C_1 & C_2 & \dots & C_n \\ \begin{matrix} A_1 \\ A_2 \\ \dots \\ A_m \end{matrix} & \begin{bmatrix} x_{11} & x_{12} & \dots & x_{1n} \\ x_{21} & x_{22} & \dots & x_{2n} \\ \dots & \dots & \dots & \dots \\ x_{m1} & x_{m2} & \dots & x_{mn} \end{bmatrix} \end{matrix} \quad (1)$$

gde je m ukupan broj alternativa, n ukupan broj kriterijuma.

Korak 2: Normalizacija elemenata početne matrice (X).

$$N = \begin{matrix} & C_1 & C_2 & \dots & C_n \\ \begin{matrix} A_1 \\ A_2 \\ \dots \\ A_m \end{matrix} & \begin{bmatrix} n_{11} & n_{12} & \dots & n_{1n} \\ n_{21} & n_{22} & \dots & n_{2n} \\ \dots & \dots & \dots & \dots \\ n_{m1} & n_{m2} & \dots & n_{mn} \end{bmatrix} \end{matrix} \quad (2)$$

Elementi normalizovane matrice (N) se dobijaju korišćenjem sledećih jednačina:

a) Za benefitne (prihodovne) tipove kriterijuma (preferirana je visoka vrednost kriterijuma)

$$n_{ij} = \frac{x_{ij} - x_i^-}{x_i^+ - x_i^-} \quad (3)$$

b) Za nebenefitne (troškovne) tipove kriterijuma (poželjna je niža vrednost kriterijuma)

$$n_{ij} = \frac{x_i^+ - x_{ij}}{x_i^+ - x_i^-} \quad (4)$$

gde su x_{ij} , x_i^+ i x_i^- elementi inicijalne matrice odlučivanja (X), pri čemu su x_i^+ i x_i^- definisani kao:

$x_i^+ = \max(x_1, x_2, \dots, x_m)$ i predstavljaju maksimalne vrednosti posmatranog kriterijuma po alternativama.

$x_i^- = \min(x_1, x_2, \dots, x_m)$ predstavlja minimalne vrednosti posmatranog kriterijuma po alternativama.

Korak 3: Proračun elemenata težinske matrice (V).

Elementi težinske matrice (V) se izračunavaju na sledeći način:

$$V_{ij} = w_i g(n_{ij} + 1) \quad (5)$$

gde su n_{ij} elementi normalizovane matrice (N), w_i težinski koeficijenti kriterijuma.

Na bazi prethodne jednačine dobija se sledeća težinska matrica V

$$V = \begin{bmatrix} v_{11} & v_{12} & \dots & v_{1n} \\ v_{21} & v_{22} & \dots & v_{2n} \\ \dots & \dots & \dots & \dots \\ v_{m1} & v_{m2} & \dots & v_{mn} \end{bmatrix} = \begin{bmatrix} w_1 g(n_{11} + 1) & w_2 g(n_{12} + 1) & \dots & w_n g(n_{1n} + 1) \\ w_1 g(n_{21} + 1) & w_2 g(n_{22} + 1) & \dots & w_n g(n_{2n} + 1) \\ \dots & \dots & \dots & \dots \\ w_1 g(n_{m1} + 1) & w_2 g(n_{m2} + 1) & \dots & w_n g(n_{mn} + 1) \end{bmatrix} \quad (6)$$

gde su n ukupan broj kriterijuma, m ukupan broj alternativa.

Korak 4: Određivanje matrice graničnih aproksimativnih oblasti (G).

Granična aproksimativna oblast (BAA) za svaki kriterijum se određuje prema sledećem izrazu:

$$g_i = \left(\prod_{j=1}^m v_{ij} \right)^{1/m} \quad (7)$$

gde su v_{ij} elementi težinske matrice (V), m ukupan broj alternativa.

Posle izračunavanja vrednosti g_i za svaki kriterijum, formira se matrica graničnih aproksimativnih oblasti (G) formata $n+1$ (n predstavlja ukupan broj kriterijuma po kojima se vrši izbor ponuđenih alternativa):

$$G = \begin{bmatrix} C_1 & C_2 & \dots & C_n \\ g_1 & g_2 & \dots & g_n \end{bmatrix} \quad (8)$$

Korak 5: Proračun elemenata matrice udaljenosti alternativa od granične aproksimativne oblasti (Q).

$$Q = \begin{bmatrix} q_{11} & q_{12} & \dots & q_{1n} \\ q_{21} & q_{22} & \dots & q_{2n} \\ \dots & \dots & \dots & \dots \\ q_{m1} & q_{m2} & \dots & q_{mn} \end{bmatrix} \quad (9)$$

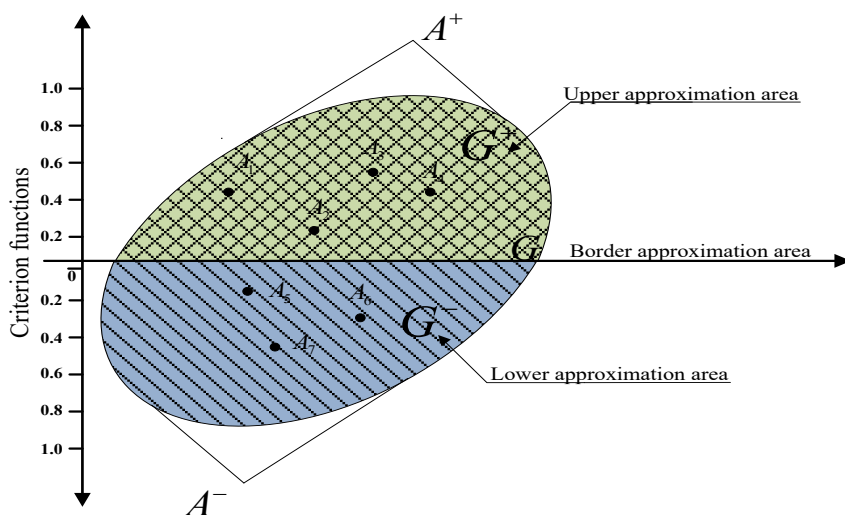
Udaljenost alternativa od granične aproksimativne oblasti (q_{ij}) određuje se kao razlika između elemenata težinske matrice (V) i vrednosti graničnih aproksimativnih oblasti (G).

$$Q = V - G = \begin{bmatrix} v_{11} & v_{12} & \dots & v_{1n} \\ v_{21} & v_{22} & \dots & v_{2n} \\ \dots & \dots & \dots & \dots \\ v_{m1} & v_{m2} & \dots & v_{mn} \end{bmatrix} - \begin{bmatrix} q_1 & q_2 & \dots & q_n \\ q_1 & q_2 & \dots & q_n \\ \dots & \dots & \dots & \dots \\ q_1 & q_2 & \dots & q_n \end{bmatrix} \quad (10)$$

$$Q = \begin{bmatrix} v_{11} - g_1 & v_{12} - g_2 & \dots & v_{1n} - g_n \\ v_{21} - g_1 & v_{22} - g_2 & \dots & v_{2n} - g_n \\ \dots & \dots & \dots & \dots \\ v_{m1} - g_1 & v_{m2} - g_2 & \dots & v_{mn} - g_n \end{bmatrix} - \begin{bmatrix} q_{11} & q_{12} & \dots & q_{1n} \\ q_{21} & q_{22} & \dots & q_{2n} \\ \dots & \dots & \dots & \dots \\ q_{m1} & q_{m2} & \dots & q_{mn} \end{bmatrix} \quad (11)$$

gde su g_i granična aproksimativna oblast za kriterijum C_i , v_{ij} elementi težinske matrice (V), n broj kriterijuma, m broj alternativa.

Alternativa A_i može da pripada graničnoj aproksimativnoj oblasti (G), gornjoj aproksimativnoj oblasti (G^+) ili donjoj aproksimativnoj oblasti (G^-) tj. $A_i \in \{G \cup G^+ \cup G^-\}$. Gornja aproksimativna oblast (G^+) je oblast u kojoj se nalazi idealna alternativa (A^+) a donja aproksimativna oblast je oblast u kojoj se nalazi anti-idealna alternativa (A^-) (Slika 1).



Slika 1. Prikaza gornje (G^+), donje (G^-) i aproksimativne oblasti
Izvor: Pamučar, 2015

Pripadnost alternative A_i aproksimativnoj oblasti (G , G^+ ili G^-) određuje se na osnovu sledeće jednačine:

$$A_i \in \begin{cases} G^+ & \text{if } q_{ij} > 0 \\ G & \text{if } q_{ij} = 0 \\ G^- & \text{if } q_{ij} < 0 \end{cases} \quad (12)$$

Da bi alternativa A_i bila izabrana kao najbolja iz skupa potrebno je da po što većem broju kriterijuma pripada gornjoj aproksimativnoj oblasti (G^+).

Ukoliko, na primer alternativa A_i po 5 kriterijuma (od ukupno 6 kriterijuma) pripada gornjoj aproksimativnoj oblasti, a po jednom kriterijumu pripada donjoj aproksimativnoj oblasti (G^-), to znači, drugim rečima, da je po 5 kriterijuma alternativa bliska ili jednaka idealnoj alternativni, dok je po jednom kriterijumu bliska ili jednaka anti-idealnoj alternativni.

Ako je vrednost $q_{ij} > 0$, tj. $q_{ij} \in G^+$, tada je alternativa A_i blizu ili jednaka idealnoj alternativni. Međutim, ukoliko je $q_{ij} < 0$, tj. $q_{ij} \in G^-$, tada je alternativa A_i blizu ili jednaka anti-idealnoj alternativni (Pamučar, 2015).

Korak 6: Rangiranje alternativa.

Proračun vrednosti kriterijumskih funkcija po alternativama (13) dobija se kao suma rastojanja alternativa od graničnih aproksimativnih oblasti (q). Sumiranjem elemenata matrice Q po redovima dobijaju se konačne vrednosti kriterijumskih funkcija alternativa:

$$S_i = \sum_{j=1}^n q_{ij} \quad j = 1, 2, \dots, n \quad i = 1, 2, \dots, m \quad (13)$$

gde su n broj kriterijuma, m broj alternativa.

Merenje efikasnosti banaka u Srbiji primenom MABAC metode: rezultati i diskusija

Merenje efikasnosti banaka u Srbiji korišćenjem MABAC metode zasnovano je na sledećim pretpostavkama:

1) Kriterijumi su: C1 – Troškovi zarada, naknada zarada i ostali lični rashodi, C2 – Aktiva, C3 – Kapital, C4 – Ukupan neto poslovni prihod i C5 – Neto rezultat.

2) Alternative su posmatrane banke: A1 – API Bank a.d. Beograd, A2 – Addiko Bank a.d. Beograd, A3 – Agroindustrijsko komercijalna banka AIK banka a.d. Beograd, A4 – Banca Intesa a.d. Beograd, A5 – Bank of China Srbija a.d. Beograd, A6 – Banka Poštanska štedionica a.d. Beograd, A7 – Crédit Agricole banka Srbija a.d. Novi Sad, A8 – Direktna banka a.d. Kragujevac, A9 – Erste Bank a.d. Novi Sad, A10 – Eurobank a.d. Beograd, A11 – Expobank a.d. Beograd, A12 – Halkbank a.d. Beograd, A13 – ALTA banka a.d. Beograd, A14 – Komercijalna banka a.d. Beograd, A15 – MIRABANK a.d. Beograd, A16 – MTS banka a.d. Beograd, A17 – NLB banka a.d. Beograd, A18 – OTP Banka Srbija a.d. Beograd, A19 – Opportunity banka a.d. Novi Sad, A20 – ProCredit Bank a.d. Beograd, A21 – Raiffeisen banka a.d. Beograd, A22 – Sberbank Srbija a.d. Beograd, A23 – Srpska banka a.d. Beograd, A24 – Mobi Banka a.d. Beograd, A25 – Unicredit Bank Srbija a.d. Beograd, A26 – Vojvodanska banka a.d. Novi Sad.

U Tabeli 1. su prikazani inicijalni podaci za merenje efikasnosti banaka u Srbiji primenom MABAC metode za 2020.

Tabela 1. Inicijalni podaci

	Troškovi zarada, naknada zarada i ostali lični rashodi	Aktiva	Kapital	Ukupan neto poslovni prihod	Neto rezultat	Učešće u ukupnoj aktivnosti (%)*	Učešće u ukupnom neto poslovnom prihodu (%)*	Prinos od aktive (%)*	Prinos od kapitala (%)*	Prinos od ukupnog neto poslovnog prihoda (%)*	Finansijska zaduženost*
API Bank a.d. Beograd	330	10360	1951	240	-413	0.23	0.15	-3.99	-21.2	-172.1	5.310097
Addiko Bank a.d. Beograd	1231	101461	22759	4718	543	2.21	2.88	0.54	2.4	11.5	4.458061

Agroindustrijsko komercijalna banka AIK banka a.d. Beograd	1343	234932	53106	14442	9801	5.11	8.83	4.17	18.5	67.9	4.423832
Banca Intesa a.d. Beograd	6376	717185	109014	26478	9481	15.59	16.18	1.32	8.7	35.8	6.578834
Bank of China Srbija a.d. Beograd	309	12941	1762	304	-174	0.28	0.19	-1.34	-9.9	-57.2	7.344495
Banka Poštanska štedionica a.d. Beograd	4125	290681	26504	11192	2588	6.32	6.84	0.89	9.8	23.1	10.96744
Crédit Agricole banka Srbija a.d. Novi Sad	2077	152176	13707	4984	857	3.31	3.05	0.56	6.3	17.2	11.10206
Direktna banka a.d. Kragujevac	985	60087	11079	3157	660	1.31	1.93	1.10	6.0	20.9	5.423504
Erste Bank a.d. Novi Sad	2507	287003	32929	8649	1333	6.24	5.29	0.46	4.0	15.4	8.715813
Eurobank a.d. Beograd	1984	196239	53676	6447	725	4.26	3.94	0.37	1.4	11.2	3.655992
Expobank a.d. Beograd	301	16276	3465	584	-257	0.35	0.36	-1.58	7.4	-44.0	4.697258
Halkbank a.d. Beograd	958	85015	12488	2778	529	1.85	1.70	0.62	4.2	19.0	6.807735
ALTA banka a.d. Beograd	316	23638	4041	698	12	0.51	0.43	0.05	0.3	1.7	5.849542

Komer- cijalna banka a.d. Beograd	5819	459427	74086	16341	2928	9.99	9.99	0.64	4.0	17.9	6.201266
MIRABANK a.d. Beograd	171	6248	1710	170	-209	0.14	0.10	-3.35	-12.2	-122.9	3.653801
MTS banka a.d. Beograd	287	14387	2330	679	-156	0.31	0.42	-1.08	-6.7	-23.0	6.174678
NLB banka a.d. Beograd	1254	80774	8782	3013	297	1.76	1.84	0.37	3.4	9.9	9.197677
OTP Banka Srbija a.d. Beograd	3343	375876	52039	10018	2353	8.17	6.12	0.63	4.5	23.5	7.222967
Opportunity banka a.d. Novi Sad	726	22355	3852	1875	241	0.49	1.15	1.08	6.3	12.9	5.803479
ProCredit Bank a.d. Beograd	951	148530	17272	3859	687	3.23	2.36	0.46	4.0	17.8	8.599467
Raiffeisen banka a.d. Beograd	3217	377709	63563	14960	5529	8.21	9.14	1.46	8.7	37.0	5.942278
Sberbank Srbija a.d. Beograd	1381	158448	25590	3822	374	3.44	2.34	0.24	1.5	9.8	6.191794
Srpska banka a.d. Beograd	147	19679	3587	474	20	0.43	0.01	0.10	0.6	4.2	5.4862
Mobi Banka a.d. Beograd	758	24047	4135	1037	584	0.52	0.63	2.43	14.1	56.3	5.815478
Unicredit Bank Srbija a.d. Beograd	3204	486496	82950	15266	5334	10.57	9.33	1.10	6.4	34.9	5.864931
Vojvodan ska banka a.d. Novi Sad	3324	239181	30665	7423	-1179	5.20	4.54	-0.49	-3.8	-15.9	7.799804

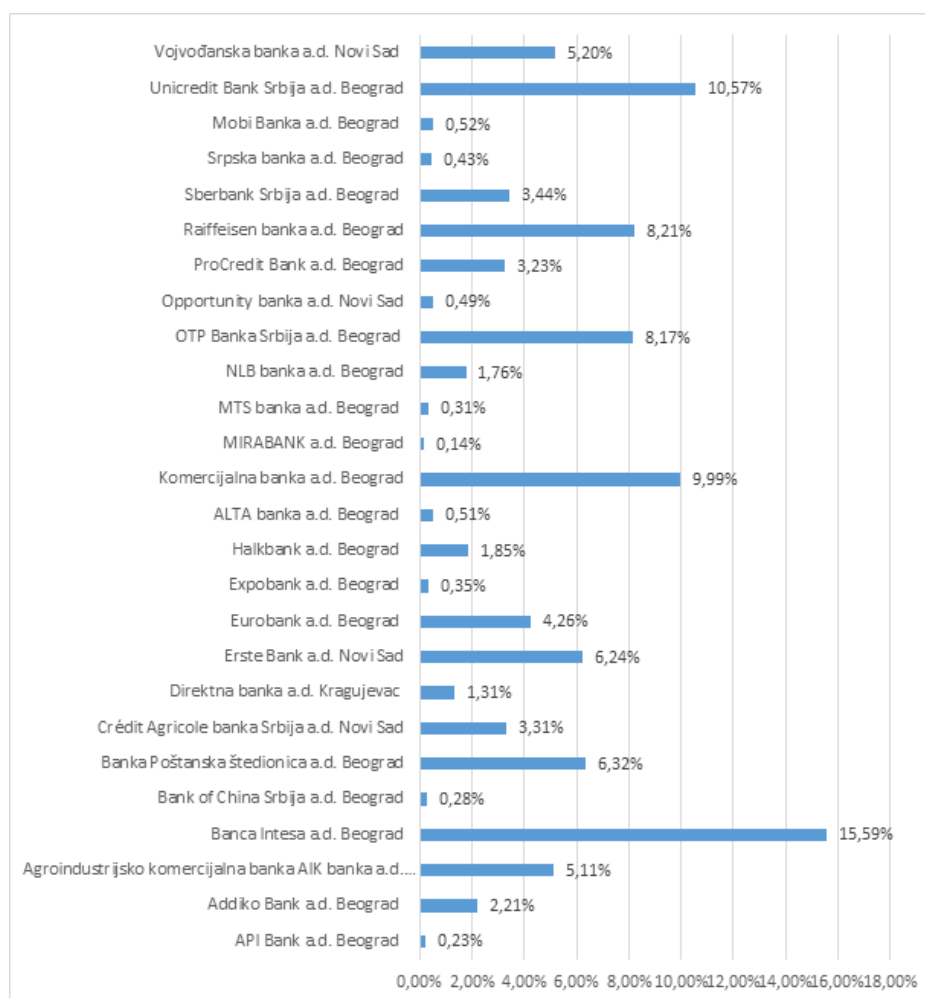
Statistics											
Mean	1823.6538	176967.3462	27578.5385	6292.6154	1634.1538	3.8473	3.8362	.2600	2.0731	.4923	6.5111
Std. Error of Mean	336.48971	36169.82848	5785.73315	1307.22885	559.14482	.78616	.80078	.31670	1.64145	10.08026	.38161
Median	1242.5000	124995.5000	15489.5000	3840.5000	563.5000	2.7200	2.3500	.5000	4.0000	14.1500	6.0585
Std. Deviation	1715.76758	184430.66120	29501.56624	6665.58543	2851.09037	4.00863	4.08320	1.61484	8.36978	51.39942	1.94585
Skewness	1.297	1.299	1.271	1.399	1.988	1.299	1.389	-.637	-.843	-2.119	.892
Std. Error of Skewness	.456	.456	.456	.456	.456	.456	.456	.456	.456	.456	.456
Kurtosis	1.162	1.466	.942	1.844	3.391	1.467	1.818	2.427	1.507	5.136	.588
Std. Error of Kurtosis	.887	.887	.887	.887	.887	.887	.887	.887	.887	.887	.887
The minimum	147.00	6248.00	1710.00	170.00	1179.00	.14	.01	-3.99	-21.20	-172.10	3.65
Maximum	6376.00	717185.00	109014.00	26478.00	9801.00	15.59	16.18	4.17	18.50	6790	11.10
Test Statistics^a											
N	26										
Chi-Square	213.973										
df	10										
Asymp. Sig.	.000										
a. Friedman Test											

Napomena: Podaci su iskazani u milionima dinara. *Autorovo izračunavanje. Prinos od aktive = Neto rezultat / Aktiva. Prinos od kapitala = Neto rezultat / Kapital. Prinos od ukupnog neto poslovnog prihoda = Neto rezultat / Ukupan neto poslovni prihod. Finansijska zaduženost = Aktiva / Kapital. Statistika je izračunata pomoću softverskog programa SPSS

Izvor: Narodna banka Srbije

Postoji značajna statistička razlika između posmatranih varijabli (Asymp. Sig. .000 < .05), tako da se odbacuje nulta hipoteza.

Na Slici 2. je prikazano procentualno tržišno učešće pojedinačnih banaka u ukupnoj bankarskoj aktivi Srbije.



Slika 2. Tržišno učešće prema ukupnoj bankarskoj aktivi Srbije

Izvor: Autorova slika

Top pet banaka prema aktivi u Srbiji su: 1. Banca Intesa a.d. Beograd (15.59%), 2. Unicredit Bank Srbija a.d. Beograd (10.57%), 3. Komercijalna banka a.d. Beograd (9.99%), 4. Raiffeisen banka a.d. Beograd (8.21%) i 5. OTP Banka Srbija a.d. Beograd (8.17%). One zajedno učestvuju u ukupnoj bankarskoj aktivi Srbije sa 52.53%. To znači da značajno kontrolišu bankarsko tržište u Srbiji. Izračunati Herfindahi-Hirschman Index (HHI) je 788, što znači da je slaba koncentracija.

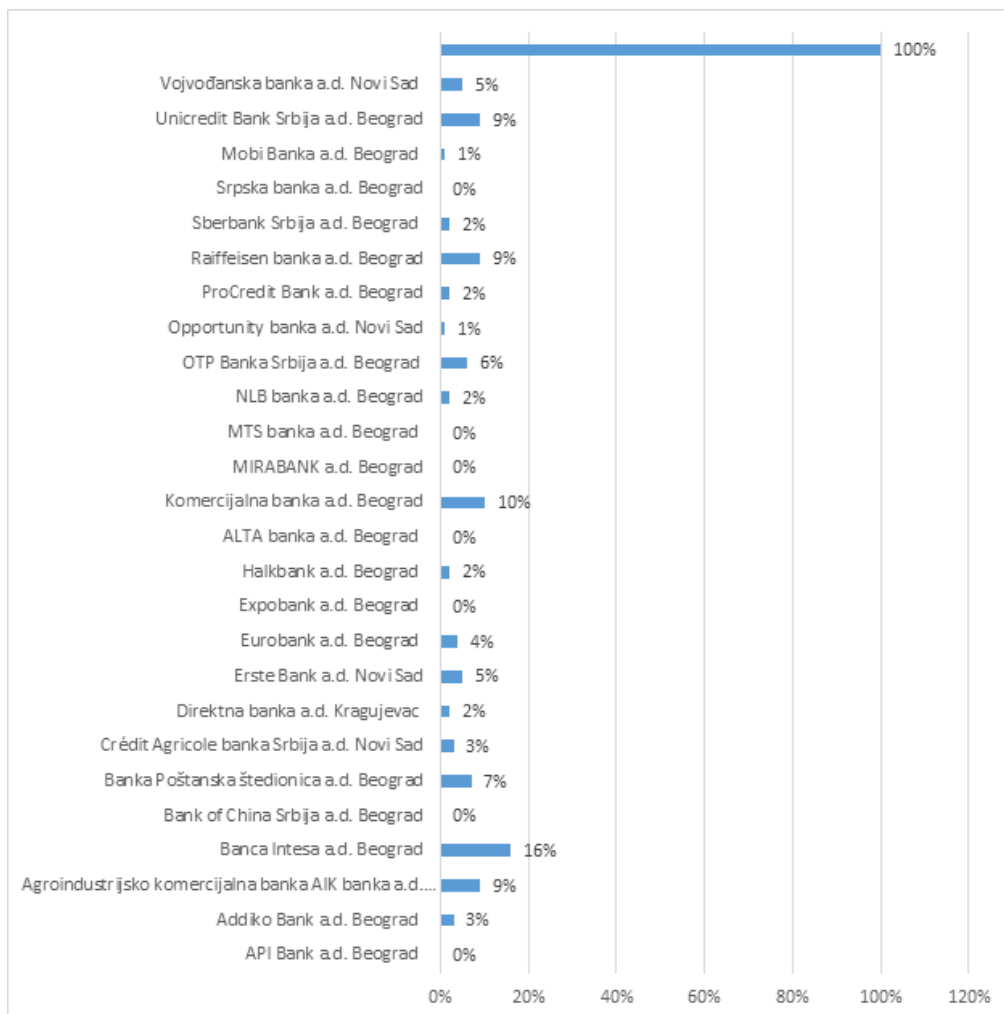
(Formula za izračunavanje HHI je:

$$HHI = MS1^2 + MS2^2 + MS3^2 + \dots + MSn^2 \quad (14)$$

gde je: MSn procentualno tržišno učešće firme n izraženo u celom broju.

Značenje HHI je sledeće: Ako je $HHI < 1500$, niska je koncentracija. Ukoliko je HHI između 1500 i 2500, umerena je koncentracija. I najzad, ako je $HHI > 2500$, visoka je koncentracija.)

Na Slici 3. je u cilju sagledavanja tržišne koncentracije prikazano procentualno tržišno učešće pojedinačne banke u ukupnom neto poslovnom prihodu banaka Srbije.



Slika 3. Tržišno učešće prema ukupnom neto poslovnom prihodu banaka Srbije

Izvor: Autorova slika

Top pet banaka prema učešću u ukupnom neto poslovnom prihodu u Srbiji su: 1. Banca Intesa a.d. Beograd (16%), 2. Komercijalna banka a.d. Beograd (10%), 3. Unicredit bank Srbija a.d. Beograd (9%), 4. Raiffeisen banka a.d. Beograd (9%). i 5. Agroindustrijsko komercijalna banka AIK banka a.d. Beograd (9%). One dakle, značajno kontrolišu bankarsko tržište u Srbiji (sa 53%). Izračunati **Herfindahi-Hirschman Index (HHI)** je 792. To znači da je niska koncentracija.

U Tabeli 2. je prikazana korelaciona matrica inicijalnih podataka.

Tabela 2. Korelaciona matrica

Correlations												
		1	2	3	4	5	6	7	8	9	10	11
1 Troškovi zarada, naknada zarada i ostali lični rashodi	Pearson Correlation	1	.936**	.859**	.904**	.596**	.936**	.904**	.346	.403*	.400*	.303
	Sig.(2-tailed)		.000	.000	.000	.001	.000	.000	.083	.041	.043	.132
	N	26	26	26	26	26	26	26	26	26	26	26
2 Aktiva	Pearson Correlation	.936**	1	.961**	.968**	.757**	1.000**	.968**	.410*	.446*	.447*	.182
	Sig.(2-tailed)	.000		.000	.000	.000	.000	.000	.037	.022	.022	.373
	N	26	26	26	26	26	26	26	26	26	26	26
3 Kapital	Pearson Correlation	.859**	.961**	1	.957**	.805**	.961**	.956**	.449*	.449*	.455*	-.047
	Sig.(2-tailed)	.000	.000		.000	.000	.000	.000	.021	.021	.020	.819
	N	26	26	26	26	26	26	26	26	26	26	26
4 Ukupan neto poslovni prihod	Pearson Correlation	.859**	.961**	1	.957**	.805**	.961**	.956**	.449*	.449*	.455*	-.047
	Sig.(2-tailed)	.000	.000		.000	.000	.000	.000	.021	.021	.020	.819
	N	26	26	26	26	26	26	26	26	26	26	26

5 Neto rezultat	Pearson Correlation	.596**	.757**	.805**	.870**	1	.757**	.869**	.613**	.602**	.494*	-.069
	Sig.(2-tailed)	.001	.000	.000	.000		.000	.000	.001	.001	.010	.739
	N	26	26	26	26	26	26	26	26	26	26	26
6 Učešće u ukupnoj aktivi	Pearson Correlation	.936**	1	.961**	.968**	.757**	1.000**	.968**	.410*	.446*	.447*	.182
	Sig.(2-tailed)	.000	.000	.000	.000	.000		.000	.037	.022	.022	.373
	N	26	26	26	26	26	26	26	26	26	26	26
7 Učešće u ukupnom neto poslovnom prihodu	Pearson Correlation	.904**	.968**	.956**	1.000**	.869**	.968**	1	.505**	.526**	.485*	.113
	Sig.(2-tailed)	.000	.000	.000	.000	.000	.000		.009	.006	.012	.583
	N	26	26	26	26	26	26	26	26	26	26	26
8 Prinos od aktive	Pearson Correlation	.346	.410*	.449*	.506**	.613**	.410*	.505**	1	.974**	.950**	.122
	Sig.(2-tailed)	.083	.037	.021	.008	.001	.037	.009		.000	.000	.552
	N	26	26	26	26	26	26	26	26	26	26	26
9 Prinos od kapital	Pearson Correlation	.403*	.446*	.449*	.527**	.602**	.446*	.526**	.974**	1	.945**	.213
	Sig.(2-tailed)	.041	.022	.021	.006	.001	.022	.006	.000		.000	.295
	N	26	26	26	26	26	26	26	26	26	26	26
10 Prinos od ukupnog neto poslovnog prihoda	Pearson Correlation	.400*	.447*	.455*	.487*	.494*	.447*	.485*	.950**	.945**	1	.222
	Sig.(2-tailed)	.043	.022	.020	.012	.010	.022	.012	.000	.000		.275
	N	26	26	26	26	26	26	26	26	26	26	26
11 Finansijska zaduženost	Pearson Correlation	.303	.182	-.047	.112	-.069	.182	.113	.122	.213	.222	1
	Sig.(2-tailed)	.132	.373	.819	.588	.739	.373	.583	.552	.295	.275	
	N	26	26	26	26	26	26	26	26	26	26	26
**. Correlation is significant at the 0.01 level (2-tailed).												
*. Correlation is significant at the 0.05 level (2-tailed).												

Napomena: Autorovo izračunavanje pomoću softverskog programa SPSS

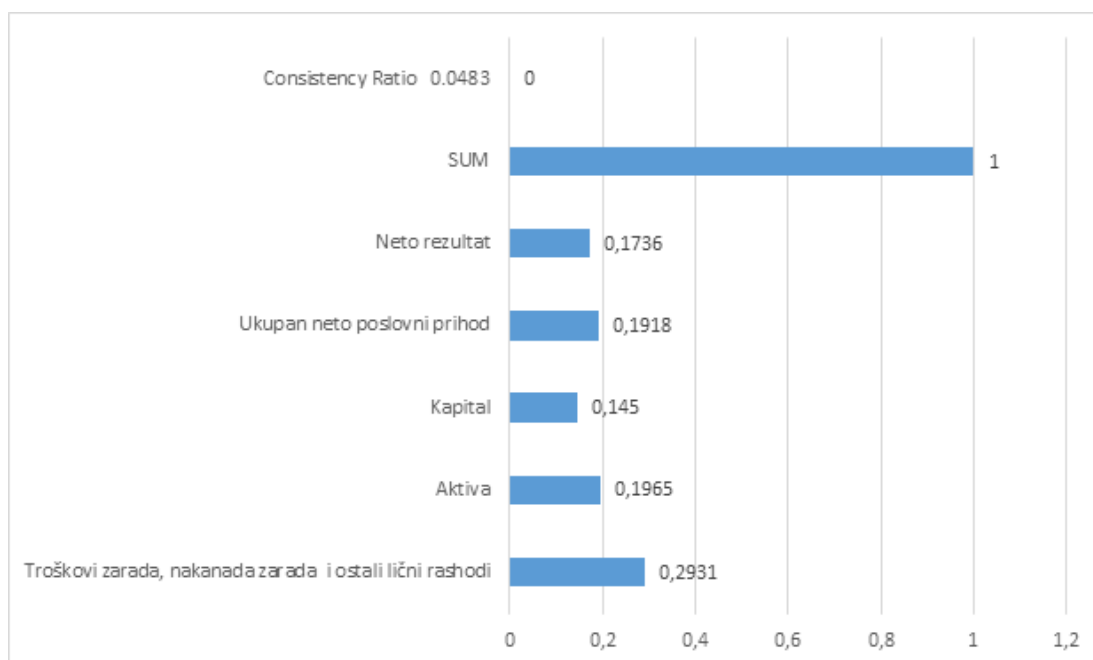
Između posmatranih varijabli postoji dakle umerena korelaciona veza na nivou statističke značajnosti, sem finansijske zaduženosti.

Pomoću AHP (Analizički Hijerarhijski Proces) metode su utvrđeni težinski koeficijenti kriterijuma (Saaty, 2008; Lukić, 2020a,b,c, 2021a,b,c,d). Oni su prikazani u Tabeli 3. i na Slici 4.

Tabela 3. Težinski koeficijenti kriterijuma

Weights of Criteria	
Troškovi zarada, naknada zarada i ostali lični rashodi	0.2931
Aktiva	0.1965
Kapital	0.1450
Ukupan neto poslovni prihod	0.1918
Neto rezultat	0.1736
SUM	1
Consistency Ratio 0.0483	COMPARE WITH 0.1; IT SHOULD BE LESS THAN 0.1.

Napomena: Autorovo kalkulisane pomoću softverskog programa AHPSoftware.Excel



Slika 4. Težinski koeficijenti kriterijuma

Izvor: Autorova slika

U Tabelama 4, 5, 6, 7, 8. i 9), kao i grafički (Slika 5), su prikazani dobijeni rezultati istraživanja efikasnosti banaka u Srbiji korišćenjem MABAC metode.

Tabela 4. Inicijalna matrica

Initial Matrix					
weights of criteria	0.2931	0.1965	0.145	0.1918	0.1736
kind of criteria	-1	1	1	1	1
	C1	C2	C3	C4	C5
A1	330	10360	1951	240	-413
A2	1231	101461	22759	4718	543
A3	1343	234932	53106	14442	9801
A4	6376	717185	109014	26478	9481
A5	309	12941	1762	304	-174
A6	4125	290681	26504	11192	2588
A7	2077	152176	13707	4984	857
A8	985	60087	11079	3157	660
A9	2507	287003	32929	8649	1333
A10	1984	196239	53676	6447	725
A11	301	16276	3465	584	-257
A12	958	85015	12488	2778	529
A13	316	23638	4041	698	12
A14	5819	459427	74086	16341	2928
A15	171	6248	1710	170	-209
A16	287	14387	2330	679	-156
A17	1254	80774	8782	3013	297
A18	3334	375876	52039	10018	2353
A19	726	22355	3852	1875	241
A20	951	148530	17272	3859	687
A21	3217	377709	63563	14960	5529
A22	1381	158448	25590	3822	374
A23	147	19679	3587	474	20

A24	758	24047	4135	1037	584
A25	3204	486496	82950	15266	5334
A26	3324	239181	30665	7423	-1179

MAX	6376	717185	109014	26478	9801
MIN	147	6248	1710	170	-1179

Napomena: Autorovo izračunavanje pomoću softverskog programa MABACSoftware.Excel

Tabela 5. Normalizovana matrica

Normalized Matrix					
weights of criteria	0.2931	0.1965	0.145	0.1918	0.1736
kind of criteria	-1	1	1	1	1
	C1	C2	C3	C4	C5
A1	0.9706	0.0058	0.0022	0.0027	0.0000
A2	0.8260	0.1339	0.1962	0.1729	0.1568
A3	0.8080	0.3217	0.4790	0.5425	1.0000
A4	0.0000	1.0000	1.0000	1.0000	0.9709
A5	0.9740	0.0094	0.0005	0.0051	0.0000
A6	0.3614	0.4001	0.2311	0.4190	0.3431
A7	0.6902	0.2053	0.1118	0.1830	0.1854
A8	0.8655	0.0757	0.0873	0.1135	0.1675
A9	0.6211	0.3949	0.2909	0.3223	0.2288
A10	0.7051	0.2672	0.4843	0.2386	0.1734
A11	0.9753	0.0141	0.0164	0.0157	0.0000
A12	0.8698	0.1108	0.1004	0.0991	0.1556
A13	0.9729	0.0245	0.0217	0.0201	0.1085
A14	0.0894	0.6374	0.6745	0.6147	0.3740
A15	0.9961	0.0000	0.0000	0.0000	0.0000
A16	0.9775	0.0114	0.0058	0.0193	0.0000
A17	0.8223	0.1048	0.0659	0.1081	0.1344
A18	0.4884	0.5199	0.4690	0.3743	0.3217
A19	0.9070	0.0227	0.0200	0.0648	0.1293
A20	0.8709	0.2001	0.1450	0.1402	0.1699

A21	0.5071	0.5225	0.5764	0.5622	0.6109
A22	0.8019	0.2141	0.2225	0.1388	0.1414
A23	1.0000	0.0189	0.0175	0.0116	0.1092
A24	0.9019	0.0250	0.0226	0.0330	0.1606
A25	0.5092	0.6755	0.7571	0.5738	0.5932
A26	0.4900	0.3276	0.2698	0.2757	0.0000

Napomena: Autorovo izračunavanje pomoću softverskog programa MABACSoftware.Excel

Tabela 6. Normalizovana težinski matrica

NormalizedWeighted Matrix (V)					
	C1	C2	C3	C4	C5
A1	0.5776	0.1976	0.1453	0.1923	0.1736
A2	0.5352	0.2228	0.1734	0.2250	0.2008
A3	0.5299	0.2597	0.2145	0.2959	0.3472
A4	0.2931	0.3930	0.2900	0.3836	0.3421
A5	0.5786	0.1983	0.1451	0.1928	0.1736
A6	0.3990	0.2751	0.1785	0.2722	0.2332
A7	0.4954	0.2368	0.1612	0.2269	0.2058
A8	0.5468	0.2114	0.1577	0.2136	0.2027
A9	0.4752	0.2741	0.1872	0.2536	0.2133
A10	0.4998	0.2490	0.2152	0.2376	0.2037
A11	0.5790	0.1993	0.1474	0.1948	0.1736
A12	0.5480	0.2183	0.1596	0.2108	0.2006
A13	0.5782	0.2013	0.1481	0.1956	0.1924
A14	0.3193	0.3218	0.2428	0.3097	0.2385
A15	0.5851	0.1965	0.1450	0.1918	0.1736
A16	0.5796	0.1987	0.1458	0.1955	0.1736
A17	0.5341	0.2171	0.1546	0.2125	0.1969
A18	0.4362	0.2987	0.2130	0.2636	0.2294
A19	0.5590	0.2010	0.1479	0.2042	0.1961
A20	0.5484	0.2358	0.1660	0.2187	0.2031
A21	0.4417	0.2992	0.2286	0.2996	0.2797
A22	0.5281	0.2386	0.1773	0.2184	0.1982
A23	0.5862	0.2002	0.1475	0.1940	0.1926

A24	0.5574	0.2014	0.1483	0.1981	0.2015
A25	0.4424	0.3292	0.2548	0.3019	0.2766
A26	0.4367	0.2609	0.1841	0.2447	0.1736

Napomena: Autorovo izračunavanje pomoću softverskog programa MABACSoftware.Excel

Tabela 7. Matrica graničnih aproksimativnih oblasti

Border Approximation Area Matrix (G)	0.5000	0.2391	0.1762	0.2322	0.2111
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Napomena: Autorovo izračunavanje pomoću softverskog programa MABACSoftware.Excel

Tabela 8. Matrica udaljenost alternativa od graničnih aproksimativnih oblasti

Distance of Alternatives from BAA matrix (Q)					
	C1	C2	C3	C4	C5
A1	0.0776	-0.0415	-0.0309	-0.0399	-0.0375
A2	0.0352	-0.0163	-0.0028	-0.0073	-0.0102
A3	0.0299	0.0206	0.0382	0.0636	0.1361
A4	-0.2069	0.1539	0.1138	0.1514	0.1311
A5	0.0786	-0.0408	-0.0312	-0.0394	-0.0375
A6	-0.1010	0.0360	0.0023	0.0399	0.0221
A7	-0.0046	-0.0023	-0.0150	-0.0053	-0.0053
A8	0.0468	-0.0278	-0.0186	-0.0186	-0.0084
A9	-0.0248	0.0350	0.0110	0.0214	0.0023
A10	-0.0002	0.0099	0.0390	0.0053	-0.0074
A11	0.0790	-0.0399	-0.0289	-0.0374	-0.0375
A12	0.0480	-0.0209	-0.0167	-0.0214	-0.0105
A13	0.0783	-0.0378	-0.0281	-0.0366	-0.0186
A14	-0.1807	0.0826	0.0666	0.0775	0.0275
A15	0.0851	-0.0426	-0.0312	-0.0404	-0.0375
A16	0.0796	-0.0404	-0.0304	-0.0367	-0.0375
A17	0.0341	-0.0221	-0.0217	-0.0197	-0.0141
A18	-0.0638	0.0595	0.0368	0.0314	0.0184
A19	0.0590	-0.0382	-0.0283	-0.0280	-0.0150
A20	0.0484	-0.0033	-0.0102	-0.0135	-0.0080
A21	-0.0583	0.0600	0.0524	0.0674	0.0686
A22	0.0281	-0.0006	0.0010	-0.0138	-0.0129

A23	0.0862	-0.0389	-0.0287	-0.0382	-0.0185
A24	0.0575	-0.0377	-0.0279	-0.0341	-0.0096
A25	-0.0576	0.0901	0.0786	0.0696	0.0655
A26	-0.0633	0.0217	0.0079	0.0125	-0.0375

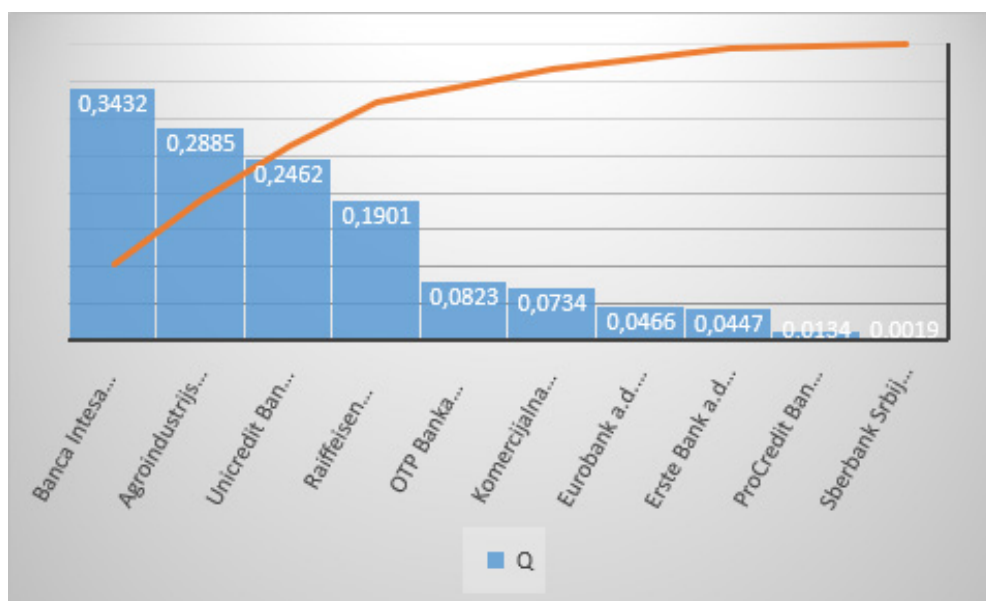
Napomena: Autorovo izračunavanje pomoću softverskog programa MABACSoftware.Excel

Tabela 9. Rangiranje alternativa

	Alternatives	Q	Q	Ranking
API Bank a.d. Beograd	A1	-0.0722	-0.0722	26
Addiko Bank a.d. Beograd	A2	-0.0014	-0.0014	12
Agroindustrijsko komercijalna banka AIK banka a.d. Beograd	A3	0.2885	0.2885	2
Banca Intesa a.d. Beograd	A4	0.3432	0.3432	1
Bank of China Srbija a.d. Beograd	A5	-0.0703	-0.0703	25
Banka Poštanska štedionica a.d. Beograd	A6	-0.0007	-0.0007	11
Crédit Agricole banka Srbija a.d. Novi Sad	A7	-0.0325	-0.0325	15
Direktna banka a.d. Kragujevac	A8	-0.0266	-0.0266	14
Erste Bank a.d. Novi Sad	A9	0.0447	0.0447	8
Eurobank a.d. Beograd	A10	0.0466	0.0466	7
Expobank a.d. Beograd	A11	-0.0646	-0.0646	22
Halkbank a.d. Beograd	A12	-0.0214	-0.0214	13
ALTA banka a.d. Beograd	A13	-0.0429	-0.0429	17
Komercijalna banka a.d. Beograd	A14	0.0734	0.0734	6
MIRABANK a.d. Beograd	A15	-0.0667	-0.0667	24

MTS banka a.d. Beograd	A16	-0.0653	-0.0653	23
NLB banka a.d. Beograd	A17	-0.0434	-0.0434	18
OTP Banka Srbija a.d. Beograd	A18	0.0823	0.0823	5
Opportunity banka a.d. Novi Sad	A19	-0.0506	-0.0506	19
ProCredit Bank a.d. Beograd	A20	0.0134	0.0134	9
Raiffeisen banka a.d. Beograd	A21	0.1901	0.1901	4
Sberbank Srbija a.d. Beograd	A22	0.0019	0.0019	10
Srpska Banka a.d. Beograd	A23	-0.0381	-0.0381	16
Mobi Banka a.d. Beograd	A24	-0.0519	-0.0519	20
Unicredit Bank Srbija a.d. Beograd	A25	0.2462	0.2462	3
Vojvodanska banka a.d. Novi Sad	A26	-0.0587	-0.0587	21

Napomena: Autorovo izračunavanje pomoću softverskog programa MABACSoftware.Excel



Slika 5. Rangiranje alternativa
Izvor: Autorova slika

Istraživanje efikasnosti banaka u Srbiji pomoću MABAC metode je pokazalo da je na prvom mestu (1) Banca Intesa a.d. Beograd. Slede: 2 - Agroindustrijsko komercijalna banka AIK banka a.d. Beograd, 3 - Unicredit Bank Srbija a.d. Beograd, 4 - Raiffeisen banka a.d. Beograd, 5 - OTP Banka Srbija a.d. Beograd, 6 - Komercijalna banka a.d. Beograd, 7 - Eurobank a.d. Beograd, 8 - Erste Bank a.d. Novi Sad, 9 - ProCredit Bank a.d. Beograd, 10 - Sberbank Srbija a.d. Beograd, 11 - Banka Poštanska štedionica a.d. Beograd, 12 - Addiko Bank a.d. Beograd, 13 - Halkbank a.d. Beograd, 14 - Direktna banka a.d. Kragujevac, 15 - Crédit Agricole banka Srbija a.d. Novi Sad, 16 - Srpska banka a.d. Beograd, 17 - ALTA banka a.d. Beograd, 18 - NLB banka a.d. Beograd, 19 - Opportunity banka a.d. Novi Sad, 20 - Mobi Banka a.d. Beograd, 21 - Vojvođanska banka a.d. Novi Sad, 22 - Expobank a.d. Beograd, 23 - MTS banka a.d. Beograd, 24 - MIRABANK a.d. Beograd, 25 - Bank of China Srbija a.d. Beograd i 26 - API Bank a.d. Beograd.

Na ovakvo rangiranje banaka u Srbiji prema MABAC metode uticali su brojni makro i mikro faktori (ekonomska klima, strane direktne investicije, devizni kurs, inflacija, zaposlenost, životni standard stanovništva, finansiranje infrastrukturnih projekata i dugi). Negativan je uticaj pandemije korona virusa Covid-19 na efikasnost banaka u Srbiji. Zabeležen je smanjeni broj zaposlenih i „zamrznute” su kreditne aktivnosti. Ove negativne efekte elektronsko bankarstvo gotovo da nije ublažilo, kao što je to slučaj, poređenja radi, sa drugim uslužnim sektorima (na primer, trgovina, osiguranje). U cilju poboljšanja efikasnosti banaka u Srbiji u budućnosti neophodno je, dakle, što efikasnije upravljati ljudskim resursima (trening, nagrađivanje, napredovanje, fleksibilno zapošljavanje), aktivom, kapitalom, prihodima i profito.

Zaključak

Analiza efikasnosti banaka u Srbiji na bazi MABAC metode je pokazala da je na prvom mestu (1) Banca Intesa a.d. Beograd. Slede: 2 - Agroindustrijsko komercijalna banka AIK banka a.d. Beograd, 3 - Unicredit Bank Srbija a.d. Beograd, 4 - Raiffeisen banka a.d. Beograd, 5 - OTP Banka Srbija a.d. Beograd, 6 - Komercijalna banka a.d. Beograd, 7 - Eurobank a.d. Beograd, 8 - Erste Bank a.d. Novi Sad, 9 - ProCredit Bank a.d. Beograd, 10 - Sberbank Srbija a.d. Beograd, 11 - Banka Poštanska štedionica a.d. Beograd, 12 - Addiko Bank a.d. Beograd, 13 - Halkbank a.d. Beograd, 14 - Direktna banka a.d. Kragujevac, 15 - Crédit Agricole banka Srbija a.d. Novi Sad, 16 - Srpska banka a.d. Beograd, 17 - ALTA banka a.d. Beograd, 18 - NLB banka a.d. Beograd, 19 - Opportunity banka a.d. Novi Sad, 20 - Mobi Banka a.d. Beograd, 21 - Vojvođanska banka a.d. Novi Sad, 22 - Expobank a.d. Beograd, 23 - MTS banka a.d. Beograd, 24 - MIRABANK a.d. Beograd, 25 - Bank of China Srbija a.d. Beograd i 26 - API Bank a.d. Beograd.

Brojni su makro i mikro faktori rangiranja banaka u Srbiji prema MABAC metode (ekonomska klima, strane direktne investicije, devizni kurs, inflacija, zaposlenost, životni standard stanovništva, finansijska tržišta, infrastrukturni projekti i dugi). Zabeležen je negativan uticaj pandemije korona virusa Covid-19 na efikasnost banaka u Srbiji (smanjen je broj zaposlenih i „zamrznute” su mnoge kreditne aktivnosti). Ove negativne efekte elektronsko bankarstvo gotovo da nije ublažilo, kao što je to slučaj, poređenja radi, sa drugim uslužnim sektorima (na primer, trgovina, osiguranje).

U cilju poboljšanja efikasnosti banaka u Srbiji u budućnosti neophodno je što efikasnije upravljati ljudskim kapitalom, aktivom, kapitalom, prihodima i profitom.

Metoda MABAC je vrlo jednostavna, postoje softverski programi i omogućuje u odnosu na racio analizu utvrđivanje realnije situacije u pogledu efikasnosti banaka u Srbiji u funkciji unapređenja u budućnosti preduzimanjem relevantnih efikasnih mera. Iz tih razloga se ona preporučuje, posebno istovremeno u kombinaciji sa drugim metodama višekriterijumske analize (AHP, TOPSIS, ARAS, WASPAS i druge)

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EVALUATION OF THE EFFICIENCY OF BANKS IN SERBIA USING THE MABAC METHOD

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Summary

In recent times, as is known, various methods of multi-criteria analysis are used more and more in order to evaluate the efficiency of financial institutions as accurately as possible. One of them is MABAC (Multi-Attributive Border Approximation Area Comparison) method. Bearing that in mind, this paper analyzes the efficiency of banks in Serbia based on this method. The results of the research on the efficiency of banks in Serbia based on the MABAC method show that Banca Intesa ad Beograd is in first place. The ranking of banks in Serbia according to the MABAC method was influenced by numerous macro and micro factors (economic climate, foreign direct investments, exchange rate, inflation, employment, living standards of the population, financing of infrastructure projects and debts). The impact of the Covid-19 corona virus pandemic on the efficiency of banks in Serbia is negative.

A reduced number of employees was recorded and credit activities were „frozen“. This also affected the efficiency of banks in Serbia. In order to improve the efficiency of banks in Serbia in the future, it is necessary to manage human resources, assets, capital, income and profit as efficiently as possible.

Keywords: efficiency, banks, Serbia, determinants, MABAC method

Jel classification : D40, G21

Introduction

Recently, in order to more realistically evaluate the efficiency of companies/financial institutions, various methods of multi-criteria analysis have been developed (Mathew, 2018; Timiryanova, 2020; Okwu, 2020; Singh, 2020; Pachar, 2021; Brezović, 2021; Tsai, 2021; Wang, 2021; Heather, 2021). One of them is the MABAC method (Pamučar, 2015; Božanić, 2016; Boyanic, 2019, 2020; Işik, 2020; Nedeljković, 2021; Stanujkic, 2021). In this paper, as a subject of research, an analysis of the efficiency of banks in Serbia is carried out based on the MABAC method. The aim and purpose of this is to determine the most realistic situation as possible as a basis and assumption for taking appropriate external and internal measures in order to improve the efficiency of Serbian banks in the future (Lukic, 2020 a,b,c, 2021a,b,c,d,e).

In the world, there is an increasingly rich literature dedicated to the analysis of the efficiency of companies, that is, financial institutions based on various methods of multi-criteria analysis (Ersoy, 2017). This is also the case with literature in Serbia (Cvetkoska, 2021; Lukic, 2010, 2011 a, b, 2017, 2018 a, b, c, d, 2019 a, b, 2020 a, b, c, d, e, 2021 a, b, c). However, in the relevant literature, as far as we know, there is not a single complete work dedicated to the evaluation of the efficiency of banks in Serbia using the MABAC contribution method (Lukic, 2020 a,b,c, 2021 a,b,c,d; Liu, 2021). This work fills that gap to some extent, and in that, among other things, his scientific and professional contribution is reflected.

The primary research hypothesis of the problem analyzed in this paper is based on the fact that continuous evaluation in order to determine the most realistic situation is the starting point and assumption for improving the efficiency of banks (in the specific case of Serbia) in the future by more effective control of critical factors and the effects of the application of relevant external and internal measure. Knowing the real position of a specific bank on the banking market is an important assumption for improving its efficiency in the future. To that end, it is important to compare with the best banks (the first five) in terms of business efficiency.

In addition to ratio analysis, the application of various methods of multi-criteria analysis, including the MABAC method, plays a significant role in this. Compared to ratio analysis, it provides a more complete overview of the more realistic situation regarding the efficiency of banks in Serbia because it simultaneously integrates all the selected variables. Based on that, relevant external and internal measures (economic, organizational, technical nature; for example, new organizational structure of the bank, digitization of the entire business, more effective external and internal audit in order to mitigate potential risks of all kinds, etc.) can be taken in order to improve efficiency of Serbian banks in the future (Lukic, 2020a,b,c, 2021a,b,c,d; Liu, 2021).

For the purposes of researching the problem treated in this paper (i.e., the efficiency of Serbian banks), empirical - accounting data were obtained from the National Bank of Serbia. Accounting information (i.e. data) is "produced" in accordance with relevant international standards (Lukic, 2010, 2011a, b, 2016, 2017, 2018a, b, 2019a, b, 2020a,b,c, 2021a,b,c, d). Considering that, there are no restrictions regarding the comparability of the efficiency of banks in Serbia and other countries, primarily the European Union.

MABAC method

(Multi-Attributive Border Approximation Area Comparison) is a newer multi-criteria decision-making method developed by Pamučar and Čirović (2015). The main feature of this method is in defining the distance of the criterion function of each observed alternative from the limit approximate value. The mathematical formulation of the MABAC method consists of the following steps (Pamućar, 2015; Lukić, 2021c):

Step 1: Formation of the initial decision matrix (X).

m alternatives are evaluated according to n criteria. Alternatives are represented by vectors $A_i = (x_{i1}, x_{i2}, \dots, x_{in})$ where x_{ij} is the value of the i -th alternative according to the j -th criterion ($i = 1, 2, \dots, m; j = 1, 2, \dots, n$).

$$X = \begin{matrix} & C_1 & C_2 & \dots & C_n \\ \begin{matrix} A_1 \\ A_2 \\ \dots \\ A_m \end{matrix} & \begin{bmatrix} x_{11} & x_{12} & \dots & x_{1n} \\ x_{21} & x_{22} & \dots & x_{2n} \\ \dots & \dots & \dots & \dots \\ x_{m1} & x_{m2} & \dots & x_{mn} \end{bmatrix} \end{matrix} \quad (1)$$

where m is the total number of alternatives, n is the total number of criteria.

Step 2: Normalization of the elements of the initial matrix (X).

$$N = \begin{matrix} & C_1 & C_2 & \dots & C_n \\ \begin{matrix} A_1 \\ A_2 \\ \dots \\ A_m \end{matrix} & \begin{bmatrix} n_{11} & n_{12} & \dots & n_{1n} \\ n_{21} & n_{22} & \dots & n_{2n} \\ \dots & \dots & \dots & \dots \\ n_{m1} & n_{m2} & \dots & n_{mn} \end{bmatrix} \end{matrix} \quad (2)$$

The elements of the normalized matrix (N) are obtained using the following equations:

a) For benefit (income) types of criteria (a high value of the criteria is preferred)

$$n_{ij} = \frac{x_{ij} - x_i^-}{x_i^+ - x_i^-} \quad (3)$$

b) For non-finite (cost) types of criteria (a lower value of the criteria is preferable)

$$n_{ij} = \frac{x_i^+ - x_{ij}}{x_i^+ - x_i^-} \quad (4)$$

where x_{ij} , x_i^+ and x_i^- are the elements of the initial decision matrix (X), and are x_i^+ defined x_i^- as:

$x_i^+ = \max(x_1, x_2, \dots, x_m)$ and represent the maximum values of the observed criterion by alternatives.

$x_i^- = \min(x_1, x_2, \dots, x_m)$ and represents the minimum values of the observed criterion by alternatives.

Step 3: Calculation of elements of the weight matrix (V).

The elements of the weight matrix (V) are calculated as follows:

$$V_{ij} = w_i g(n_{ij} + 1) \quad (5)$$

where the n_{ij} elements of the normalized matrix (N) are the w_i weighting coefficients of the criteria.

Based on the previous equation, the following weight matrix V is obtained

$$V = \begin{bmatrix} v_{11} & v_{12} & \dots & v_{1n} \\ v_{21} & v_{22} & \dots & v_{2n} \\ \dots & \dots & \dots & \dots \\ v_{m1} & v_{m2} & \dots & v_{mn} \end{bmatrix} = \begin{bmatrix} w_1 g(n_{11} + 1) & w_2 g(n_{12} + 1) & \dots & w_n g(n_{1n} + 1) \\ w_1 g(n_{21} + 1) & w_2 g(n_{22} + 1) & \dots & w_n g(n_{2n} + 1) \\ \dots & \dots & \dots & \dots \\ w_1 g(n_{m1} + 1) & w_2 g(n_{m2} + 1) & \dots & w_n g(n_{mn} + 1) \end{bmatrix} \quad (6)$$

where n are the total number of criteria, m the total number of alternatives.

Step 4: Determining the matrix of boundary approximate areas (G).

The Boundary Approximate Area (BAA) for each criterion is determined according to the following expression:

$$g_i = \left(\prod_{j=1}^m v_{ij} \right)^{1/m} \quad (7)$$

where the v_{ij} elements of the weight matrix (V), m are the total number of alternatives.

After calculating the value of g_i and for each criterion, a matrix of border approximate areas (G) of the format $n+1$ is formed (n represents the total number of criteria by which the choice of the offered alternatives is made):

$$G = \begin{matrix} C_1 & C_2 & \dots & C_n \\ [g_1 & g_2 & \dots & g_n] \end{matrix} \quad (8)$$

Step 5: Calculation of the elements of the distance matrix of alternatives from the boundary approximate area (Q).

$$Q = \begin{bmatrix} q_{11} & q_{12} & \dots & q_{1n} \\ q_{21} & q_{22} & \dots & q_{2n} \\ \dots & \dots & \dots & \dots \\ q_{m1} & q_{m2} & \dots & q_{mn} \end{bmatrix} \quad (9)$$

distance of the alternatives from the border approximate area (q_{ij}) is determined as the difference between the elements of the weight matrix (V) and the values of the border approximate areas (G).

$$Q = V - G = \begin{bmatrix} v_{11} & v_{12} & \dots & v_{1n} \\ v_{21} & v_{22} & \dots & v_{2n} \\ \dots & \dots & \dots & \dots \\ v_{m1} & v_{m2} & \dots & v_{mn} \end{bmatrix} - \begin{bmatrix} q_1 & q_2 & \dots & q_n \\ q_1 & q_2 & \dots & q_n \\ \dots & \dots & \dots & \dots \\ q_1 & q_2 & \dots & q_n \end{bmatrix} \quad (10)$$

$$Q = \begin{bmatrix} v_{11} - g_1 & v_{12} - g_2 & \dots & v_{1n} - g_n \\ v_{21} - g_1 & v_{22} - g_2 & \dots & v_{2n} - g_n \\ \dots & \dots & \dots & \dots \\ v_{m1} - g_1 & v_{m2} - g_2 & \dots & v_{mn} - g_n \end{bmatrix} - \begin{bmatrix} q_{11} & q_{12} & \dots & q_{1n} \\ q_{21} & q_{22} & \dots & q_{2n} \\ \dots & \dots & \dots & \dots \\ q_{m1} & q_{m2} & \dots & q_{mn} \end{bmatrix} \quad (11)$$

where g and the border approximate area for the criterion C_i , v_{ij} are the elements of the weighting matrix (V), n the number of criteria, m the number of alternatives.

Alternative A_i can belong to the border approximate area (G), the upper approximate area (G^+) or the lower approximate area (G^-), i.e. $A_i \in \{G^- \cup G^+ \cup G\}$. The upper approximate area (G^+) is the area where the ideal alternative (A^+) is located, and the lower approximate area is the area where the anti-ideal alternative (A^-) is located (Figure 1).

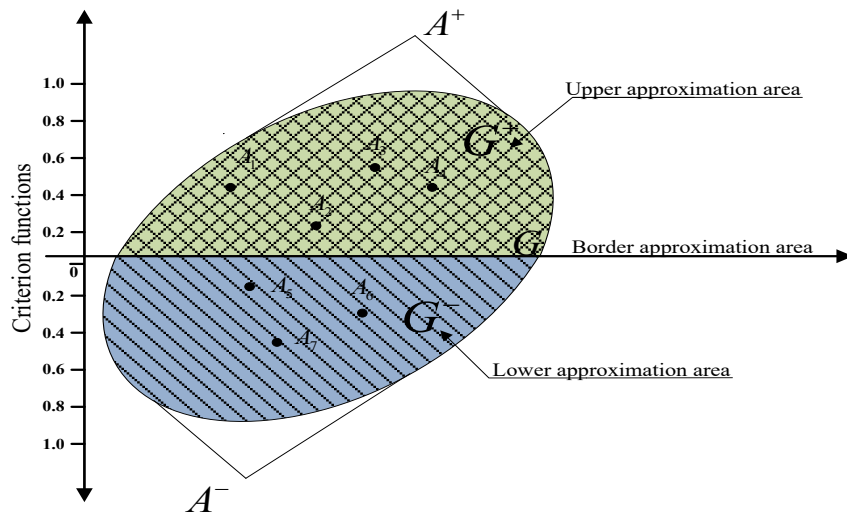


Figure 1. Shows the upper (G^+), lower (G^-) and approximate areas

Source: Pamučar, 2015

Belonging to the alternative A and the approximate area (G , G^+ or G^-) is determined based on the following equation:

$$A_i \in \begin{cases} G^+ & \text{if } q_{ij} > 0 \\ G & \text{if } q_{ij} = 0 \\ G^- & \text{if } q_{ij} < 0 \end{cases} \quad (12)$$

In order for alternative A to be selected as the best from the set, it is necessary that it belongs to the upper approximate area (G^+) according to as many criteria as possible . If, for example, alternative A_i according to 5 criteria (out of a total of 6 criteria) it belongs to the upper approximate area, and according to one criterion it belongs to the lower approximate area (G^-), this means, in other words, that according to 5 criteria the alternative is close to or equal to the ideal alternative, while according to one criterion close to or equal to the anti-ideal alternative. If the value of $q_{ij} > 0$, .e. $q_{ij} \in G^+$ then alternative A is close to or equal to the ideal alternative. However, if $q_{ij} < 0$, .e. $q_{ij} \in G^-$ then alternative A is close to or equal to the anti-ideal alternative (Pamučar, 2015).

Step 6: Ranking of alternatives.

The calculation of the value of the criteria functions according to the alternatives (13) is obtained as the sum of the distances of the alternatives from the boundary approximate areas (q). By summing the elements of the matrix Q by row, the final values of the criterion functions of the alternatives are obtained:

$$S_i = \sum_{j=1}^n q_{ij} \quad j = 1, 2, \dots, n \quad i = 1, 2, \dots, m \quad (13)$$

where n is the number of criteria, m is the number of alternatives.

Measuring the Efficiency of Banks in Serbia Using the MABAC Method: Results and Discussion

Measuring the efficiency of banks in Serbia using the MABAC method is based on the following assumptions:

1) The criteria are: C1 - Salary expenses, salary compensation and other personal expenses, C2 - Assets, C3 - Capital, C4 - Total net business income and C5 - Net result.

2) Alternatives are observed banks: A1 - API Bank ad Beograd, A2 - Addiko Bank ad Beograd, A3 - Agroindustrijsko komercijalna banka AIK banka ad Beograd, A4 - Banca Intesa ad Beograd, A5 - Bank of China Srbija ad Beograd, A6 - Bank Poštanska štedionica ad Beograd, A7 - Crédit Agricole banka Srbija ad Novi Sad, A8 - Direktna banka ad Kragujevac, A9 - Erste Bank ad Novi Sad, A10 - Eurobank ad Beograd, A11 - Expobank ad Beograd, A12 - Halkbank ad Beograd, A13 - ALTA banka ad Belgrade, A14 - Komercijalna banka ad Belgrade, A15 - MIRABANK ad Belgrade, A16 - MTS banka ad Belgrade, A17 - NLB banka ad Belgrade, A18 - OTP Banka Srbija ad Belgrade, A19 - Opportunity banka ad Novi Sad, A20 - ProCredit Bank ad Belgrade, A21 - Raiffeisen bank ad Belgrade, A22 - Sberbank Srbija ad Belgrade, A23 - Srpska banka ad Belgrade, A24 - Mobi Bank ad Belgrade, A25 - Unicredit Bank Srbija ad Belgrade, A26 - Vojvodanska banka ad Novi Sad.

Table 1 shows the initial data for measuring the efficiency of banks in Serbia using the MABAC method for 2020.

Table 1. Initial data

	Salary expenses, salary allowances and other personal expenses	Assets	Capital	Total net operating income	Net result	Share in total assets (%)*	Share in total net business income	Return on assets (%)*	Return on equity (%)*	Return on total net loan income (%)*	Financial Indebtedness*
API Bank ad Belgrade	330	10360	in 1951	240	-413	0.23	0.15	-3.99	-21.2	-172.1	5.310097
Addiko Bank ad Belgrade	1231	101461	22759	4718	543	2.21	2.88	0.54	2.4	11.5	4.458061

Agro-industrijsko komercijalna banka AIK banka ad Beograd	1343	234932	53106	14442	9801	5.11	8.83	4.17	18.5	67.9	4.423832
Banca Intesa ad Belgrade	6376	717185	109014	26478	9481	15.59	16.18	1.32	8.7	35.8	6.578834
Bank of China Serbia ad Belgrade	309	12941	1762	304	-174	0.28	0.19	-1.34	-9.9	-57.2	7.344495
Banka Poštanska štedionica ad Beograd	4125	290681	26504	11192	2588	6.32	6.84	0.89	9.8	23.1	10.96744
Crédit Agricole banka Srbija ad Novi Sad	2077	152176	13707	4984	857	3.31	3.05	0.56	6.3	17.2	11.10206
Direktna banka ad Kragujevac	985	60087	11079	3157	660	1.31	1.93	1.10	6.0	20.9	5.423504
Erste Bank ad Novi Sad	2507	287003	32929	8649	1333	6.24	5.29	0.46	4.0	15.4	8.715813
Eurobank ad Belgrade	1984	196239	53676	6447	725	4.26	3.94	0.37	1.4	11.2	3.655992
Expobank ad Belgrade	301	16276	3465	584	-257	0.35	0.36	-1.58	7.4	-44.0	4.697258
Halkbank ad Belgrade	958	85015	12488	2778	529	1.85	1.70	0.62	4.2	19.0	6.807735
ALTA bank ad Belgrade	316	23638	4041	698	12	0.51	0.43	0.05	0.3	1.7	5.849542

Komercijalna banka ad Belgrade	5819	459427	74086	16341	2928	9.99	9.99	0.64	4.0	17.9	6.201266
MIRABANK ad Belgrade	171	6248	1710	170	-209	0.14	0.10	-3.35	-12.2	-122.9	3.653801
MTS bank ad Belgrade	287	14387	2330	679	-156	0.31	0.42	-1.08	-6.7	-23.0	6.174678
NLB Bank ad Belgrade	1254	80774	8782	3013	297	1.76	1.84	0.37	3.4	9.9	9.197677
OTP Bank Serbia ad Belgrade	3343	375876	52039	10018	2353	8.17	6.12	0.63	4.5	23.5	7.222967
Opportunity bank ad Novi Sad	726	22355	3852	1875	241	0.49	1.15	1.08	6.3	12.9	5.803479
ProCredit Bank ad Belgrade	951	148530	17272	3859	687	3.23	2.36	0.46	4.0	17.8	8.599467
Raiffeisen bank ad Belgrade	3217	377709	63563	14960	5529	8.21	9.14	1.46	8.7	37.0	5.942278
Sberbank Serbia ad Belgrade	1381	158448	25590	3822	374	3.44	2.34	0.24	1.5	9.8	6.191794
Srpska banka ad Belgrade	147	19679	3587	474	20	0.43	0.01	0.10	0.6	4.2	5.4862
Mobi Bank ad Belgrade	758	24047	4135	1037	584	0.52	0.63	2.43	14.1	56.3	5.815478
Unicredit Bank Serbia ad Belgrade	3204	486496	82950	15266	5334	10.57	9.33	1.10	6.4	34.9	5.864931
Vojvodanska banka ad Novi Sad	3324	239181	30665	7423	-1179	5.20	4.54	-0.49	-3.8	-15.9	7.799804

Statistics											
Mean	1823.6538	176967.3462	27578.5385	6292.6154	1634.1538	3.8473	3.8362	.2600	2.0731	.4923	6.5111
Std. Error of Mean	336.48971	36169.82848	5785.73315	1307.22885	559.14482	.78616	.80078	.31670	1.64145	10.08026	.38161
Median	1242.5000	124995.5000	15489.5000	3840.5000	563.5000	2.7200	2.3500	.5000	4.0000	14.1500	6.0585
Std. Deviation	1715.76758	184430.66120	29501.56624	6665.58543	2851.09037	4.00863	4.08320	1.61484	8.36978	51.39942	1.94585
Skewness	1.297	1.299	1.271	1.399	1.988	1.299	1.389	-.637	-.843	-2.119	.892
Std. Error of Skewness	.456	.456	.456	.456	.456	.456	.456	.456	.456	.456	.456
Kurtosis	1.162	1.466	.942	1.844	3.391	1.467	1.818	2.427	1.507	5.136	.588
Std. Error of Kurtosis	.887	.887	.887	.887	.887	.887	.887	.887	.887	.887	.887
The minimum	147.00	6248.00	1710.00	170.00	1179.00	.14	.01	-3.99	-21.20	-172.10	3.65
Maximum	6376.00	717185.00	109014.00	26478.00	9801.00	15.59	16.18	4.17	18.50	67.90	11.10
Test Statistics^a											
N	26										
Chi-Square	213.973										
df	10										
Asymp. Sig.	.000										
a. Friedman Test											

Note: Data are expressed in millions of dinars. *Author's calculation. Return on assets = Net result / Assets. Return on capital = Net result / Capital. Return on total net operating income = Net result / Total net operating income. Financial indebtedness = Assets / Capital. Statistics were calculated using the SPSS software program

Source: National Bank of Serbia

There is a significant statistical difference between the observed variables (Asymp. Sig. .000 < .05), so the null hypothesis is rejected.

In Figure 2. the percentage market share of individual banks in the total banking assets of Serbia is shown.

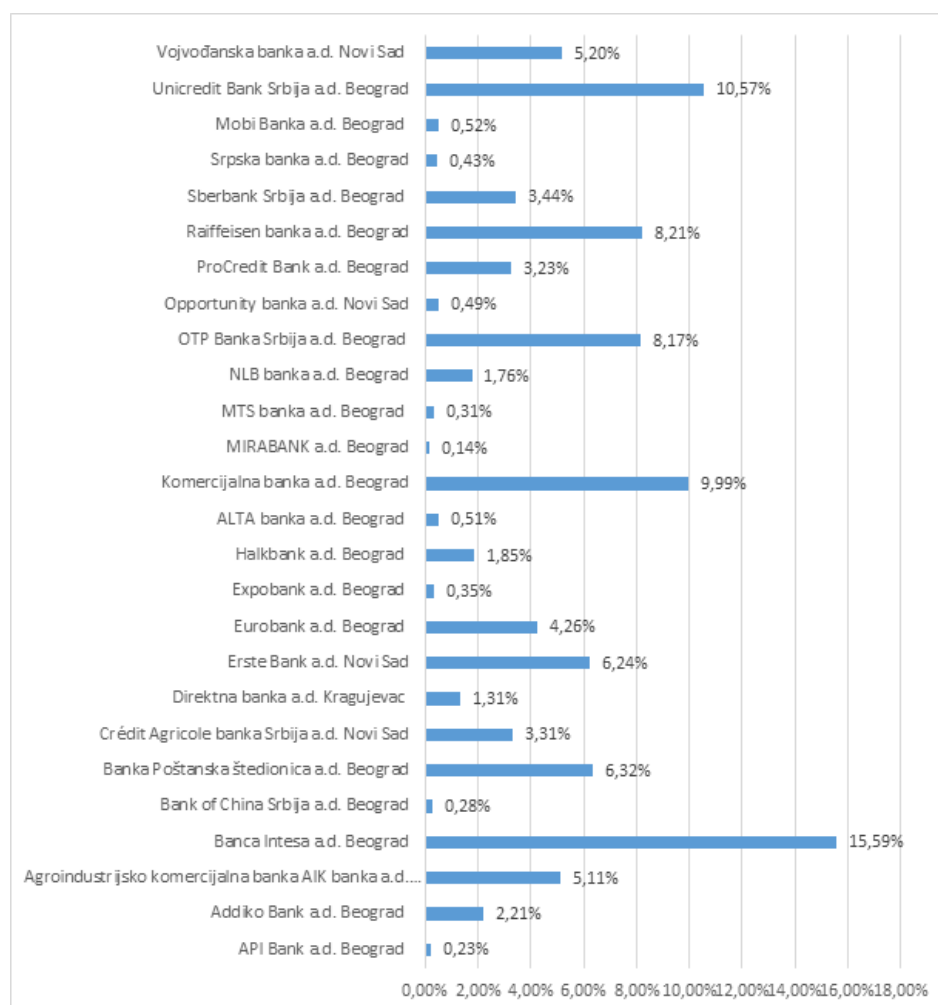


Figure 2. Market share according to the total banking assets of Serbia

Source: Author's picture

Top five banks according to assets in Serbia are: 1. Banca Intesa ad Beograd (15.59%). 2. Unicredit Bank Serbia ad Belgrade (10.57%), 3. Komercijalna banka ad Belgrade (9.99%), 4. Raiffeisen banka ad Belgrade (8.21%) and 5. OTP Banka Srbija ad Belgrade (8.17%). Together, they participate in the total banking assets of Serbia with 52.53%. This means that they significantly control the banking market in Serbia. The calculated Herfindahi-Hirschman Index (HHI) is 788, which means that it is a weak concentration.

(The formula for calculating the HHI is:

$$HHI = MS1^2 + MS2^2 + MS3^2 + \dots + MSn^2 \quad (14)$$

where: MS_n is the percentage market share of firm n expressed as a whole number.

The meaning of HHI is as follows: If $HHI < 1500$, it is a low concentration. If the HHI is between 1500 and 2500, the concentration is moderate. And finally, if $HHI > 2500$, it is a high concentration.)

Figure 3 shows the percentage market share of an individual bank in the total net business income of Serbian banks in order to understand the market concentration.

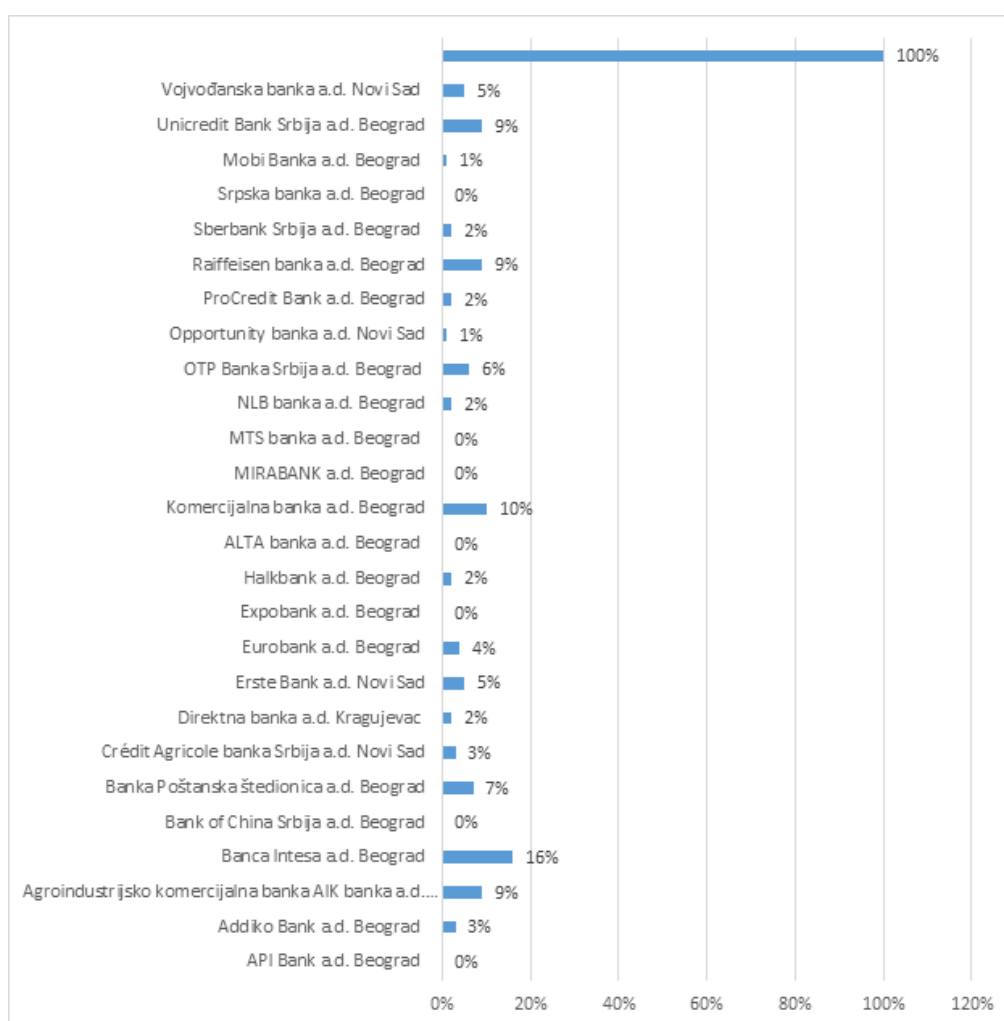


Figure 3. Market share according to the total net business income of Serbian banks

Source: Author's picture

The top five banks by share in total net business income in Serbia are: 1. Banca Intesa ad Beograd (16%), 2. Komercijalna banka ad Beograd (10%), 3. Unicredit bank Srbija ad Beograd (9%), 4. Raiffeisen Bank ad Belgrade (9%). and 5. Agro-industrial commercial bank AIK banka ad Beograd (9%). They therefore significantly control the banking market in Serbia (with 53%). The calculated Herfindahi-Hirschman Index (HHI) is 792. This means that the concentration is low.

Table 2 shows the correlation matrix of the initial data.

Table 2. Correlation matrix

Correlations												
		1	2	3	4	5	6	7	8	9	10	11
1 Salary expenses, salary compensation and other personal expenses	Pearson Correlation	1	.936**	.859**	.904**	.596**	.936**	.904**	.346	.403*	.400*	.303
	Sig.(2-tailed)		.000	.000	.000	.001	.000	.000	.083	.041	.043	.132
	N	26	26	26	26	26	26	26	26	26	26	26
2 Assets	Pearson Correlation	.936**	1	.961**	.968**	.757**	1.000**	.968**	.410*	.446*	.447*	.182
	Sig.(2-tailed)	.000		.000	.000	.000	.000	.000	.037	.022	.022	.373
	N	26	26	26	26	26	26	26	26	26	26	26
3 Capital	Pearson Correlation	.859**	.961**	1	.957**	.805**	.961**	.956**	.449*	.449*	.455*	-.047
	Sig.(2-tailed)	.000	.000		.000	.000	.000	.000	.021	.021	.020	.819
	N	26	26	26	26	26	26	26	26	26	26	26
4 Total net operating income	Pearson Correlation	.859**	.961**	1	.957**	.805**	.961**	.956**	.449*	.449*	.455*	-.047
	Sig.(2-tailed)	.000	.000		.000	.000	.000	.000	.021	.021	.020	.819
	N	26	26	26	26	26	26	26	26	26	26	26

5 Net result	Pearson Correlation	.596**	.757**	.805**	.870**	1	.757**	.869**	.613**	.602**	.494*	-.069
	Sig.(2-tailed)	.001	.000	.000	.000		.000	.000	.001	.001	.010	.739
	N	26	26	26	26	26	26	26	26	26	26	26
6 Participation in total assets	Pearson Correlation	.936**	1	.961**	.968**	.757**	1.000**	.968**	.410*	.446*	.447*	.182
	Sig.(2-tailed)	.000	.000	.000	.000	.000		.000	.037	.022	.022	.373
	N	26	26	26	26	26	26	26	26	26	26	26
7 Participation in total net business income	Pearson Correlation	.904**	.968**	.956**	1.000**	.869**	.968**	1	.505**	.526**	.485*	.113
	Sig.(2-tailed)	.000	.000	.000	.000	.000	.000		.009	.006	.012	.583
	N	26	26	26	26	26	26	26	26	26	26	26
8 Return on assets	Pearson Correlation	.346	.410*	.449*	.506**	.613**	.410*	.505**	1	.974**	.950**	.122
	Sig.(2-tailed)	.083	.037	.021	.008	.001	.037	.009		.000	.000	.552
	N	26	26	26	26	26	26	26	26	26	26	26
9 Return on capital	Pearson Correlation	.403*	.446*	.449*	.527**	.602**	.446*	.526**	.974**	1	.945**	.213
	Sig.(2-tailed)	.041	.022	.021	.006	.001	.022	.006	.000		.000	.295
	N	26	26	26	26	26	26	26	26	26	26	26
10 Return on total net business income	Pearson Correlation	.400*	.447*	.455*	.487*	.494*	.447*	.485*	.950**	.945**	1	.222
	Sig.(2-tailed)	.043	.022	.020	.012	.010	.022	.012	.000	.000		.275
	N	26	26	26	26	26	26	26	26	26	26	26
11 Financial indebtedness	Pearson Correlation	.303	.182	-.047	.112	-.069	.182	.113	.122	.213	.222	1
	Sig.(2-tailed)	.132	.373	.819	.588	.739	.373	.583	.552	.295	.275	
	N	26	26	26	26	26	26	26	26	26	26	26
**. Correlation is significant at the 0.01 level (2-tailed).												
*. Correlation is significant at the 0.05 level (2-tailed).												

Note: Author's calculation using SPSS software

Therefore, there is a moderate correlation between the observed variables at the level of statistical significance, except for financial indebtedness.

Using the AHP (Analytical Hierarchical Process) method, the weight coefficients of the criteria were determined (Saaty, 2008; Lukic, 2020a,b,c, 2021a,b,c,d). They are shown in Table 3 and Figure 4.

Table 3. Weight coefficients of the criteria

	Weights of Criteria
Salary expenses, salary allowances and other personal expenses	0.2931
Assets	0.1965
Capital	0.1450
Total net operating income	0.1918
Net result	0.1736
SUM	1
Consistency Ratio 0.0483	COMPARE WITH 0.1; IT SHOULD BE LESS THAN 0.1.

Note: Author's calculation using the software program AHPSoftware.Excel

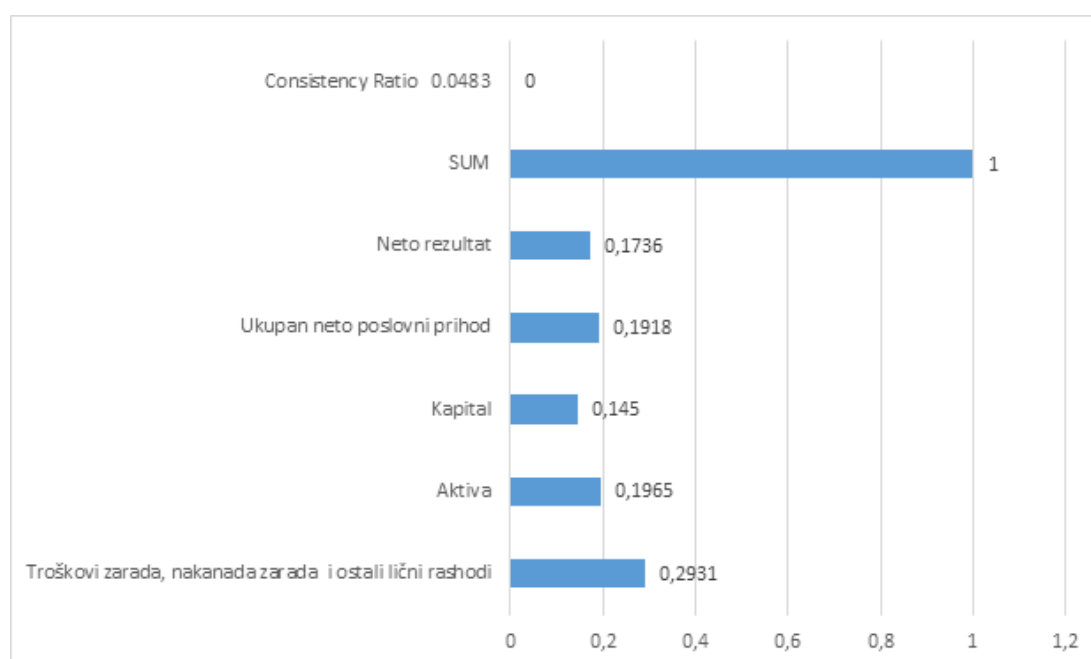


Figure 4. Weight coefficients of criteria

Source: Author's picture

Tables 4, 5, 6, 7, 8 and 9), as well as graphically (Figure 5), show the results of the research on the efficiency of banks in Serbia using the MABAC method.

Table 4. Initial matrix

Initial Matrix					
weights of criteria	0.2931	0.1965	0.145	0.1918	0.1736
kind of criteria	-1	1	1	1	1
	C1	C2	C3	C4	C5
A1	330	10360	in 1951	240	-413
A2	1231	101461	22759	4718	543
A3	1343	234932	53106	14442	9801
A4	6376	717185	109014	26478	9481
A5	309	12941	1762	304	-174
A6	4125	290681	26504	11192	2588
A7	2077	152176	13707	4984	857
A8	985	60087	11079	3157	660
A9	2507	287003	32929	8649	1333
A10	in 1984	196239	53676	6447	725
A11	301	16276	3465	584	-257
A12	958	85015	12488	2778	529
A13	316	23638	4041	698	12
A14	5819	459427	74086	16341	2928
A15	171	6248	1710	170	-209
A16	287	14387	2330	679	-156
A17	1254	80774	8782	3013	297
A18	3334	375876	52039	10018	2353
A19	726	22355	3852	in 1875	241
A20	951	148530	17272	3859	687
A21	3217	377709	63563	14960	5529
A22	1381	158448	25590	3822	374
A23	147	19679	3587	474	20

A24	758	24047	4135	1037	584
A25	3204	486496	82950	15266	5334
A26	3324	239181	30665	7423	-1179

MAX	6376	717185	109014	26478	9801
MIN	147	6248	1710	170	-1179

Note: Author's calculation using the software program MABACSoftware.Excel

Table 5. Normalized matrix

Normalized Matrix					
weights of criteria	0.2931	0.1965	0.145	0.1918	0.1736
kind of criteria	-1	1	1	1	1
	C1	C2	C3	C4	C5
A1	0.9706	0.0058	0.0022	0.0027	0.0000
A2	0.8260	0.1339	0.1962	0.1729	0.1568
A3	0.8080	0.3217	0.4790	0.5425	1.0000
A4	0.0000	1.0000	1.0000	1.0000	0.9709
A5	0.9740	0.0094	0.0005	0.0051	0.0000
A6	0.3614	0.4001	0.2311	0.4190	0.3431
A7	0.6902	0.2053	0.1118	0.1830	0.1854
A8	0.8655	0.0757	0.0873	0.1135	0.1675
A9	0.6211	0.3949	0.2909	0.3223	0.2288
A10	0.7051	0.2672	0.4843	0.2386	0.1734
A11	0.9753	0.0141	0.0164	0.0157	0.0000
A12	0.8698	0.1108	0.1004	0.0991	0.1556
A13	0.9729	0.0245	0.0217	0.0201	0.1085
A14	0.0894	0.6374	0.6745	0.6147	0.3740
A15	0.9961	0.0000	0.0000	0.0000	0.0000
A16	0.9775	0.0114	0.0058	0.0193	0.0000
A17	0.8223	0.1048	0.0659	0.1081	0.1344
A18	0.4884	0.5199	0.4690	0.3743	0.3217
A19	0.9070	0.0227	0.0200	0.0648	0.1293
A20	0.8709	0.2001	0.1450	0.1402	0.1699

A21	0.5071	0.5225	0.5764	0.5622	0.6109
A22	0.8019	0.2141	0.2225	0.1388	0.1414
A23	1.0000	0.0189	0.0175	0.0116	0.1092
A24	0.9019	0.0250	0.0226	0.0330	0.1606
A25	0.5092	0.6755	0.7571	0.5738	0.5932
A26	0.4900	0.3276	0.2698	0.2757	0.0000

Note: Author's calculation using the software program MABACSoftware.Excel

Table 6. Normalized weight matrix

NormalizedWeighted Matrix (V)					
	C1	C2	C3	C4	C5
A1	0.5776	0.1976	0.1453	0.1923	0.1736
A2	0.5352	0.2228	0.1734	0.2250	0.2008
A3	0.5299	0.2597	0.2145	0.2959	0.3472
A4	0.2931	0.3930	0.2900	0.3836	0.3421
A5	0.5786	0.1983	0.1451	0.1928	0.1736
A6	0.3990	0.2751	0.1785	0.2722	0.2332
A7	0.4954	0.2368	0.1612	0.2269	0.2058
A8	0.5468	0.2114	0.1577	0.2136	0.2027
A9	0.4752	0.2741	0.1872	0.2536	0.2133
A10	0.4998	0.2490	0.2152	0.2376	0.2037
A11	0.5790	0.1993	0.1474	0.1948	0.1736
A12	0.5480	0.2183	0.1596	0.2108	0.2006
A13	0.5782	0.2013	0.1481	0.1956	0.1924
A14	0.3193	0.3218	0.2428	0.3097	0.2385
A15	0.5851	0.1965	0.1450	0.1918	0.1736
A16	0.5796	0.1987	0.1458	0.1955	0.1736
A17	0.5341	0.2171	0.1546	0.2125	0.1969
A18	0.4362	0.2987	0.2130	0.2636	0.2294
A19	0.5590	0.2010	0.1479	0.2042	0.1961
A20	0.5484	0.2358	0.1660	0.2187	0.2031
A21	0.4417	0.2992	0.2286	0.2996	0.2797
A22	0.5281	0.2386	0.1773	0.2184	0.1982
A23	0.5862	0.2002	0.1475	0.1940	0.1926

A24	0.5574	0.2014	0.1483	0.1981	0.2015
A25	0.4424	0.3292	0.2548	0.3019	0.2766
A26	0.4367	0.2609	0.1841	0.2447	0.1736

Note: Author's calculation using the software program MABACSoftware.Excel

Table 7. Matrix of boundary approximate areas

Border Approximation Area Matrix (G)	0.5000	0.2391	0.1762	0.2322	0.2111
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Note: Author's calculation using the software program MABACSoftware.Excel

Table 8. Distance matrix of alternatives from border approximate areas

Distance of Alternatives from BAA matrix (Q)					
	C1	C2	C3	C4	C5
A1	0.0776	-0.0415	-0.0309	-0.0399	-0.0375
A2	0.0352	-0.0163	-0.0028	-0.0073	-0.0102
A3	0.0299	0.0206	0.0382	0.0636	0.1361
A4	-0.2069	0.1539	0.1138	0.1514	0.1311
A5	0.0786	-0.0408	-0.0312	-0.0394	-0.0375
A6	-0.1010	0.0360	0.0023	0.0399	0.0221
A7	-0.0046	-0.0023	-0.0150	-0.0053	-0.0053
A8	0.0468	-0.0278	-0.0186	-0.0186	-0.0084
A9	-0.0248	0.0350	0.0110	0.0214	0.0023
A10	-0.0002	0.0099	0.0390	0.0053	-0.0074
A11	0.0790	-0.0399	-0.0289	-0.0374	-0.0375
A12	0.0480	-0.0209	-0.0167	-0.0214	-0.0105
A13	0.0783	-0.0378	-0.0281	-0.0366	-0.0186
A14	-0.1807	0.0826	0.0666	0.0775	0.0275
A15	0.0851	-0.0426	-0.0312	-0.0404	-0.0375
A16	0.0796	-0.0404	-0.0304	-0.0367	-0.0375
A17	0.0341	-0.0221	-0.0217	-0.0197	-0.0141
A18	-0.0638	0.0595	0.0368	0.0314	0.0184
A19	0.0590	-0.0382	-0.0283	-0.0280	-0.0150
A20	0.0484	-0.0033	-0.0102	-0.0135	-0.0080
A21	-0.0583	0.0600	0.0524	0.0674	0.0686
A22	0.0281	-0.0006	0.0010	-0.0138	-0.0129

A23	0.0862	-0.0389	-0.0287	-0.0382	-0.0185
A24	0.0575	-0.0377	-0.0279	-0.0341	-0.0096
A25	-0.0576	0.0901	0.0786	0.0696	0.0655
A26	-0.0633	0.0217	0.0079	0.0125	-0.0375

Note: Author's calculation using the software program MABACSoftware.Excel

Table 9. Ranking of alternatives

	Alternatives	Q	Q	Ranking
API Bank ad Belgrade	A1	-0.0722	-0.0722	26
Addiko Bank ad Belgrade	A2	-0.0014	-0.0014	12
Agroindustrijsko komercijalna banka AIK banka ad Belgrade	A3	0.2885	0.2885	2
Banca Intesa ad Belgrade	A4	0.3432	0.3432	1
Bank of China Serbia ad Belgrade	A5	-0.0703	-0.0703	25
Banka Poštanska štedionica ad Belgrade	A6	-0.0007	-0.0007	11
Crédit Agricole banka Serbia ad Novi Sad	A7	-0.0325	-0.0325	15
Direktna banka ad Kragujevac	A8	-0.0266	-0.0266	14
Erste Bank ad Novi Sad	A9	0.0447	0.0447	8
Eurobank ad Belgrade	A10	0.0466	0.0466	7
Expobank ad Belgrade	A11	-0.0646	-0.0646	22
Halkbank ad Belgrade	A12	-0.0214	-0.0214	13
ALTA bank ad Belgrade	A13	-0.0429	-0.0429	17
Komercijalna banka ad Belgrade	A14	0.0734	0.0734	6
MIRABANK ad Belgrade	A15	-0.0667	-0.0667	24

MTS bank ad Belgrade	A16	-0.0653	-0.0653	23
NLB Bank ad Belgrade	A17	-0.0434	-0.0434	18
OTP Bank Serbia ad Belgrade	A18	0.0823	0.0823	5
Opportunity bank ad Novi Sad	A19	-0.0506	-0.0506	19
ProCredit Bank ad Belgrade	A20	0.0134	0.0134	9
Raiffeisen bank ad Belgrade	A21	0.1901	0.1901	4
Sberbank Serbia ad Belgrade	A22	0.0019	0.0019	10
Srpska Banka ad Belgrade	A23	-0.0381	-0.0381	16
Mobi Banka a.d. Beograd	A24	-0.0519	-0.0519	20
Unicredit Bank Srbija a.d. Beograd	A25	0.2462	0.2462	3
Vojvodanska banka a.d. Novi Sad	A26	-0.0587	-0.0587	21

Note: Author's calculation using the software program MABACSoftware.Excel

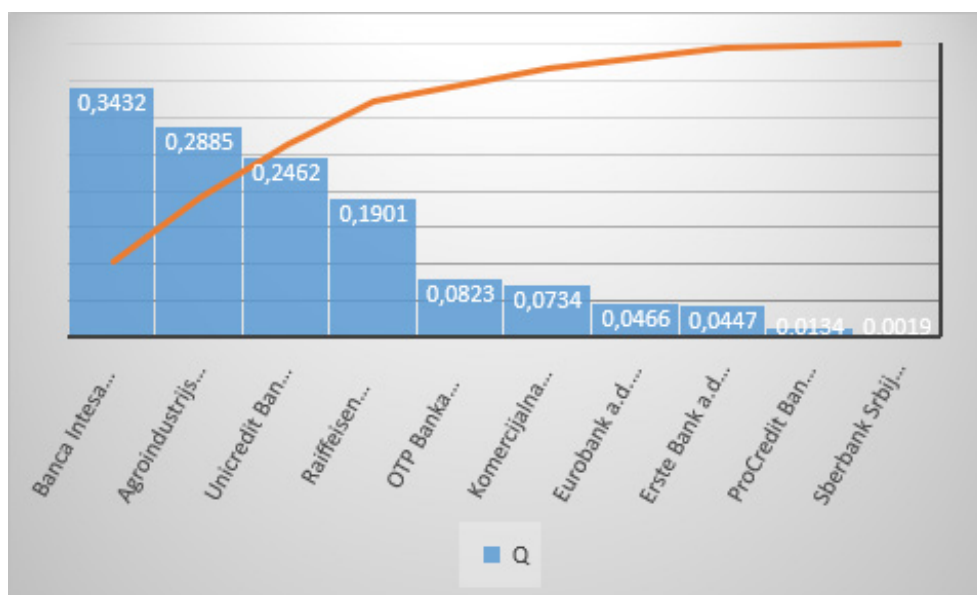


Figure 5. Ranking of alternatives

Source: Author's picture

Research on the efficiency of banks in Serbia using the MABAC method has shown that the first place is (1) Banca Intesa ad Beograd. They are as follows: 2 - Agroindustrijsko komercijalna banka AIK banka ad Belgrade, 3 - Unicredit Bank Srbija ad Belgrade, 4 - Raiffeisen banka ad Belgrade, 5 - OTP Banka Srbija ad Belgrade, 6 - Komercijalna banka ad Belgrade, 7 - Eurobank ad Belgrade, 8 - Erste Bank ad Novi Sad, 9 - ProCredit Bank ad Belgrade, 10 - Sberbank Srbija ad Belgrade, 11 - Banka Poštanska štedionica ad Belgrade, 12 - Addiko Bank ad Belgrade, 13 - Halkbank ad Belgrade, 14 - Direktna banka ad Kragujevac, 15 - Crédit Agricole banka Srbija ad Novi Sad, 16 - Srpska banka ad Beograd, 17 - ALTA banka ad Beograd, 18 - NLB banka ad Beograd, 19 - Opportunity banka ad Novi Sad, 20 - Mobi Banka ad Beograd, 21 - Vojvođanska banka ad Novi Now, 22 - Expobank ad Belgrade, 23 - MTS bank ad Belgrade, 24 - MIRABANK ad Belgrade, 25 - Bank of China Srbija ad Belgrade and 26 - API Bank ad Belgrade.

This ranking of banks in Serbia according to the MABAC method was influenced by numerous macro and micro factors (economic climate, foreign direct investments, exchange rate, inflation, employment, living standards of the population, financing of infrastructure projects and debts). The impact of the Covid-19 corona virus pandemic on the efficiency of banks in Serbia is negative. A reduced number of employees was recorded and credit activities were „frozen“. These negative effects are hardly mitigated by electronic banking, as is the case, for the sake of comparison, with other service sectors (for example, trade, insurance). In order to improve the efficiency of banks in Serbia in the future, it is therefore necessary to manage human resources (training, rewards, promotion, flexible employment), assets, capital, income and profit as efficiently as possible.

Conclusion

Analysis of the efficiency of banks in Serbia based on the MABAC method showed that the first place is (1) Banca Intesa ad Beograd. They are as follows: 2 - Agroindustrijsko komercijalna banka AIK banka ad Belgrade, 3 - Unicredit Bank Srbija ad Belgrade, 4 - Raiffeisen banka ad Belgrade, 5 - OTP Banka Srbija ad Belgrade, 6 - Komercijalna banka ad Belgrade, 7 - Eurobank ad Belgrade, 8 - Erste Bank ad Novi Sad, 9 - ProCredit Bank ad Belgrade, 10 - Sberbank Srbija ad Belgrade, 11 - Banka Poštanska štedionica ad Belgrade, 12 - Addiko Bank ad Belgrade, 13 - Halkbank ad Belgrade, 14 - Direktna banka ad Kragujevac, 15 - Crédit Agricole banka Srbija ad Novi Sad, 16 - Srpska banka ad Beograd, 17 - ALTA banka ad Beograd, 18 - NLB banka ad Beograd, 19 - Opportunity banka ad Novi Sad, 20 - Mobi Banka ad Beograd, 21 - Vojvođanska banka ad Novi Now, 22 - Expobank ad Belgrade, 23 - MTS bank ad Belgrade, 24 - MIRABANK ad Belgrade, 25 - Bank of China Srbija ad Belgrade and 26 - API Bank ad Belgrade.

There are numerous macro and micro factors for the ranking of banks in Serbia according to the MABAC method (economic climate, foreign direct investments, exchange rate, inflation, employment, standard of living of the population, financial markets, infrastructure projects and debts). The negative impact of the Covid-19 pandemic on the efficiency of banks in Serbia was recorded (the number of employees was reduced and many credit activities were „frozen“). These negative effects are hardly mitigated by electronic banking, as is the case, for the sake of comparison, with other service sectors (for example, trade, insurance).

In order to improve the efficiency of banks in Serbia in the future, it is necessary to manage human capital, assets, capital, income and profit as efficiently as possible.

The MABAC method is very simple, there are software programs, and it enables, in relation to ratio analysis, to determine a more realistic situation regarding the efficiency of banks in Serbia in terms of improvement in the future by undertaking relevant effective measures. For these reasons, it is recommended, especially in combination with other methods of multi-criteria analysis (AHP, TOPSIS, ARAS, WASPAS and others).

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RAZVOJ I PERSPEKTIVE SISTEMA OSIGURANJA DEPOZITA U SVETU

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Rezime

Istorija razvoja sistema osiguranja depozita je dosta duga. U svetu funkcioniše veliki broj različitih sistema koji su se vremenom menjali prilagođavajući se okolnostima u okruženju. U svakom slučaju, osiguranje depozita je postalo centralna komponenta finansijske sigurnosne mreže u većini zemalja. Predmet rada predstavlja analiza razvoja sistema osiguranja depozita kroz istoriju, uporedna analiza organizovanja, funkcija i mandata osiguravača depozita, sa akcentom na značaj sistema osiguranja depozita za očuvanje finansijske stabilnosti zemlje. Pored toga, rad ima za cilj da ukaže na značaj lekcija proisteklih iz finansijskih kriza koje su pre svega, naglasile potrebu za reformama finansijskih sistema i kreiranje efikasnih sistema zaštite.

Ključne reči: sistem osiguranja depozita, finansijska stabilnost, Agencija za osiguranje depozita, Fond za osiguranje depozita

JEL Klasifikacija: G21, G28, O16

Uvod

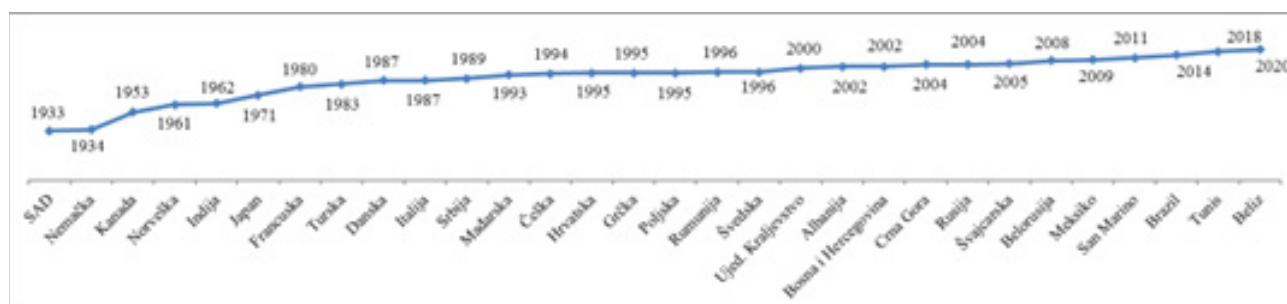
Pružajući zaštitu najranjivijim kategorijama deponenata isplatom osiguranih iznosa u slučaju stečaja ili likvidacije banaka, sistem osiguranja depozita doprinosi jačanju poverenja javnosti u finansijski sistem i u značajnoj meri doprinosi njegovoj stabilnosti.

Ovi ciljevi sistema osiguranja depozita često se podrazumevaju u periodima finansijske stabilnosti, ali u periodima finansijskih kriza, njihov značaj dolazi do izražaja. Ukoliko pogledamo stvari iz drugačije perspektive: odsustvo zaštite depozita u periodima nestabilnosti ili potresa na tržištu može u kratkom roku uzrokovati značajan odliv depozita iz banaka (tzv. bank run), čime se može ugroziti likvidnost celokupnog bankarskog sistema, koji je ključan za stabilnost privrede kao celine naročito u bankocentričnim finansijskim sistemima.

Iako Sjedinjene Američke Države nisu bile prve koje su osnovale nacionalni sistem osiguranja depozita, on postoji gotovo devedeset godina i najstariji je u kontinuitetu budući da sistem Norveške osnovan 1921. godine, kao i sistemi Finske i Češke osnovani 1924. godine nisu „preživeli“ II Svetski rat. Sistem osiguranja depozita uspostavljen je u Sjedinjenim Američkim Državama 1933. i vezuje se za Saveznu korporaciju za osiguranje depozita (Federal Deposit Insurance Corporation, FDIC), koja osigurava depozite deponenata u američkim komercijalnim bankama i štednim institucijama, a osnovana je Zakonom o bankarstvu donetim iste godine, kako bi se nakon Velike depresije povratilo poverenje u američki bankarski sistem.

Do danas je preko 130 država uspostavilo sistem osiguranja depozita. U periodu između 1961. godine i 1990. godine osnovani su sistemi osiguranja depozita Norveške (1961), Belgije (1974), Francuske (1980), a od 1991. godine do danas osnovani su sistemi osiguranja zemalja centralne i istočne Azije, Latinske Amerike i Evrope. Sistem osiguranja depozita u našoj zemlji uspostavljen je u decembru 1989. godine formiranjem Agencije za osiguranje depozita, sanaciju, stečaj i likvidaciju banaka.

Grafikon 1: Godine osnivanja sistema osiguranja depozita u svetu

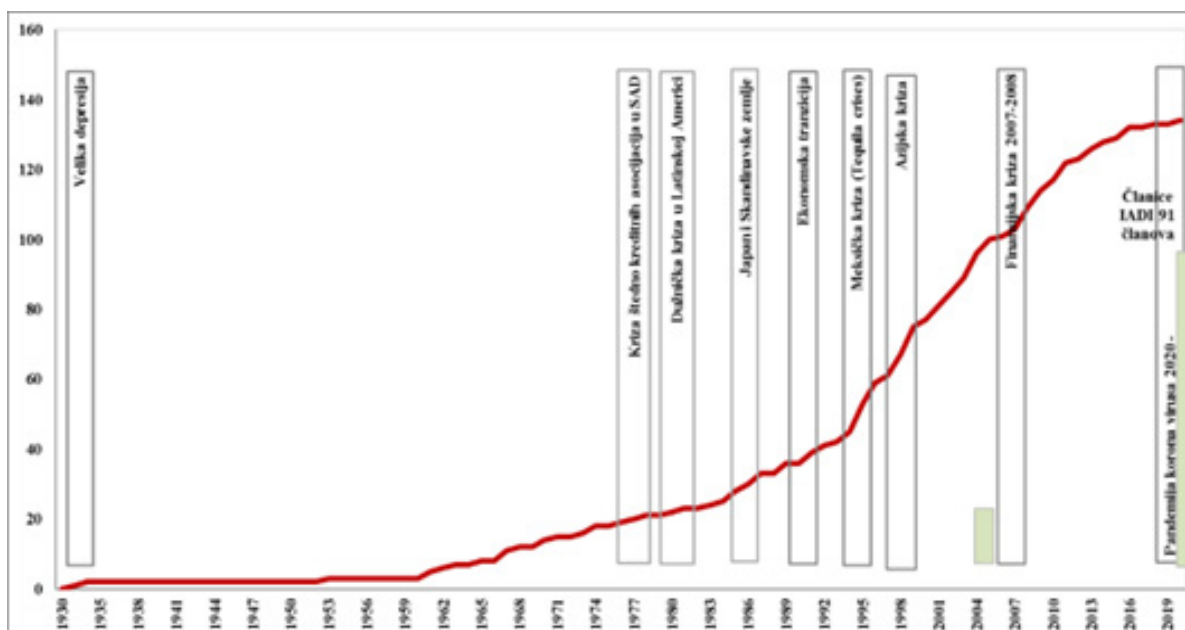


Izvor: Prikaz autora

Uticaj finansijskih kriza na osnivanje sistema osiguranja depozita

Finansijske krize su u velikoj meri uticale na osnivanje sistema osiguranja depozita širom sveta, jer su ukazale na potrebu sistemskog pristupa regulaciji finansijskog sektora i obezbeđenju poverenja deponenata. U svetu se neprekidno osnivaju novi sistemi, pa tako na primer, trenutno se planira uvođenje sistema osiguranja depozita na Novom Zelandu. Teorija destabilizujuće zaštite koja se zasniva na shvatanju da osiguranje depozita podstiče krize, jer ohrabruje banke da prihvataju nepotrebne rizike u poslovanju, bila je više od jednog veka osnova za protivljenje uspostavljanju sistema osiguranja depozita u nekim državama, među kojima su i Sjedinjene Američke Države, ali je zakon kojim se reguliše sistem osiguranja depozita ipak donet u sklopu seta novih finansijskih zakona, odnosno mera za izlazak iz finansijske krize 1933. godine. Na Grafikonu 2. Prikazan je trend uspostavljanja sistema osiguranja depozita u periodima finansijskih kriza.

Grafikon 2: Finansijske krize, broj sistema osiguranja depozita i članica IADI-a



Izvor: Prikaz autora

Međunarodna asocijacija osiguravača depozita (International Association of Deposit Insurers, IADI) osnovana je 06. maja 2002. godine u cilju razmene iskustva u osiguranju depozita u svetu obezbeđujući na taj način doprinos stabilnosti finansijskih sistema. IADI je neprofitna organizacija osnovana prema švajcarskom zakonu sa sedištem u Banci za međunarodna poravnanja (Bank for International Settlements, BIS) u Bazelu u Švajcarskoj.

Od 193 zemlje u svetu, 91 su članice IADI i imaju eksplicitne sisteme zaštite depozita. Ova Asocijacija takođe broji i 7 članova sa statusom saradnika (centralne banke i nadzorni organi), kao i 17 članova sa statusom partnera (različite međunarodne institucije) koji pružaju de fakto implicitne garancije, odnosno ne ispunjavaju sve kriterijume da budu članice IADI, ali su deo finansijske sigurnosne mreže ili imaju direktan interes vezan za efikasnost sistema osiguranja depozita.

Značaj osiguranja depozita u očuvanju finansijske stabilnosti vidljiv je i na primeru Srbije. Kada je finansijska kriza 2008. godine dovela do odliva štednje iz banaka u iznosu od 1,1 milijarde evra, merama regulatora monetarne politike, u septembru 2008. godine uvedene su promene u sistem osiguranja depozita. Promene su se pre svega odnosile na povećanje iznosa pokrića sa 3.000 evra na 50.000 evra, kao i na proširenje obuhvata strukture zaštićenih deponenata (pored fizičkih lica zaštićeni su i preduzetnici kao i mala i srednja preduzeća), što je doprinelo jačanju poverenja i vraćanju depozita u bankarski sistem u narednih jedanaest meseci.

Uvedene mere su uveliko doprinele povećanju finansijske stabilnosti na tržištu.

Očuvanje i jačanje poverenja javnosti u bankarski sektor ogleda se kroz kontinuirani rast štednje. Zahvaljujući merama Narodne banke Srbije obezbeđena je makroekonomska stabilnost, a domaće tržište karakterišu visoke stope rasta depozita. Primera radi, osigurani depoziti povećani su 16,5% u 2020. godini i 11,7% u 2021. godini (podaci Agencije za osiguranje depozita).

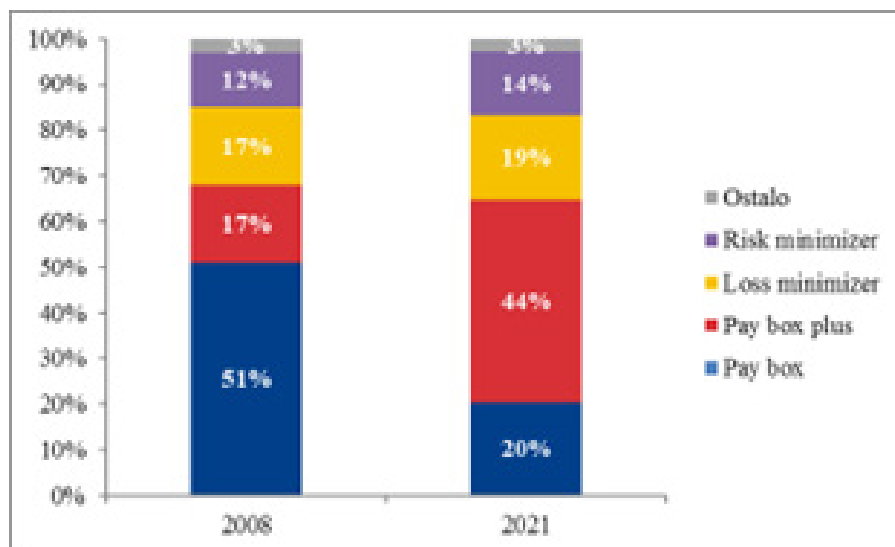
Funkcije i ovlašćenja osiguravača depozita

U uporednoj praksi primenjuju se različita rešenja kada je reč o obuhvatu funkcija i ovlašćenja osiguravača depozita. Najuzi mandat predstavlja tzv. „isplatna blagajna“ (Pay-box) u kome je osiguravač depozita nadležan samo za isplatu osiguranih depozita po nastupanju osiguranog slučaja (stečaj banke).

Model „isplatne blagajne plus“ (Pay-box plus) podrazumeva da osiguravač depozita pored isplate osiguranih depozita ima i dodatne odgovornosti kao što su određena ovlašćenja u procesu restrukturiranja finansijskih institucija (npr. finansijska podrška). Za ovaj model opredelila se većina zemalja među kojima je i Srbija.

Grafikon 3: Uporedni pregled funkcija i ovlašćenja osiguravača depozita, 2008-2021. godine Modeli sa širim mandatom podrazumevaju da se osiguravač depozita pored isplate osiguranih depozita aktivno angažuje u izboru instrumenata restrukturiranja banaka po principu najmanjih troškova (Loss minimizer) ili da ima široko definisane funkcije u cilju svođenja rizika na najmanju meru, koje uključuju upravljanje i procenu rizika, niz ovlašćenja u primenama mera rane intervencije i restrukturiranja institucija, i u nekim slučajevima, odgovornosti u pogledu prudenčijalnog nadzora (Risk minimizer). U poslednjih deset godina primetan je znatan porast osiguravača depozita koji funkcionišu po modelu „isplatne blagajne plus“.

Grafikon 3: Uporedni pregled funkcija i ovlašćenja osiguravača depozita, 2008-2021. godine



Izvor: Prikaz autora na osnovu podataka IADI Annual Survey 2021

U narednoj tabeli dat je pregled mandata sistema osiguranja depozita među pojedinim članicama IADI-a.

Tabela 1: Mandati uspostavljeni u pojedinim zemljama članicama IADI

Mandat	Zemlje
1. Pay-box	Belgija, Danska, Makedonija, Švajcarska
2. Pay-box plus	Bosna i Hercegovina, Bugarska, Češka, Grčka, Mađarska, Crna Gora, Rumunija, Srbija, Španija, UK
3. Loss minimizer	Francuska, Italija, Japan, Poljska, Rusija, Turska
4. Risk minimizer	Nemačka, Norveška, SAD

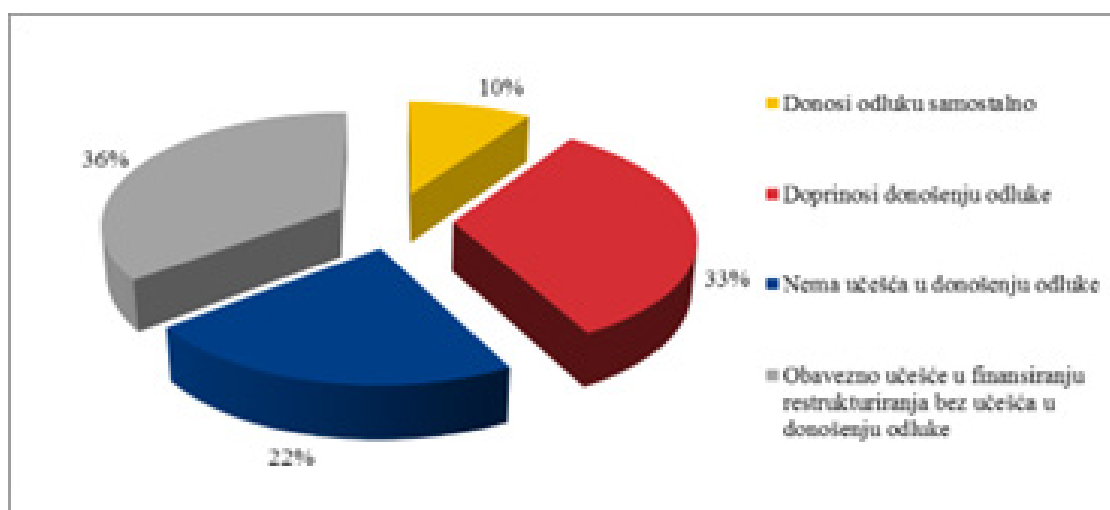
Izvor: IADI Annual Survey 2021

U skladu sa Zakonom o bankama, Zakonom o Agenciji za osiguranje depozita i Zakonom o osiguranju depozita u Republici Srbiji, Fond za osiguranje depozita se pored osnovne funkcije isplate depozita takođe može koristiti i za finansiranje procesa restrukturiranja banaka, dok Agencija može upravljati imovinom prenetom u postupku restrukturiranja banaka i obavljati druge poslove u vezi sa postupkom restrukturiranja u skladu sa zakonom kojim se uređuju banke.

U uporednoj praksi primenjena su različita rešenja kada je reč o ulozi osiguravača depozita u donošenju odluka u procesu restrukturiranja banaka. U najvećem broju zemalja sredstva fonda se mogu koristiti za finansiranje restrukturiranja banaka, s tim da osiguravač depozita nije ovlašćen da samostalno o tome odlučuje, dok u trećini zemalja osiguravač depozita učestvuje u donošenju odluke.

U Republici Srbiji ne postoji poseban fond za restrukturiranje banaka. Zakonska regulativa omogućila je stoga korišćenje sredstava fonda za osiguranje depozita kao jednog od izvora za finansiranje postupka restrukturiranja banaka. Agencija za osiguranje depozita dužna je da, prilikom izrade testa najmanjeg troška, kojim se utvrđuje da li bi sprovođenje postupka restrukturiranja i primena pojedinih instrumenata i mera restrukturiranja bili celishodniji od sprovođenja stečajnog ili likvidacionog postupka nad bankom, Narodnoj banci Srbije dostavi mišljenje na nacrt izveštaja o testu najmanjih troškova.

Grafikon 4: Uloge osiguravača depozita u donošenju odluka u procesu restrukturiranja banaka



Izvor: Prikaz autora na osnovu podataka IADI Annual Survey 2021

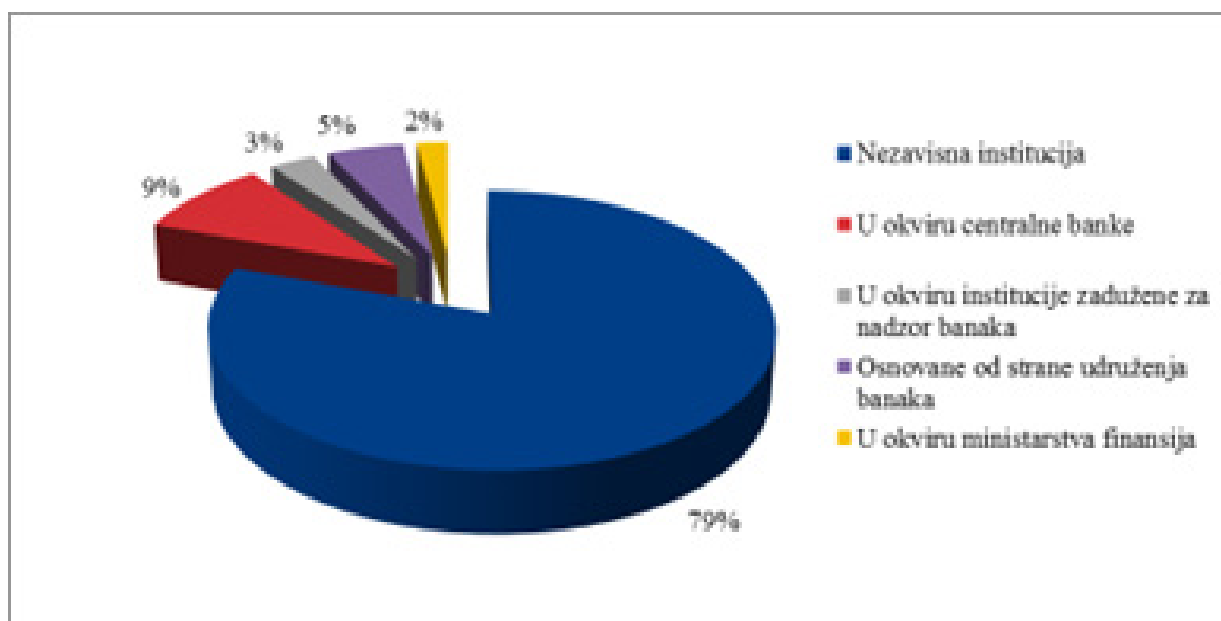
Pravna forma osiguravača depozita

U međunarodnoj praksi većina sistema osiguranja depozita uspostavljena je u skladu sa zakonom i pod državnom je upravom.

U stručnim krugovima se dugo vodila diskusija o najpogodnijoj pravnoj formi organizovanja osiguravača depozita. Najzastupljeniji način osnivanja i organizovanja sistema osiguranja depozita je oblik nezavisne institucije koji primenjuje velika većina zemalja uključujući i Srbiju.

Manji broj sistema organizovan je u okviru centralnih banaka (Holandija, Saudijska Arabija, Slovenija), institucija za nadzor nad bankama (Australija, Brazil, Kanada - Kvebek), udruženja banaka (Nemačka, Italija, Brazil, Lihtenštajn) ili ministarstava nadležnih za poslove finansija (Belgija, Kolumbija).

Grafikon 5: Zastupljenost modela sistema osiguranja depozita prema pravnoj formi



Izvor: Prikaz autora na osnovu podataka IADI Annual Survey 2021

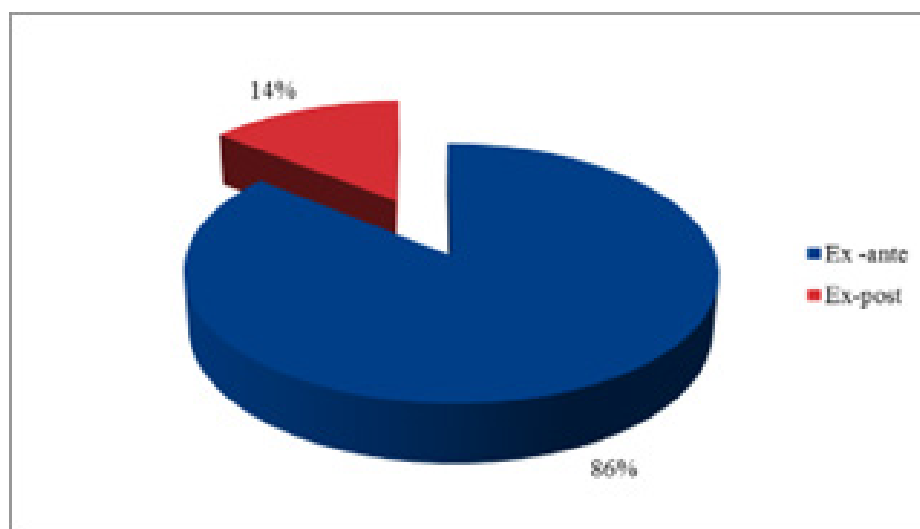
Načini finansiranja fonda osiguranja depozita

Generalno, primarni izvor obrazovanja sredstava fonda za osiguranje depozita predstavljaju premije koje se naplaćuju od banaka članica sistema osiguranja depozita (generalno, članstvo je u najvećem broju zemalja obavezno i nije uspostavljeno na dobrovoljnoj osnovi).

Najzastupljeniji način finansiranja fonda osiguranja depozita, koji primenjuje i Srbija, je naplata redovnih premija od banaka (tzv. ex-ante) u cilju akumuliranja sredstava za ispunjenje potencijalnih budućih obaveza isplate deponenata. Ovaj način finansiranja je preferencijalan, s obzirom na to da su i one banke nad kojim je pokrenut u nekom trenutku stečajni postupak za vreme svoje poslovne aktivnosti uplaćivale premije u fond.

Mali broj sistema primenjuje metod naknadne naplate premija (tzv. ex-post), gde se premija naplaćuje nakon što se dogodi osigurani slučaj od članica sistema osiguranja koje su i dalje aktivne na tržištu. Države čiji se sistemi finansiraju isključivo ex-post su Australija, pojedine kanadske provincije i Švajcarska, dok pojedine zemlje primenjuju hibridni model, prema kome su prisutna oba vida finansiranja.

Grafikon 6: Zastupljenost modela sistema osiguranja depozita prema načinu finansiranja



Izvor: Prikaz autora na osnovu podataka IADI Annual Survey 2021

Uopšteno posmatrano postoje dva načina obračuna i naplate premija: linearni i diferencijalni metod. Evropska Direktiva o sistemima osiguranja depozita nalaže da se premije obračunavaju na osnovu procene nivoa rizika u poslovanju članica i ovaj način obračuna obavezujući je za sve članice EU. U Republici Srbiji, Zakonom o izmenama i dopunama zakona o osiguranju depozita iz 2019. godine uvedena je mogućnost obračuna premije na osnovu nivoa rizika u poslovanju banaka. U vezi sa tim, Agencija za osiguranje depozita, uz prethodnu saglasnost Narodne banke Srbije, donela je relevantnu metodologiju, a naknadno će utvrditi početak njene primene. Trenutno, premija se obračunava linearnom metodom, što podrazumeva primenu utvrđene premijske stope za datu godinu na zakonsku osnovicu, koja podrazumeva prosečan iznos depozita do visine osiguranih iznosa u banci u tromesečju koje prethodi obračunu.

Visina osiguravajućeg pokrića

Nivoi ili visina osiguravajućeg pokrića trebalo bi da budu utvrđeni na nivou koji štiti „male“ depozite, pre svega fizička lica, koji generalno ne moraju biti u velikoj meri finansijski pismeni da bi bili u stanju da procenjuju rizike u poslovanju banaka.

S druge strane oni ne mogu svojim delovanjem umanjiti efekat moralnog hazarda u bankama (u smislu podsticaja za veće preuzimanje rizika zbog zaštite koju sistem osiguranja depozita pruža). Zbog toga je neophodno da određeni nivo depozita ostane izložen tržišnoj disciplini. Ipak, hipoteza da će neosigurani deponenti vršiti monitoring nad profilom rizika banaka i sprovoditi tržišnu disciplinu prenoseći sredstva u manje rizične banke je diskutabilna, iz razloga što informacije o finansijskom položaju banaka nisu uvek dostupne trenutno (najčešće se mogu dobiti kvartalno),

a čak i da jesu, transakcioni troškovi promene banaka su relativno visoki, obzirom da su poslovni odnosi pravnih lica sa bankama znatno složeniji i dublji (IADI, 2013). Regulisanje procesa restrukturiranja zakonskim okvirom, s druge strane, utiče na smanjenje moralnog hazarda, odnosno prekomernog preuzimanja rizika od strane banaka, obzirom da počiva na načelu da gubitke u postupku restrukturiranja prvo snose akcionari, a potom i poverioci banke, a u cilju zaštite deponenata, investitora, budžetskih javnih sredstava, što dalje implicira da na efikasnost sistema osiguranja depozita u velikoj meri utiču zakonski okvir i makroekonomsko okruženje.

Finansijske krize potvrdile su pretpostavke da nizak nivo osiguravajućeg pokrića neće sprečiti značajne odlive depozita iz bankarskog sektora u slučaju potresa, a ujedno je potvrđen značaj informisanosti deponenata o vrsti i obimu zaštite koju sistem osiguranja depozita pruža za održavanje tržišne discipline.

Tokom finansijske krize, u periodu 2008-2009. godine 19 sistema osiguranja depozita pokrivalo je sve ili veliku većinu depozita u bankarskom sistemu, 22 su trajno povećale nivo osiguravajućeg pokrića, među kojima je i Srbija, a 7 su povećale osigurani iznos privremeno (IADI, 2013).

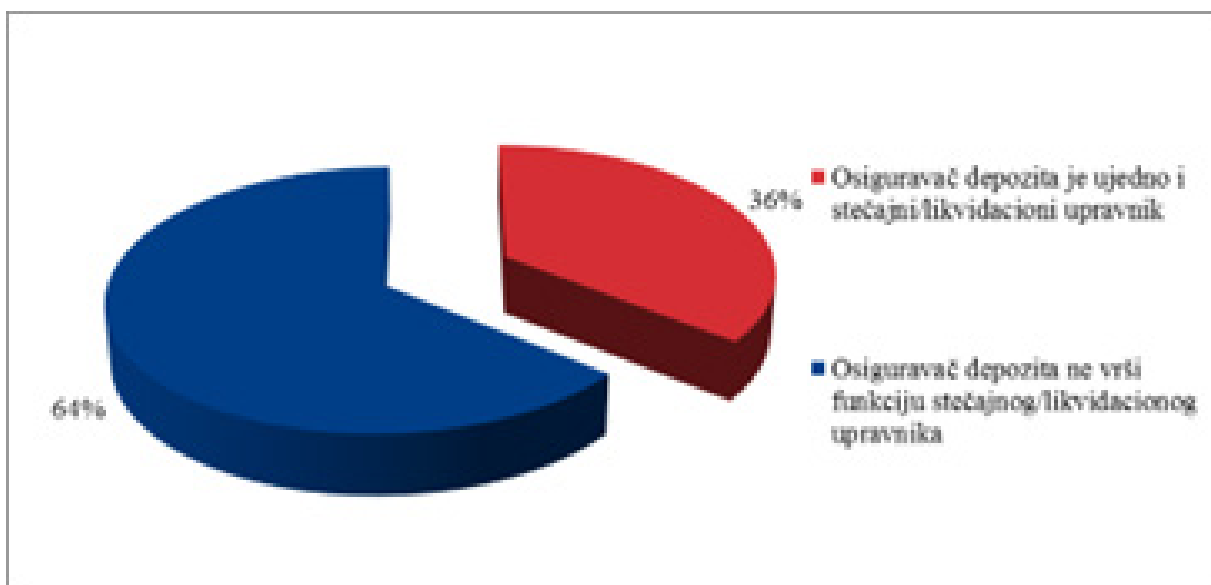
Kada je u pitanju visina pokrića osiguranja (radi uporedivosti podataka iskazano u američkim dolarima po kursu na dan 31.12.2020. godine), najmanji osigurani iznos beleže afričke zemlje: Zimbabve (122 USD), zatim Ruanda (505 USD) i Gana (1.085 USD). Istovremeno osigurani iznos u SAD-u iznosi 250 hiljada USD, a u Norveškoj oko 232,5 hiljada USD (2 miliona NOK) i Australiji oko 192,3 hiljade USD (250 hiljada AUD). Evropska Direktiva o sistemima osiguranja depozita propisuje osigurani iznos u visini 100.000 evra po deponentu po banci, naglašavajući da je harmonizacija po pitanju visine osiguranog iznosa neophodna kako bi se obezbedili jednaki uslovi za sve učesnike, konkurentnost i stabilnost na unutrašnjem finansijskom tržištu. Osigurani iznos depozita u Republici Srbiji utvrđen Zakonom o osiguranju depozita iznosi 50.000 evra i obzirom da se njime pokriva velika većina deponenata (oko 99% fizičkih lica) njegovo povećanje ne bi bilo svrsishodno. Svakako, usklađivanjem sa pravnim tekovinama EU i ulaskom Republike Srbije u EU biće neophodno uskladiti i visinu osiguranog iznosa sa visinom propisanom Direktivom EU. Na polju Direktive o sistemima osiguranja depozita, Evropska komisija sarađuje sa Evropskim nadzornim telom za bankarstvo (EBA) i dva savetodavna tela. U tom kontekstu, u periodu 2019-2020. godina EBA je pripremlilo tri izveštaja na osnovu kojih Evropskoj komisiji daje predlog potencijalnih izmena Direktive. Jedna od konstatacija je i da je trenutno utvrđen osigurani iznos na nivou od 100.000 evra, na osnovu kvalitativnih i kvantitativnih analiza ocenjen kao adekvatan i da ga ne treba menjati.

Takođe, evropska Direktiva propisuje zaštitu pojedinih depozita iznad nivoa osiguravajućeg pokrića određeni vremenski period. To su depoziti proistekli iz trgovine nekretninama, zatim depoziti proistekli iz isplata suma osiguranja, sklapanja braka, razvoda, penzionisanja i sl., tzv. privremeno visoki saldo (temporary high balances, THB).

Obavljanje funkcije stečajnih/likvidacionih upravnika finansijskih institucija od strane osiguravača depozita

Kao što je to slučaj u Srbiji, u međunarodnoj praksi, jedan deo osiguravača depozita vrši ujedno i funkciju stečajnog/likvidacionog upravnika. Cilj ovakvog rešenja je efikasniji stečajni postupak i brži povraćaj sredstava isplaćenih deponentima iz fonda za osiguranje depozita nakon otvaranja stečaja nad finansijskim institucijama. Osiguravač depozita obavlja i ovu funkciju u Rusiji, Kanadi, Francuskoj, Rumuniji, Turskoj, Ukrajini, SAD, Japanu i drugim zemljama.

Grafikon 7: Zastupljenost sistema osiguranja depozita prema ulozi stečajnog/likvidacionog upravnika u finansijskim institucijama



Izvor: Prikaz autora na osnovu podataka IADI Annual Survey 2021

Osiguranje depozita u Evropskoj uniji

Direktiva 94/19/EC Evropskog parlamenta i Saveta od 30. maja 1994. godine o sistemima za osiguranje depozita koja je propisivala minimum harmonizacije na nivou EU, obavezala je sve članice na uvođenje sopstvenog sistema osiguranja depozita.

Globalna finansijska kriza iz 2007-2009. godine uticala je na reviziju Direktive koja je 2009. godine pretrpela izmene. U aprilu 2014. godine usvojena je nova Direktiva 2014/49/EU Evropskog parlamenta i Saveta o sistemima za osiguranje depozita koja podrazumeva pre svega postepeno skraćivanje rokova za početak isplate osiguranih iznosa depozita sa 20 na 7 radnih dana, dok je velika pažnja posvećena načinu, formi i obimu informacija koje se dostavljaju deponentima u vezi sa osiguranjem njihovih depozita.

Sistemi osiguranja depozita uspostavljeni i koji funkcionišu u skladu sa odredbama navedene Direktive predstavljali bi osnovu za formiranje Evropskog sistema osiguranja depozita (European Deposit Insurance System, EDIS), koji bi ujedno predstavljao i treći stub bankarske unije (pored Jedinstvenog mehanizma supervizije i Jedinstvenog mehanizama za restrukturiranje banaka), čime bi ona bila zaokružena, a sa ciljem povećanja otpornosti Ekonomske i monetarne unije (Economic and Monetary Union, EMU). Cilj EDIS-a je jača i ujednačena zaštita deponenata u okviru evro zone, u smislu da poverenje deponenata ne zavisi od lokacije banke. Ideja je da se EDIS razvija fazno sa ciljem da u finalnoj fazi zaštitu pruža EDIS u saradnji sa nacionalnim sistemima zaštite.

Iako je Evropska komisija još 2015. godine predložila formiranje EDIS-a, ovaj sistem još uvek nije operativan. Članice evrozone se dele na one koje se intenzivno zalažu za njegovo uvođenje (Italija, Španija, i dr.) i na one koje izražavaju zabrinutost, na prvom mestu Nemačka. U osnovi debata je pitanje moralnog hazarda koje je u osnovi nejednake disperzije rizika u bankarskom sektoru u okviru EU (M.Tümmeler, M.Thiemann, 2020).

Umesto zaključka

Iako u svetu postoje različiti modaliteti organizovanja i funkcionisanja sistema osiguranja depozita, najveći broj država je odavno uvideo značaj njihovog uspostavljanja za stabilnost celokupnog finansijskog sistema. Sistemi osiguranja depozita evoluiraju, i pored inkrementalnih promena sa ciljem usklađivanja sa najboljom međunarodnom praksom i standardima, u periodima kriza najčešće značajno menjaju osnovne karakteristike u smislu povećanja visine osiguranih iznosa i proširenja obuhvata zaštićenih deponenata. S druge strane finansijske krize su često bile i uzrok samog uspostavljanja ovih institucionalnih sistema zaštite u pojedinim zemljama.

U Srbiji je u periodu 2018.-2019. godine izvršena procena usklađenosti sistema osiguranja sa Baznim principima delotvornih sistema osiguranja depozita IADI, što je poslužilo kao osnova za reformu i bitno unapređenje efektivnosti sistema osiguranja depozita i jačanje institucionalnog kapaciteta Agencije kao osiguravača depozita i to, kako u regulatornom, tako i u nadzornom smislu.

Za zaokruživanje bankarske unije na nivou EU, koja je ključna za finansijsku stabilnost i otpornost na krizne situacije, preostalo je uspostavljanje Evropskog sistema osiguranja depozita. Na Samitu EU u junu 2021. godine lideri su obnovili svoju punu posvećenost kompletiranju bankarske unije i pozvali Evrogrupu na dogovor o daljim aktivnostima na tom polju.

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DEVELOPMENT AND PERSPECTIVES OF THE DEPOSIT INSURANCE SYSTEM WORLDWIDE

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Summary

The history of the development of the deposit insurance system is quite long. There are a large number of different systems operating in the world that have changed over time, adapting to the circumstances in the environment. In any case, deposit insurance has become a central component of the financial safety net in most countries. The subject of this paper is an analysis of the development of the deposit insurance system throughout history, a comparative analysis of the organisation, functions and mandate of deposit insurers, with an emphasis on the importance of the deposit insurance system for preserving the country's financial stability. In addition, this paper aims to point out the importance of lessons derived from financial crises, which, above all, emphasised the need for financial system reforms and the creation of effective protection systems.

Keywords: deposit insurance system, financial stability, Deposit Insurance Agency, Deposit Insurance Fund

JEL classification: G21, G28, O16

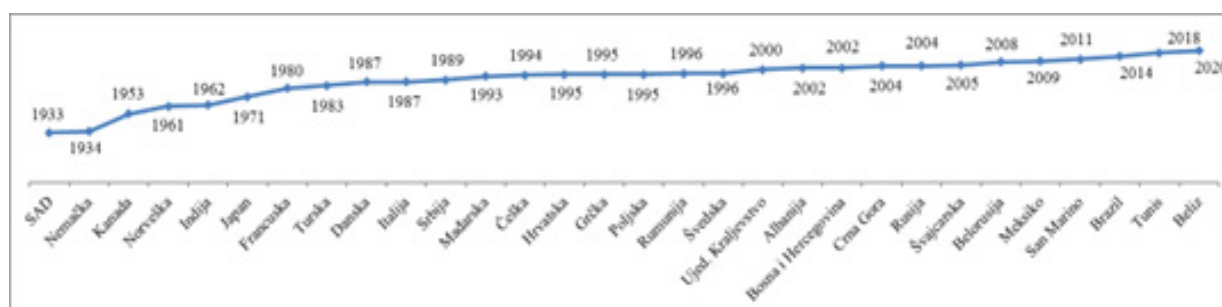
Introduction

By providing protection to the most vulnerable categories of depositors by paying insured amounts in case of bankruptcy or liquidation of banks, the deposit insurance system contributes to strengthening public confidence in the financial system and significantly contributes to its stability. These goals of the deposit insurance system are often taken for granted in periods of financial stability, but in periods of financial crises, their importance comes to the fore. If we look at things from a different perspective: the absence of deposit protection during periods of instability or shocks on the market can cause a significant outflow of deposits from banks in the short term (so-called bank run), which can threaten the liquidity of the entire banking system, which is crucial for the stability of the economy as units, especially in bank-centric financial systems.

Although the United States of America was not the first to establish a national deposit insurance system, it has existed for almost ninety years and is the oldest in continuity since the Norwegian system established in 1921, as well as the systems of Finland and the Czech Republic established in 1924, did not “survive” World War II. war. The deposit insurance system was established in the United States in 1933 and is linked to the Federal Deposit Insurance Corporation (FDIC), which insures deposits of depositors in American commercial banks and savings institutions, and was established by the Banking Act passed by the same in order to restore confidence in the American banking system after the Great Depression.

To date, over 130 countries have established a deposit insurance system. In the period between 1961 and 1990, the deposit insurance systems of Norway (1961), Belgium (1974), France (1980) were established, and from 1991 until today, the insurance systems of the countries of Central and Eastern Asia, Latin America and of Europe. The deposit insurance system in our country was established in December 1989 with the establishment of the Agency for Deposit Insurance, Rehabilitation, Bankruptcy and Liquidation of Banks.

Graph 1: Date of Establishment for Deposit Insurance Systems Worldwide

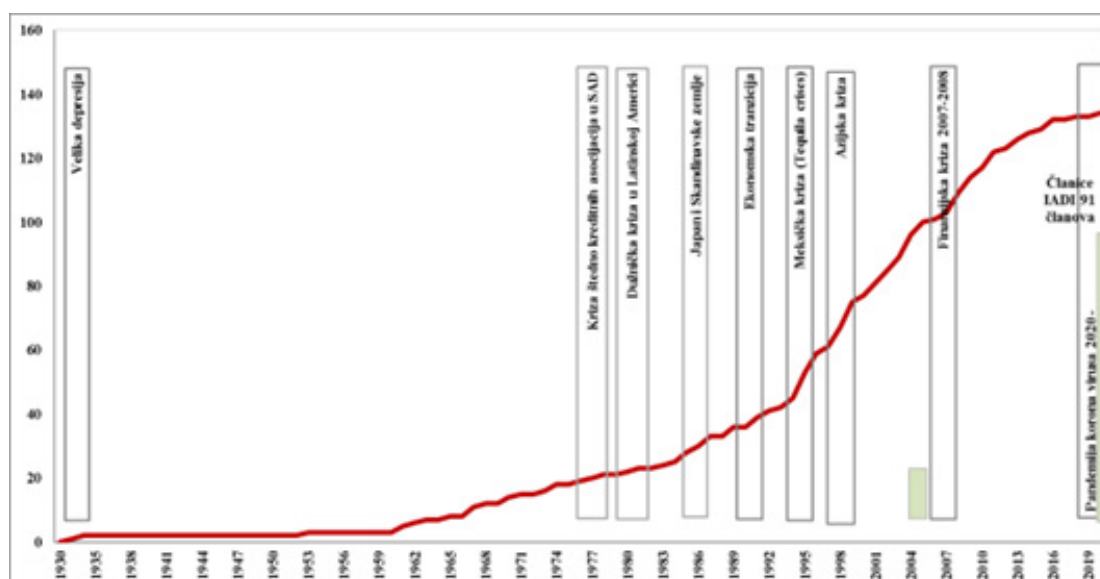


Source: Author

The Impact of Financial Crises on the Establishment of the Deposit Insurance System

Financial crises greatly influenced the establishment of deposit insurance systems around the world, because they indicated the need for a systemic approach to the regulation of the financial sector and ensuring the trust of depositors. New systems are constantly being established in the world, so for example, the introduction of a deposit insurance system in New Zealand is currently being planned. The theory of destabilizing protection, which is based on the understanding that deposit insurance encourages crises, because it encourages banks to accept unnecessary risks in business, has been the basis for more than a century for opposing the establishment of a deposit insurance system in some countries, including the United States, but is a law regulating the deposit insurance system, which was passed as part of a set of new financial laws, i.e. a measure to get out of the financial crisis in 1933. Graph 2 shows the trend of establishing a deposit insurance system during periods of financial crises.

Graph 2: Financial Crises, Number of Deposit Insurance Systems and IADI Members



Source: Author

The International Association of Deposit Insurers (IADI) was founded on May 6, 2002 with the aim of exchanging experience in deposit insurance in the world, thereby ensuring a contribution to the stability of financial systems. IADI is a non-profit organization established under Swiss law with its headquarters at the Bank for International Settlements (BIS) in Basel, Switzerland.

Out of 193 countries in the world, 91 are members of IADI and have explicit deposit protection systems. This Association also has 7 members with the status of associates (central banks and supervisory authorities), as well as 17 members with the status of partners (various international institutions) who provide de facto implicit guarantees, i.e. they do not meet all the criteria to be members of IADI, but they are part financial safety nets or have a direct interest in the efficiency of the deposit insurance system.

The importance of deposit insurance in preserving financial stability is also visible in the example of Serbia. When the financial crisis in 2008 led to the outflow of savings from banks in the amount of 1.1 billion euros, changes were introduced to the deposit insurance system in September 2008, as a result of the measures of the monetary policy regulator. The changes primarily related to the increase in the amount of coverage from EUR 3,000 to EUR 50,000, as well as to the expansion of the structure of protected depositors (entrepreneurs as well as small and medium-sized enterprises are protected in addition to natural persons), which contributed to the strengthening of trust and the return of deposits in banking system in the next eleven months. The introduced measures greatly contributed to increasing financial stability on the market.

Preservation and strengthening of public trust in the banking sector is reflected in the continuous growth of savings. Thanks to the measures of the National Bank of Serbia, macroeconomic stability has been ensured, and the domestic market is characterized by high deposit growth rates. For example, insured deposits increased by 16.5% in 2020 and 11.7% in 2021 (data from the Deposit Insurance Agency).

Functions and Authorisations of the Deposit Insurer

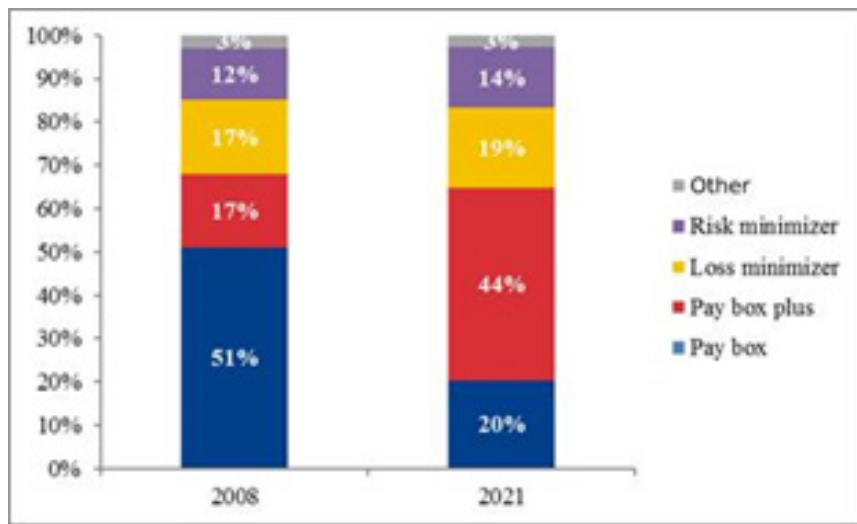
In comparative practice, different solutions are applied when it comes to covering the functions and powers of deposit insurers. The narrowest mandate is represented by the so-called “Pay-box” in which the deposit insurer is responsible only for the payment of insured deposits upon the occurrence of the insured event (bankruptcy).

The “Pay-box plus” model implies that the deposit insurer, in addition to the payment of insured deposits, has additional responsibilities, such as certain powers in the process of restructuring financial institutions (eg financial support). The majority of countries, including Serbia, opted for this model.

Models with a broader mandate imply that the deposit insurer, in addition to paying out insured deposits, actively engages in the selection of bank restructuring instruments based on the principle of the lowest costs (Loss minimizer) or that it has broadly defined functions aimed at reducing risk to the smallest possible extent, which include risk management and assessment, a series of powers in the implementation of measures of early intervention and restructuring of institutions, and in some cases, responsibilities in terms of prudential supervision (Risk Minimizer).

In the last ten years, there has been a noticeable increase in deposit insurers that operate according to the “pay-box plus” model.

Graph 3: Comparative Overview of Functions and Authorisations of Deposit Insurers, 2008-2021



Source: Author's depiction based on the IADI Annual Survey 2021

The following table gives an overview of the mandate of the deposit insurance system among individual members of IADI.

Table 1: Mandates Established in Certain IADI Member Countries

Mandate	Countries
1. Pay-box	Belgium, Denmark, Macedonia, Switzerland
2. Pay-box plus	Bosnia and Herzegovina, Bulgaria, Czech Republic, Greece, Hungary, Montenegro, Romania, Serbia, Spain, UK
3. Loss minimizer	France, Italy, Japan, Poland, Russia, Turkey
4. Risk minimizer	Germany, Norway, USA

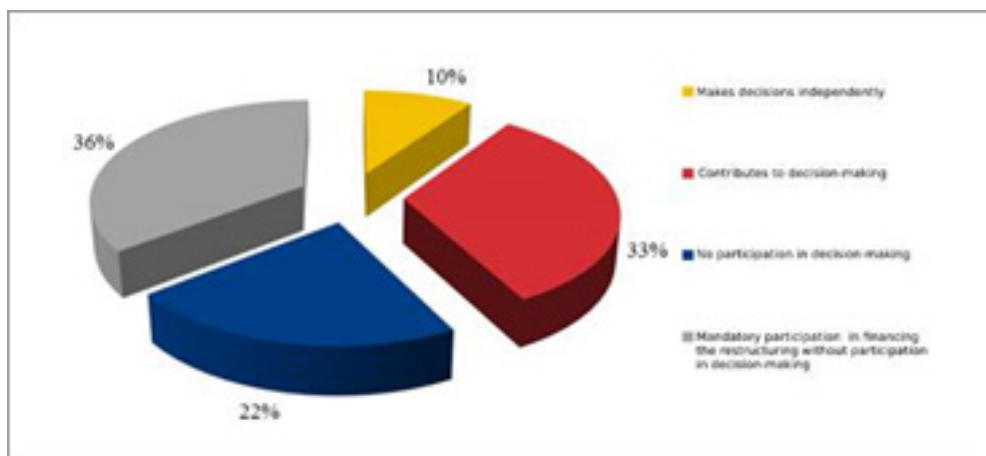
Source: IADI Annual Survey 2021

In accordance with the Law on Banks, the Law on the Deposit Insurance Agency and the Law on Deposit Insurance in the Republic of Serbia, the Deposit Insurance Fund, in addition to the basic function of paying out deposits, can also be used to finance the process of bank restructuring, while the Agency can manage assets transferred in the process restructuring of banks and perform other tasks related to the restructuring process in accordance with the law regulating banks.

In comparative practice, different solutions have been applied when it comes to the role of deposit insurers in making decisions in the process of bank restructuring. In the majority of countries, the funds of the fund can be used to finance the restructuring of banks, with the fact that the deposit insurer is not authorized to decide on this independently, while in a third of the countries, the deposit insurer participates in making the decision.

In the Republic of Serbia, there is no special fund for bank restructuring. The legal regulations therefore enabled the use of funds from the deposit insurance fund as one of the sources for financing the bank restructuring process. The Deposit Insurance Agency is obliged to submit to the National Bank of Serbia an opinion on the draft report on least cost test.

Graph 4: Roles of Deposit Insurers in the Decision-Making Process of Bank Restructuring



Source: Author's depiction based on the data from the IADI Annual Survey 2021

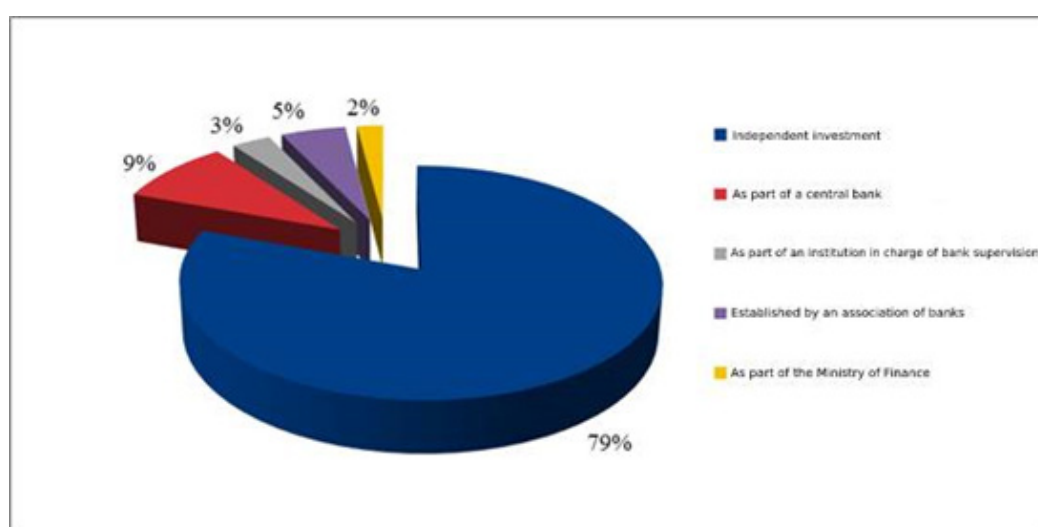
Legal Form of the Deposit Insurers

In international practice, most deposit insurance systems are established in accordance with the law and are under state administration.

In expert circles, there was a long discussion about the most suitable legal form of organizing deposit insurers. The most common way of establishing and organizing a deposit insurance system is the form of an independent institution, which is used by the majority of countries, including Serbia.

A smaller number of systems are organized within central banks (Netherlands, Saudi Arabia, Slovenia), banking supervision institutions (Australia, Brazil, Canada - Quebec), bank associations (Germany, Italy, Brazil, Liechtenstein) or ministries responsible for financial affairs. (Belgium, Colombia).

Graph 5: Representation of Deposit Insurance System Models According to Legal Form



Source: Author's depiction based on the data from the IADI Annual Survey 2021

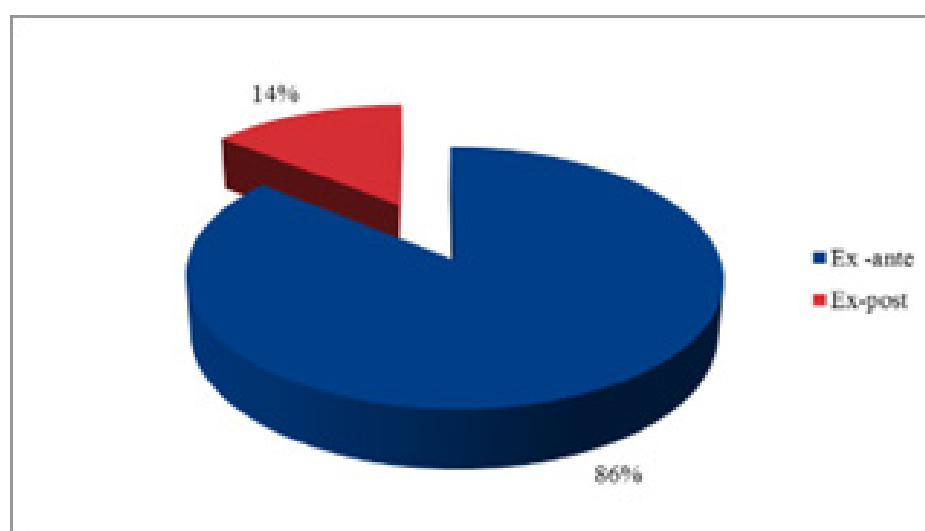
Ways of Financing the Deposit Insurance Fund

In general, the primary source of funds for the deposit insurance fund is the premiums charged by member banks of the deposit insurance system (in general, membership is mandatory in the majority of countries and is not established on a voluntary basis).

The most common way of financing the deposit insurance fund, which is also applied by Serbia, is the collection of regular premiums from banks (so-called ex-ante) in order to accumulate funds for the fulfillment of potential future payment obligations of depositors. This method of financing is preferential, given that even those banks against which bankruptcy proceedings were initiated at some point during their business activity paid premiums into the fund.

A small number of systems apply the method of subsequent collection of premiums (so-called ex-post), where the premium is collected after the insured event occurs from members of the insurance system that are still active on the market. Countries whose systems are financed exclusively ex-post are Australia, some Canadian provinces and Switzerland, while some countries apply a hybrid model, according to which both types of financing are present.

Graph 6: Representation of Deposit Insurance System Models According to Financing Method



Source: Author's depiction based on the data from the IADI Annual Survey 2021

Generally speaking, there are two ways of calculating and collecting premiums: linear and differential method. The European Directive on deposit insurance systems mandates that premiums are calculated based on an assessment of the level of risk in the member's business, and this method of calculation is binding for all EU members. In the Republic of Serbia, the Law on Amendments and Supplements to the Law on Deposit Insurance from 2019 introduced the possibility of calculating the premium based on the level of risk in bank operations. In this regard, the Deposit Insurance Agency, with the prior consent of the National Bank of Serbia, adopted the relevant methodology, and will subsequently determine the start of its application. Currently, the premium is calculated using the linear method, which implies the application of the determined premium rate for a given year on the legal base, which implies the average amount of deposits up to the number of insured amounts in the bank in the quarter preceding the calculation.

Amount of Insurance Coverage

The levels or amount of insurance coverage should be determined at a level that protects "small" depositors, primarily natural persons, who generally do not need to be financially literate to a large extent to be able to assess risks in banking operations. On the other hand, their actions cannot reduce the effect of moral hazard in banks (in terms of incentives for greater risk taking due to the protection provided by the deposit insurance system). Therefore, it is necessary that a certain level of deposits remain exposed to market discipline. Nevertheless, the hypothesis that uninsured depositors will monitor the risk profile of banks and implement market discipline by transferring funds to less risky banks is debatable, due to the fact that information on the financial position of banks is not always available at the moment (most often it can be obtained quarterly), and even that yes, the transaction costs of

changing banks are relatively high, given that the business relationships of legal entities with banks are significantly more complex and deep (IADI, 2013). Regulation of the restructuring process by the legal framework, on the other hand, affects the reduction of moral hazard, i.e. excessive risk taking by banks, given that it is based on the principle that losses in the restructuring process are borne first by the shareholders, and then by the bank's creditors, and in order to protect depositors, investors, budgetary and public funds, which further implies that the effectiveness of the deposit insurance system is largely influenced by the legal framework and the macroeconomic environment.

The financial crisis confirmed the assumptions that a low level of insurance coverage will not prevent significant outflows of deposits from the banking sector in the event of an earthquake, and at the same time, the importance of informing depositors about the type and extent of protection provided by the deposit insurance system for maintaining market discipline was confirmed.

During the financial crisis, in the period 2008-2009, 19 deposit insurance systems covered all or the vast majority of deposits in the banking system, 22 permanently increased the level of insurance coverage, including Serbia, and 7 increased the insured amount temporarily (IADI, 2013).

When it comes to the amount of insurance coverage (for data comparability expressed in US dollars at the exchange rate on 12/31/2020), the lowest insured amount is recorded by African countries: Zimbabwe (USD 122), then Rwanda (USD 505) and Ghana (USD 1,085). At the same time, the insured amount in the USA is 250 thousand USD, and in Norway about 232.5 thousand USD (2 million NOK) and in Australia about 192.3 thousand USD (250 thousand AUD). The European Directive on Deposit Insurance Systems prescribes an insured amount of EUR 100,000 per depositor per bank, emphasizing that harmonization of the insured amount is necessary to ensure equal conditions for all participants, competitiveness and stability in the internal financial market. The insured number of deposits in the Republic of Serbia determined by the Law on Deposit Insurance is 50,000 euros, and given that it covers the vast majority of depositors (about 99% of natural persons), its increase would not be expedient. Certainly, by harmonizing with the legal acquis of the EU and the entry of the Republic of Serbia into the EU, it will be necessary to harmonize the amount of the insured amount with the amount prescribed by the EU Directive. In the field of the Directive on deposit insurance systems, the European Commission cooperates with the European Banking Authority (EBA) and two advisory bodies. In this context, in the period 2019-2020, year EBA prepared three reports on the basis of which it provides the European Commission with a proposal for potential changes to the Directive. One of the findings is that the currently determined insured amount at the level of 100,000

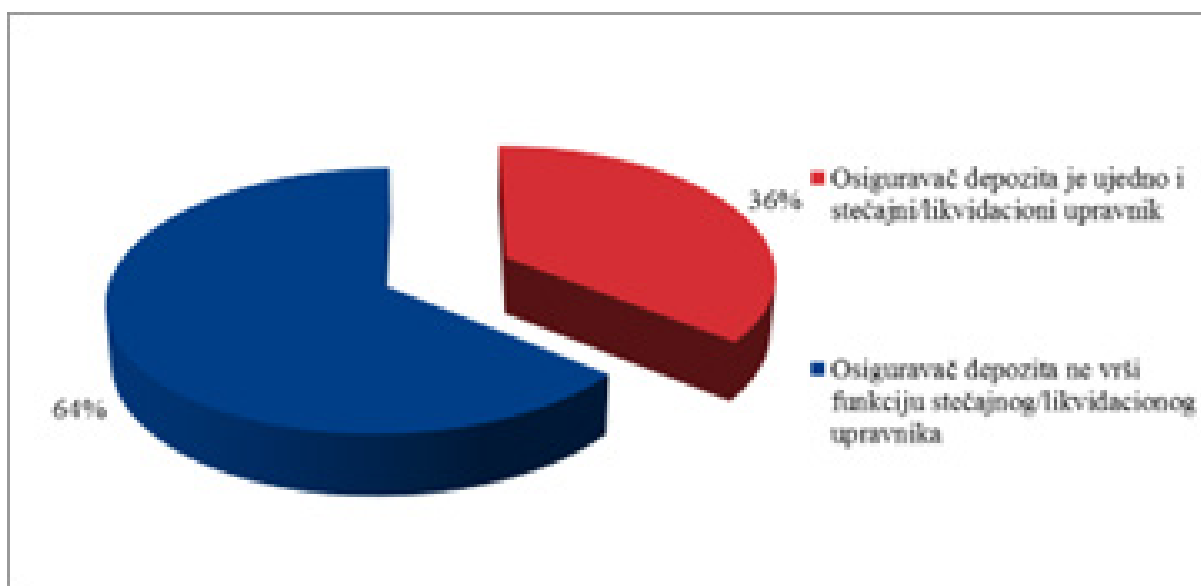
euros, based on qualitative and quantitative analyses, was assessed as adequate and should not be changed.

Also, the European Directive prescribes the protection of individual deposits above the level of insurance coverage for a certain period of time. These are deposits resulting from real estate trade, then deposits resulting from payment of insurance sums, marriage, divorce, retirement, etc., so-called. temporary high balances (temporary high balances, THB).

Performance of the Function of Bankruptcy/Liquidation Trustees of Financial Institutions by Deposit Insurers

As is the case in Serbia, in international practice, a part of the deposit insurer also performs the function of bankruptcy/liquidation administrator. The goal of such a solution is a more efficient bankruptcy procedure and faster return of funds paid to depositors from the deposit insurance fund after the opening of bankruptcy of financial institutions. The deposit insurer also performs this function in Russia, Canada, France, Romania, Turkey, Ukraine, USA, Japan and other countries.

Graph 7: Representation of the Deposit Insurance System According to the Role of Bankruptcy/Liquidation Administrator in Financial Institutions



Source: Author's depiction based on the data from the IADI Annual Survey 2021

Deposit insurance in the European Union

Directive 94/19/EC of the European Parliament and the Council of May 30, 1994 on deposit insurance systems, which prescribed minimum harmonization at the EU level, obliged all members to introduce their own deposit insurance system.

The global financial crisis of 2007-2009. influenced the revision of the Directive, which underwent changes in 2009. In April 2014, the new Directive 2014/49/EU of the European Parliament and the Council on deposit insurance systems was adopted, which first of all implies a gradual shortening of

the deadlines for starting the payment of insured deposit amounts from 20 to 7 working days, while great attention is paid to the way, the form and scope of information provided to depositors in connection with the insurance of their deposits.

Deposit insurance systems established and functioning in accordance with the provisions of the aforementioned Directive would represent the basis for the formation of the European Deposit Insurance System (EDIS), which would also represent the third pillar of the banking union (in addition to the Single Supervisory Mechanism and the Single Restructuring Mechanism banks), which would round it out, with the aim of increasing the resilience of the Economic and Monetary Union (EMU). The goal of EDIS is a stronger and uniform protection of depositors within the euro zone, in the sense that the trust of depositors does not depend on the location of the bank. The idea is that EDIS is developed in phases with the aim that in the final phase protection is provided by EDIS in cooperation with national protection systems.

Although the European Commission proposed the formation of EDIS back in 2015, this system is still not operational. Eurozone members are divided into those who strongly support its introduction (Italy, Spain, etc.) and those who express concern, Germany in first place. The debate is based on the question of moral hazard, which is the basis of the unequal dispersion of risk in the banking sector within the EU (M. Tümmeler, M. Thiemann, 2020).

Insted of conclusion

Although there are different modalities of organizing and functioning deposit insurance systems in the world, the majority of countries have long since seen the importance of their establishment for the stability of the entire financial system. Deposit insurance systems are evolving, and in addition to incremental changes with the aim of harmonizing with the best international practice and standards, in periods of crisis they often significantly change the basic characteristics in terms of increasing the number of insured amounts and expanding the scope of protected depositors. On the other hand, financial crises were often the cause of the very establishment of these institutional protection systems in certain countries.

In Serbia in the period 2018-2019. In 2008, an assessment was made of the compliance of the insurance system with the Basic Principles of Effective Deposit Insurance Systems IADI, which served as a basis for the reform and significant improvement of the effectiveness of the deposit insurance system and the strengthening of the Agency's institutional capacity as a deposit insurer, both in the regulatory and supervisory sense.

In order to complete the banking union at the EU level, which is crucial for financial stability and resistance to crisis situations, it remains to establish the European deposit insurance system. At the EU Summit in June 2021, the leaders renewed their full commitment to completing the banking union and invited the Eurogroup to agree on further activities in this field.

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KLIMATSKE PROMENE I ULOGA CENTRALNIH BANAKA

„Klimatske promene predstavljaju značajni rizik u pogledu društva, kao i ekonomije“

Iv Merš, Frankfurt,
27. novembar 2018

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Rezime

Centralne banke su u poslednjih nekoliko godina izložene novim izazovima i zadacima sa kojima je potrebno da se suoče. Jedan od tih izazova predstavljaju klimatske promene, koje direktno utiču na glavne ciljeve centralne banke, a to je postizanje i održavanje cenovne i finansijske stabilnosti. Kako bi se ispunili ciljevi definisani Pariskim sporazumom neophodno je da centralne banke uzmu aktivnije učešće u borbi protiv posledica klimatskih promena. To znači da se od centralnih banaka očekuje da usvoje politike i strategije koje će dati smernice finansijskom sektoru da uspešno upravlja rizicima od klimatskih promena i da ih ohrabri da usmere investicije u čiste tehnologije i nisko-karboničnu infrastrukturu. Time bi se ostvario održivi ekonomski razvoj u dugom roku koji je baziran na principu smanjenja rizika od klimatskih promena, uz istovremeno očuvanje životne sredine.

Ključne reči: klimatske promene, centralna banka, održive finansije, zelena transformacija

JEL Klasifikacija: Q54, E58, E42

Uvod

Klimatske promene utiču na realnu ekonomiju, kao i na celokupan finansijski sistem. Iako je centralnim bankama mandat definisan zakonskim aktima, u nekoliko poslednjih godina se pred tim institucijama postavljaju novi izazovi poput rasta cena nepokretnosti, rizika klimatskih promena i razvoja digitalnih valuta. Potrebno je da se centralne banke bave analizom i donošenjem adekvatnih smernica i politika za finansijski sektor kako bi se sanirale posledice klimatskih promena imajuću u vidu uticaj tih promena na cenovnu i finansijsku stabilnost. Kako bi se postigla nisko-karbonična ekonomija neophodno je promeniti postojeći način poslovanja baziran na prljavim tehnologijama i napraviti zaokret ka izgradnji održive ekonomije koja aktivno brine o očuvanju životne sredine. Radi postizanja tog cilja neophodno je da centralne banke aktivno rade na razvoju zelenih finansijskih instrumenata i daljem razvoju finansijskih tržišta. Kako klimatske promene predstavljaju globalni problem, neophodno je da postoji koordinacija mera monetarne, makroprudencijalne i fiskalne politike kako bi se neutralisali negativni efekti postojećih i budućih efekata klimatskih promena. U ovom radu analiziraćemo klimatske promene i ulogu centralnih banaka, i to pre svega vodećih centralnih banaka poput Evropske centralne banke, Banke Francuske i Banke Engleske.

Pregled literature

Tokom postojanja planete, klima na Zemlji se mnogo puta menjala—od ledenog doba, do značajno visokih temperatura. Poslednjih nekoliko decenija zabeležen je porast prosečne temperature vazduha i o povezanim efektima na klimu diskutovalo se na velikom broju foruma (Moretti i saradnici, 2010). Klimatske promene su naša realnost, jer sve veći cikloni i produženi sušni periodi dovode do uništavanja infrastrukture, narušavanja sredstava za život i doprinose masovnoj migraciji (Grippa i saradnici, 2019).

Mark Carney, nekadašnji guverner Centralne banke Kanade i Banke Engleske, je među prvima u septembru 2015. god. ukazao na rizike od klimatskih promena i upozorio da klimatske promene mogu dovesti do finansijske krize i smanjenje životnog standarda, ukoliko vodeće ekonomije ne učine više kako bi obezbedile da njihove kompanije koriste čistu tehnologiju (Carney, 2015).

U poslednjih nekoliko godina od centralnih banaka se očekuje da se aktivno bave pitanjem klimatskih promena i predlozi za njihovo angažovanje idu od donošenja programa „zelenih“ kvantitativnih olakšica, do povećanja kapitalnih zahteva koji imaju za cilj da utiču da poslovne banke smanje svoju kreditnu aktivnost ka poslovnim aktivnostima koje nisu u skladu sa očuvanjem životne sredine (Skinner, 2021).

Centralne banke i finansijski supervizori su u sve većoj meri svesni da klimatske promene predstavljaju izvor finansijskog rizika i do sada su, u najvećoj meri, naponi centralnih banaka bili usmereni ka integraciji rizika, povezanih sa klimatskim promenama, u prudencijalni nadzor (Oustry i saradnici, 2020). Rizik od klimatskih promena je jedinstven po svom karakteru.

U pitanju je nepovratan rizik, jer trenutno ne postoji tehnologija koja može da ispravi njegovo dejstvo, a potencijalno je i sistematski imajući u vidu da njegovom materijalizacijom se može transformisati funkcionisanje celokupne ekonomije. Realizacija klimatskih rizika može da izazove klimatske šokove, koji mogu biti nelinearni i teško predvidivi (Villeroy de Galhau, 2019).

Odgovornost centralnih banaka u pogledu supervizije, očuvanja finansijske stabilnosti, upravljanja aktivom i sprovođenja monetarne politike nalažu da se analizira potencijalni sistemski uticaj koji klimatske promene mogu da imaju na ekonomiju i na finansijski sistem kao celinu, uz nastojanje da se pitanja klimatskih promena inkorporira u makroprudencijalnu politiku kao i portfolio menadžment (González i Núñez, 2021). Potrebno je da centralne banke naprave procenu ukupnog rizika od klimatskih promena kako po monetarnu politiku, tako i po očuvanje finansijske stabilnosti imajući u vidu posledice tih promena.

To podrazumeva da se tačno utvrdi kako su i u kojoj meri različiti učesnici finansijskog sistema izloženi riziku klimatskih promena, kao i kako te promene utiču na inflaciju, korišćenje resursa i sprovođenje monetarne politike (Olovsson, 2018). Analiza Diluiso i saradnika (2022) je pokazala da učešće centralnih banaka u rešavanju pitanja klimatskih promena mora da bude adekvatno dizajnirano, kako bi bilo u skladu da njihovim mandatom.

Breitenfellner i saradnici (2019) ukazuju na značajnu ulogu centralnih banaka u razvoju zelenih finansija, kako bi se očuvala makroekonomska i finansijska stabilnost. Prema njihovoj analizi cilj zelenih finansija je postizanje zelenog finansijskog sistema, time što bi se usmerili finansijski tokovi prema investicijama koje podržavaju očuvanje životne sredine i ograničavaju efekte klimatskih promena.

Pionir u pružanju podrške zelenim finansijama je centralna banka Kine koja je 2018. god. sprovodila politiku koja se može označiti kao „zelena monetarna politika“ (Chen i saradnici, 2020).

Značaj razvoja zelenih finansija proizilazi iz značajne razlike između postojećih mogućnosti i procenjenog obima novog kapitala koji je potreban svake godine kako bi se finansirala tranzicija privrede i društva na korišćenje niske emisije ugljenika (Langley i Morris, 2020). Uloga centralnih banaka može biti efikasna samo ako je deo dobro koordinisane strategije na nacionalnom i međunarodnom nivou. Na nacionalnom nivou ključna je saradnja sa predstavnicima fiskalne politike kako bi se implemendirale mere podrške za razvoj zelenih investicija, dok je na međunarodnom nivou neophodna saradnja radi razmene mišljenja o primeni najboljih mera i međunarodne prakse (Arndt i saradnici, 2020). Centralne banke nisu izolovane od dejstva klimatskih promena i njihovih posledica i neophodno je da u različitim oblastima svog poslovanja primene aspekt održivosti, kako u upravljanju sopstvenim portfoliom, tako i u području supervizije i finansijske stabilnosti (González Martínez, 2021).

Kada je u pitanju intervencija centralnih banaka po pitanju „ozelenjavanja“ mandata centralnih banaka Ramos Muñoz i saradnici (2022) ukazuju da je potrebno sagledati tri aspekta. Prvo, potrebno je odrediti da li centralna banka treba da interveniše, odnosno da li se pitanje klimatskih promena može inkorporirati u definiciju mandata centralnih banaka. Drugo, neophodno je sagledati kada centralna banka treba da interveniše (da li da centralne banke odmah reaguju ili da sačekaju dok ne prikupe dovoljno podataka o uticaju klimatskih promena) i treće, važno je odrediti način intervenisanja.

Klimatske promene utiču na finansijski sistem preko finansijske aktive koja može da zabeleži gubitke kako za pojedince, tako i za celokupan finansijski sistem. Ove promene mogu uticati na moguće bankrotstvo kompanija, kao i na razduživanje banaka, što može dovesti do finansijske nestabilnosti (Masciandaro i Tarsia, 2021). Pojedine centralne banke su započele analizu implikacija klimatskih promena i tranziciju na korišćenje niske emisije ugljenika za finansijski sektor, imajući u vidu da su centralne banke zadužene za finansijsku regulativu i superviziju (Campiglio i saradnici, 2018). Ozili (2021) predlaže sledeće mere koje centralne banke mogu primeniti radi saniranja posledica klimatskih promena. Prvo, moguće je da centralne banke uvedu dodatni sloj kapitala koji se odnosi na klimatske promene, potom da smanje kreditnu aktivnost ka onim industrijama koje uništavaju životnu sredinu i klimu, potom da se osnuje posebna banka koja će se baviti pitanjima klimatskih promena, kao i da centralna banka traži od finansijskih institucija da izvrše realokaciju svoje aktive, kako bi bila manje izložena uticaju klimatskih promena.

Klimatske promene – opšta zapazanja

Kako bi se bolje razumele klimatske promene neophodno je precizirati šta one predstavljaju. Prema Ujedinjenim nacijama klimatske promene predstavljaju dugoročnu promenu temperature i obrazaca vremena. Pri tome ove promene mogu biti izazvane prirodnim faktorima, kao što su promene solarnih ciklusa. Međutim od 1800-tih glavni uzročnih klimatskih promena jesu aktivnosti ljudi i to primarno kroz sagorevanje fosilnih goriva, kao što su gas, nafta i ugalj. Klimatske promene utiču na zdravlje ljudi, na proizvodnju hrane, stanogradnju, kao i na bezbednost i na način obavljanja radnih aktivnosti. Pojedini delovi planete Zemlje su već izloženi uticaju klimatskih promena, kao što su ljudi koji žive na manjim ostrvskim zemljama i drugim zemljama u razvoju. Usled klimatskih promena došlo je do pada nivoa mora i povećanja saliniteta vode, što je dovelo do neophodnosti da se ljudi presele, a dugotrajne suše su nametnule rizik od gladi. U budućnosti može se očekivati porast klimatskih izbeglica (United Nations). Nešto detaljnija definicija klimatskih promena je sadržana u Okvirnoj konvenciji Ujedinjenih nacija o klimatskim promenama, gde je u članu 1. navedeno da klimatske promene podrazumevaju promenu klime koja se direktno ili indirektno pripisuje ljudskim aktivnostima, a koje menjaju sastav globalne atmosfere i koja je, pored prirodnih klimatskih promena, zabeležena u uporedivim vremenskim periodima (United Nations Framework Convention on Climate Change).

Kako bi se klimatske promene pretočile u finansijske rizike neophodno je uvesti koncept klimatskih rizika, koji se mogu grupisati u dve kategorije – fizički rizici i tranzicioni rizici. Fizički rizici podrazumevaju promene vremenskih uslova i klime koji utiču na ekonomiju. Ovi rizici se mogu kategorizovati kao akutni rizici koji se odnose na ekstremne vremenske uslove ili kao hronični rizici koji su povezani sa postepenim promenama klimatskih uslova. Akutni fizički rizici se u opštem slučaju odnose na toplotne talase, poplave, požare i oluje, što uključuje uragane, tajfune i ciklone. Tranzicioni rizici podrazumevaju tranziciju ka ekonomiji koja u manjoj meri koristi ugljen-dioksid. Ovi rizici se odnose na promene politika poslovanja javnog sektora, inovacije i promene u dostupnosti postojeće tehnologije (na primer tehnologije koje koriste obnovljivu energiju ili omogućavaju otklanjanje atmosferskih gasova staklene bašte), kao i nastojanje investitora i potrošača da ostvare zeleniju životnu sredinu. Pored dva glavna rizika klimatskih promena potrebno je navesti i druge rizike koje ove promene mogu da izazovu: (1) kreditni rizik (ukoliko dođe do porasta klimatskih rizika može se desiti porast i kreditnog rizika, što posledično utiče na sposobnost dužnika da svoje

je obaveze plaća na vreme); (2) tržišni rizik (smanjenje vrednosti finansijske aktive može biti izazvana klimatskim rizicima); (3) rizik likvidnosti (ukoliko se desi promena tržišnih uslova, uslovljena klimatskim rizicima, može se smanjiti pristup banaka stabilnim izvorima finansiranja); (4) operativni rizik (rizik koji proističe iz neophodne usaglašenosti sa pravnim propisima) i (5) rizik reputacije (porast rizika reputacije banaka može se realizovati ukoliko se desi promena tržišnog ponašanja ili sentimenta klijenata) (Basel Committee on Banking Supervision). Pored fizičkih i tranzicionih rizika u okviru glavnih klimatskih rizika Banka Engleske obuhvata i rizik odgovornosti (eng. liability risks), koji proizilazi iz kompenzacije koje pojedinci ili kompanije traže kao nadoknadu za gubitke koje su pretrpeli realizacijom fizičkih ili tranzicionih rizika. Slučajevi odgovornosti mogu da uključe pojedince koji mogu da pretrpe neki od fizičkih rizika, kao što je na primer poplava, i da zatraže neku vrstu nadoknade od kompanija zagađivača koje su barem delimično odgovorne (Banka Engleske, 2019).

Sa nastojanjem da se smanji uticaj klimatskih promena potpisano je nekoliko protokola i ugovora. U junu 1992. održana je Konferencija Ujedinjenih nacija o životnoj sredini i razvoju (eng. United Nations Conference on Environment and Development – UNCED) i okupila je političke lidere, diplomate, naučnike, predstavnike medija i nevladinih organizacija iz 179 zemalja sa ciljem da se sagleda uticaj socio-ekonomskih aktivnosti na životnu sredinu (United Nations Conference on Environment and Development). Nakon toga je u decembru 1997. usvojen Kjoto protokol, koji je nakon komplikovanog procesa ratifikacije stupio na snagu u februaru 2005. god. Kjoto protokol podrazumeva operacionalizaciju Okvirne konvencije Ujedinjenih nacija o klimatskim promenama (eng. United Nations Framework Convention on Climate Change) i označava obavezu industrijalizovanim zemljama i ekonomijama u tranziciji da ograniče emisiju gasova staklene bašte u skladu sa individualno postavljenim ciljevima (Kyoto Protocol). U decembru 2015. god., sa primenom od novembra 2016. god., potpisan je Pariski sporazum kao međunarodno obavezujući ugovor o klimatskim promenama. Sporazum je potpisalo 196 članica na Konferenciji Ujedinjenih nacija o klimatskim promenama održanoj 2015. god. Cilj Pariskog sporazuma je da se ograniči globalno zagrevanje na ispod 2, po mogućnosti na 1,5 stepeni Celzijusa, u poređenju sa temperaturom zabeleženom u predindustrijskom periodu. Kako bi se postigao navedeni temperaturni cilj neophodno je da zemlje postignu klimatski neutralni svet do sredine ovog veka. Pariski sporazum podrazumeva ekonomsku i socijalnu transformaciju, koja je zasnovana na najboljim naučnim rešenjima (Pariski sporazum). U Parizu je dve godine kasnije osnovana Mreža za ozelenjavanje finansijskog sistema (eng. Network of Central Banks and Supervisors for Greening the Financial System - NGFS) od strane vodećih centralnih banaka i regulatora sa ciljem da se obezbedi značajniji globalni odgovor koji je potreban radi ispunjenja ciljeva definisanih Pariskim sporazumom (Tooze, 2019). Cilj ove mreže je da ojača globalni odgovor kako bi se ostvarili ciljevi definisani Pariskim sporazumom, kao i da se poboljša uloga finansijskog sistema, kako bi upravljali rizicima i mobilisali kapital za zelene investicije (NGFS).

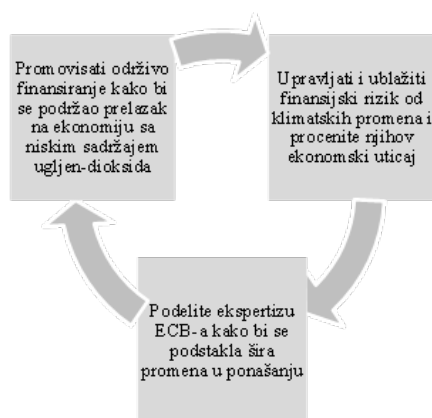
Klimatske promene i uloga Evropske centralne banke

Od 2007. god. Evropska centralna banka (ECB) je odlučila da preduzme mere kako bi se na sistemski način bavila pitanjem održivosti životne sredine. Potom je 2010, 2013, 2016. i 2019. god. objavila Izveštaj o životnoj sredini (eng. ECB environmental statement) u kojima je navela rezime napora ECB-a u pogledu očuvanja životne sredine. ECB je posvećena učešću u rešavanju problema klimatskih promena u okviru njihovog mandata. ECB daje veliki značaj klimatskim promenama i u januaru 2021. god. osnovala je centar za klimatske promene sa ciljem objedinjavanja rada na klimatskim promenama u različitim organizacionim delovima ECB-a.

Rad ECB-a u pogledu klimatskih promena se fokusira na tri glavna cilja – Grafikon 1. Prvi cilj se odnosi na monitoring i upravljanje klimatskim rizicima sa ciljem postizanja cenovne stabilnosti i sigurnosti bankarskog sistema. ECB je klimatske rizike inkorporirala u: (1) analize i proces donošenja odluka; (2) makroekonomske modele, projekcije i utvrđivanje scenarija; (3) procenu finansijske stabilnosti; (4) analizu monetarne politike i transmisivnog mehanizma i (5) proces upravljanja rizikom.

Merenje i monitoring fizičkih i tranzicionih rizika su važni za ECB kako bi obezbedila stabilnost i sigurnost poslovanja bankarskog sektora zone evra, kao i celokupnog bankarskog sistema. Upravo je odgovornost ECB-a da utvrdi da li banke zone evra mogu pravovremeno da prepoznaju, upravljaju i otkriju klimatske rizike (ECB).

Grafikon 1: Tri strateška cilja za klimatske promene



Izvor: ECBa – Evropska centralna banka, *ECB climate agenda 2022*, Pristupljeno: 21.7.2022.
https://www.ecb.europa.eu/press/pr/date/2022/html/ecb.pr220704_annex~cb39c2dcbb.en.pdf

Drugi cilj u pogledu klimatskih promena se odnosi na podršku zelenoj tranziciji. Kako bi se izbegli najgori efekti klimatskih promena neophodno je smanjiti emisiju ugljen-dioksida. Zbog toga se Evropska unija obavezala da će smanjiti emisiju ugljen-dioksida za 55% do 2020. god. i da će postići nultu emisiju do 2050. god. Iako je primarna odgovornost vlada i regulatora da pokrenu i podrže ovu tranziciju, veoma je važna uloga ECB-a u promovisanju održivih finansija i „ozelenjavanju“ operacija monetarne politike, bez ugrožavanja primarnog cilja koji se odnosi na postizanje i održavanje cenovne stabilnosti. U julu 2022. god. ECB je donela klimatski akcioni plan kako bi pitanje klimatskih promena uključila u strategiju monetarne politike.

Taj klimatski plan podrazumeva da ECB dodatno inkorporira klimatske promene u okvir monetarne politike, potom da proširi svoj analitički kapacitet u domenu makroekonomskog modelovanja, statistike i monetarne politike u domenu klimatskih promena, zatim da uključi pitanje klimatskih promena u operacije monetarne politike (ECB uzima u obzir klimatske promene pri sprovođenju programa kupovine korporativnih obveznica, pri određivanju potrebnog kolaterala, kao i u slučaju upravljanja rizikom), kao i da primeni klimatski akcioni plan u skladu sa napretkom Evropske unije u pogledu primenjenih politika i inicijativa u domenu obelodanjivanja i izveštavanja o održivosti životne sredine (ECBb).

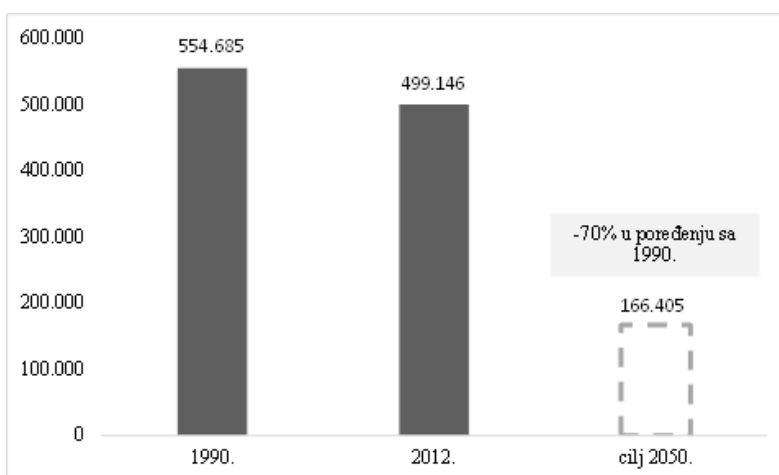
Treći cilj ECB-a u pogledu klimatskih promena se odnosi na podsticanje šire akcije. Rešavanje problema klimatskih promena predstavlja globalni izazov i iz tog razloga je potrebno uključivanje velikog broja učesnika. ECB zbog toga deli svoju ekspertizu i aktivno radi na prihvatanju i promovisanju najbolje prakse radi rešavanja problema klimatskih promena. Po tom osnovu ECB aktivno sarađuje sa partnerima iz Evrope, ali i na međunarodnom nivou, potom ECB intenzivno sprovodi aktivnosti kako bi podstakla transparentnost aktivnosti koje sprovodi na polju rešavanja klimatskih promena i nastoji da smanji svoj uticaj na okruženje kako bi se postigla nulta emisija ugljen-dioksida do 2050. god.

U januaru 2022. ECB je pokrenula klimatske stres testove kako bi procenila u kojoj meri je bankarski sektor spreman da se izbori sa finansijskim i ekonomskim šokovima koji proističu od klimatskih promena. Stres test obuhvata tri različita modula: (1) upitnik o kapacitetu banaka da sprovedu klimatske stres testove; (2) analizu održivosti bankarskih modela banaka i njihove izloženosti ka kompanijama koje imaju intenzivnu emisiju ugljen-dioksida, i (3) sprovođenje stres test odozdo prema gore (eng. bottom-up stress test) koji podrazumeva da stres testovi sprovode pojedinačne finansijske institucije, koristeći sopstveni okvir (Banking supervision, 2022). U julu 2022. god. ECB je objavila rezultate klimatskih stres testova koji su pokazali da banke zone evra nisu u dovoljnoj meri klimatski rizik uključile u svoj okvir stres testova i u svoje interne modele, iako je od 2020. god. napravljen određen nivo napretka. Primenjen klimatski stres test, koji predstavlja deo aktivnosti ECB-a u pogledu klimatske mape, nije predstavljao procenu da li banke zone evra imaju dovoljan nivo kapitala, već pokaznu težbu za banke i supervizore. Putem sprovedenog stres testa prikupljene su kvalitativne i kvantitativne informacije o proceni spremnosti bankarskog sektora na klimatske rizike, uz prikupljanje podataka o sprovođenju najbolje prakse. U navedenom klimatskom stres testu učestvovalo je 104 banaka iz zone evra i rezultati su pokazali da na bazi prvog modula, koji obuhvata upitnik o kapacitetu banaka da sprovedu klimatske stres testove, oko 60% banaka nije još uvek uvrstilo klimatske rizike u svoje modele kreditnog rizika i da samo 20% banaka uzima u obzir klimatski rizik kada odobrava kredit. U okviru drugog modula, koji predstavlja analizu održivosti bankarskih modela i njihove izloženosti ka kompanijama koje imaju intenzivnu emisiju ugljen-dioksida, skoro dve trećine prihoda banaka potiče od nefinansijskih korporativnih klijenata koji intenzivno koriste gasove staklene bašte. Sprovođenje bottom-up stress testa, kao trećeg modula, pokazao je da su banke projektovale gubitke u slučaju realizacije ekstremnih vremenskih uslova. Ovaj modul je potvrdio da fizički rizik ima različiti uticaj na evropske banke i ukazao da su banke naročito ranjive u slučaju realizacije scenarija suša i visokih temperatura, što zavisi od njihovih sektorskih aktivnosti i geografske lokacije njihove izloženosti. Primenjeni klimatski stres test je pokazao posvećenost ECB-a da bankama zone evra olakša zelenu tranziciju. Upravo su rezultati tog testa ukazali neophodnost da evropske banke ojačaju kapacitet klimatskog stres testiranja i da se pripreme za rizike i mogućnosti koji vode na nultoj emisiji ugljen-dioksida (Banking supervision, 2022a).

Klimatske promene i uloga Banke Francuske

Francuska je 2015. god. usvojila Nacionalnu strategiju za postizanje niske emisije ugljen-dioksida (eng. National Low-Carbon Strategy – SNBC), koja predstavlja okosnicu u borbi protiv klimatskih promena. Nacionalna strategija je revidirana 2018-2019. god., a potom su nove verzije Nacionalne strategije za periode 2019-2023, 2024-2028 i 2029-2033. god. usvojene u aprilu 2020. god. Nacionalna strategija podrazumeva smernice za implementaciju mera u svim sektorima, potom tranziciju ka niskoj upotrebi ugljen-dioksida, kao i postizanje cirkularne i održive ekonomije. Pored toga, Nacionalna strategija definiše vremenske odrednice o smanjenju emisije ugljen-dioksida do 2025. god., a takođe postavlja ciljeve u kratkom i srednjem roku – Grafikon 2. Dva glavna cilja strategije su postizanje neutralnosti do 2050. god. u nivou ugljen-dioksida i da se smanji nivo emisija ugljen-dioksida i ostalih komponenti baziranih na ugljeniku u potrošnji francuske ekonomije (National Low-Carbon Strategy – SNBC).

U januaru 2020. god. Banka Francuske i Banka za međunarodna poravnanja su objavile zajednički izveštaj pod nazivom „Zeleni labud“ (eng. „Green Swan“) u kojem su ukazale da klimatske promene stvaraju nove izazove za centralne banke, regulatore i supervizore. Poseban deo analize je usmeren ka ukazivanju na koji način klimatski rizici utiču na finansijsku stabilnost. Naime, neophodno je pomno pratiti klimatske rizike radi postizanja i očuvanja finansijske stabilnosti, imajući u vidu značajnu neizvesnost koja je povezana sa društvenim i ekonomskim faktorima koji imaju tendenciju velikih promena. Tradicionalne procene rizika, kao i postojeći klimatsko-ekonomski modeli nisu u mogućnosti da predvide na koji način se klimatski rizici mogu realizovati. To zapravo uključuje ono što zajednička analiza dve banke naziva rizicima „zelenog labuda“, a odnosi se na potencijalno značajne finansijske nestabilnosti koji bi mogli da predstavljaju izvor naredne sistemske finansijske krize. Značajnu ulogu u izbegavanju realizacije takve krize imaju centralne banke, što uključuje njihovo nastojanje da poboljšaju razumevanje klimatskih rizika zbog razvoja scenarija analize (eng. scenario-based analysis). Ipak, potrebno je ukazati da centralne banke ne mogu samostalno da deluju u borbi protiv klimatskih promena. Kako se radi o kompleksnom problemu potrebno je da se uključe mnogi učesnici, poput predstavnika vlada, privatnog sektora, civilnog društva i međunarodne zajednice. Time centralne banke dobijaju dodatnu ulogu koja se odnosi na podršku u procesu koordinacije mera u borbi protiv klimatskih promena. U tom pogledu neophodno je da centralne banke razviju politiku ublažavanja klimatskih promena, potom da integrišu princip održivosti u finansijskoj praksi i u računovodstvene okvire, ali i da razviju nove finansijske mehanizme na međunarodnom nivou. Navedene inicijative centralnih banaka bi trebalo da doprinesu očuvanju finansijske (i cenovne) stabilnosti u dugom roku u vremenu izraženih klimatskih promena (Bolton i saradnici, 2020).

Grafikon 2: Evolucija emisije CO₂ (u kilotonama CO₂)

Izvor: *Countries, Wake up! What is Being Done against Climate Change?*, Pristupljeno: 22.7.2022.
<https://www.institutmontaigne.org/en/blog/countries-wake-what-being-done-against-climate-change>

Banka Francuske je u aprilu 2020. god. razvila scenario klimatskih promena sa nastojanjem da projektuje bruto domaći proizvod i to projekciju štete koju bi bruto domaći proizvod pretrpeo usled klimatskih promena i uticaj mera za ublažavanje tih promena na nivo bruto domaćeg proizvoda. Model koji je nazvan Napredni dugoročni model klimatskih promena (eng. Advanced Climate Change Long-term model – ACCL) obuhvata projekciju bruto domaćeg proizvoda za period od 2060. do 2100. god. za trideset zemalja/regiona. Model projektuje dugoročni efekat uticaja oporezivanja ugljen-dioksida na ekonomski rast kroz dva kanala. Prvi se odnosi na negativne efekte uvođenja poreza na ugljen-dioksid, što posledično vodi do viših cena energenata, dok se drugi kanal bazira na pozitivnom ekonomskom uticaju oporezivanja ugljen-dioksida, kroz smanjenje te emisije. Analiza je pokazala da se u srednjem roku može očekivati neto gubitak bruto domaćeg proizvoda, što je izazvano klimatskim promenama, dok je nešto povoljniji uticaj u dugom roku (Alestra i saradnici, 2020).

Između jula 2020. i aprila 2021. god. Uprava za prudencijalni nadzor Francuske (eng. French Prudential Supervision and Resolution Authority – ACPR) je pokrenula važan korak u pogledu supervizije klimatskih rizika. To je prvi put da je telo zaduženo za superviziju primenilo klimatski stres test odozdo prema gore (eng. bottom-up stress test) koji je baziran na direktnoj proceni finansijskih institucija koje su pod njenim nadzorom. Klimatski stres test je sproveden na vremenskom horizontu od 30 godina, upotrebljena je metodologija koja se bazira na analizi scenarija po ekonomskim sektorima, obuhvaćeni su fizički i tranzicioni rizici i institucije koje su učestvovalе i direktno procenile svoj rizik na bazi zajedničkih pretpostavki. U ovom stres testu na dobrovoljnoj osnovi učestvovalo je 9 bankarskih grupa, koje čine 85% aktive ukupnog bankarskog sektora Francuske, i 15 društava za osiguranje, koja čine 75% aktive ukupnog sektora osiguranja Francuske. Rezultati sprovedenog klimatskog stres testa su pokazali da bankarski sistem i sektor osiguranja imaju umerenu izloženost klimatskim rizicima. Ipak, ovaj zaključak treba razumeti u kontekstu neizvesnosti kako brzine, tako i uticaja klimatskih promena.

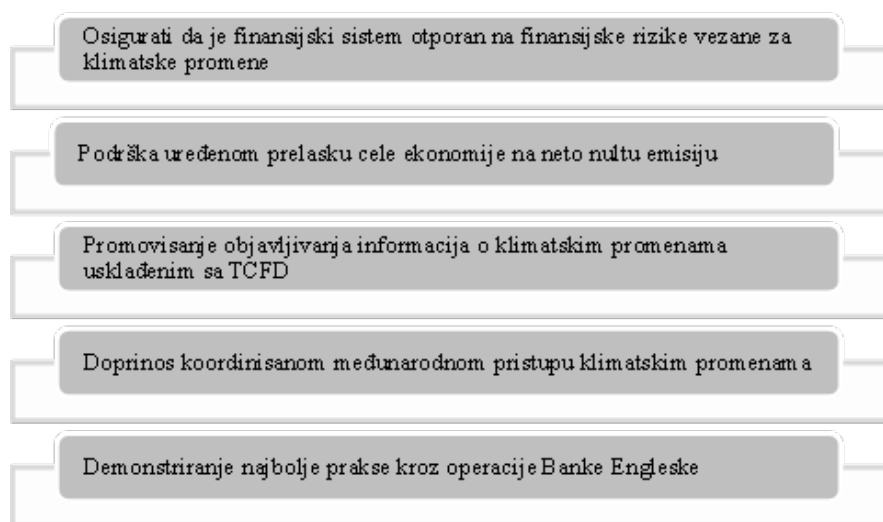
Analiza uticaja klimatskih rizika na finansijski sistem biće primenjena na redovnoj osnovi, a sledeći klimatski stres testovi biće sprovedeni 2023/2024 (ACPR). U martu 2021. god. Banka Francuske je osnovala Centar za klimatske promene (eng. Climate Change Centre), jer je uočila značaj klimatskih promena i integrisala je ambiciozne akcije u svoju korporativnu strategiju. Centar za klimatske promene deluje kao čvorište centralne banke kako bi koordinirao mere različitih organizacionih jedinica Banke Francuske u domenu borbe protiv klimatskih promena. Sam Centar za svoje poslovanje odgovara Sektoru za finansijsku stabilnost i operativan je od 1. aprila 2021. god. Pored toga, Centar obezbeđuje da inicijative Banke Francuske budu usaglašene sa prioritetima Mreže za ozelenjavanje finansijskog sistema (eng. Network of Central Banks and Supervisors for Greening the Financial System - NGFS), za koju je Banka Francuske od decembra 2017. god. obezbedila sekretarijat (Climate Change Centre).

Krajem aprila 2022. god. Banka Francuske postala je deo mreže kompanije CDP, koja predstavlja neprofitnu dobrotvornu organizaciju osnovanu sa ciljem da saopštava podatke investitorima, kompanijama, državama, regionima i gradovima kako bi upravljali svojim uticajem na životnu sredinu. Time je Banka Francuske postala prva centralnu banku na svetu koja je zatražila od kompanija da otkriju svoje podatke o uticaju na životnu sredinu. Pridruženjem kompaniji CDP Banka Francuske postojala je deo grupe od 680 finansijskih institucija koje imaju aktivu u vrednosti od 130 biliona dolara. Ovaj potez Banke Francuske predstavlja nastojanje da se postigne neutralna emisija ugljen-dioksida do 2030. god., kao i da se ispune ciljevi definisani Pariskim sporazumom (CDP).

Klimatske promene i uloga Banke Engleske

Banka Engleske je na klimatske promene reagovala odlukama i merama iz domena finansijske regulacije i supervizije, potom kroz međunarodnu saradnju i inicijative, kao i u okviru operacija same centralne banke. Banka Engleske nastavlja da deluje proaktivno, kako bi na adekvatan način odgovorila na rizike klimatskih promena. Naponi Banke Engleske su usmereni ka ispunjenju ciljeva klimatskih promena – Grafikon 3.

Grafikon 3: Ciljevi klimatskih promena



Note: TCFD - Task Force on Climate-related Financial Disclosures - Radna grupa za finansijska obelodanjivanja u vezi sa klimom

Izvor: Banka Engleske, 2022, Climate change, Pristupljeno: 25.7.2022. <https://www.bankofengland.co.uk/climate-change>

U pogledu finansijske regulacije i supervizije Banka Engleske je u aprilu 2019. god., a na bazi izveštaja o stanju u sektoru osiguranja iz 2015. god. i izveštaja o stanju u bankarskom sektoru iz 2018. god., postala prva centralna banka i supervizor koji je postavio supervizorska očekivanja za banke i osiguravajuća društva u pogledu adekvatnog upravljanja klimatskim rizicima. Time je Banka Engleske postavila jasna očekivanja po pitanju strateškog pristupa za upravljanje klimatskim promenama, uključujući identifikovanje trenutnih rizika, kao i onih koji se potencijalno mogu pojaviti u budućnosti, uz donošenje adekvatnih mera koje će ublažiti te rizike. Nakon toga je u 2020. god. usledilo slanje pisma kompanijama nazvano „Dear CEO Letter“ u kojem je Banka Engleske dala detaljno uputstvo kako kompanije treba da upravljaju klimatskim rizicima do kraja 2021. god. U oktobru 2021. god. objavljen je Drugi izveštaj o prilagođavanju klimatskim promenama (eng. second climate change adaptation report – CAR) u kojem je naveden napredak koje su kompanije napravile po pitanju upravljanja klimatskim rizicima (Climate Change Adaptation Report 2021). Od 2022. god. pa nadalje Banka Engleske nastaviće sa sprovođenjem aktivnog nadzora kompanija i klimatski rizici sada predstavljaju osnovnu komponentu pristupa supervizije ove centralne banke.

U martu 2019. god. Banka Engleske je zajedno sa Upravom za finansijsko ponašanje (eng. Financial Conduct Authority – FCA) osnovala Forum za klimatske rizike (eng. Climate Financial Risk Forum – CFRF) sa ciljem da se podeli najbolja praksa u upravljanju finansijskim rizicima koji proističu iz klimatskih promena. Forum obuhvata predstavnike iz finansijskog sektora i bazira se na radu četiri radne grupe koje se bave upravljanjem rizika, analizom scenarija, objavljivanjem informacija i inovacijama. U junu 2020. god. Forum je objavio smernice kako bi pomogao finansijskoj industriji da adekvatno prati klimatske rizike, dok je u oktobru 2021. god. publikovao drugu rundu smernica. Kako bi procenila uticaj klimatskih rizika na finansijski sistem Ujedinjenog Kraljevstva Banka Engleske je u junu 2021. god. objavila dokument ključnih elemenata. U tom dokumentu naveden je opis stres testova koji se sprovodi na dve godine u kojima se ocenjuje otpornost finansijskog sistema na fizičke rizike koji proističu od klimatskih promena. Istovremeno su sprovedeni stres testovi za banke i za društva za osiguranje gde je Banka Engleske imala mogućnost da proceni interakciju između ova dva sektora i da razume prisutan rizik od klimatskih promena u finansijskom sistemu.

U pogledu međunarodne saradnje i inicijativa Banka Engleske je jedan od osnivača Mreže za ozelenjavanje finansijskog sistema (eng. Network of Central Banks and Supervisors for Greening the Financial System – NGFS) i imala je vodeću ulogu u razvoju NGFS-a u pogledu boljeg razumevanja makroekonomskih i finansijskih rizika koji proističu iz klimatskih promena. Pored toga, Banka Engleske je suosnivač Foruma održivog osiguranja (eng. Sustainable Insurance Forum – SIF) koji obuhvata globalnu mrežu supervizora i regulatora u oblasti osiguranja, koji rade zajedno u identifikovanju izazova sa kojima se suočava sektor osiguranja, uključujući klimatske promene. Odbor za finansijsku stabilnost (eng. Financial Stability Board – FSB), čiji je član Banka Engleske, je na zahtev grupe G20 u 2015. god. osnovao Radnu grupu za finansijska obelodanjivanja u vezi sa klimom (eng. Task Force on Climate-related Financial Disclosures – TCFD). Cilj ove Radne grupe je stvaranje globalnih standarda za otkrivanje podataka o klimatskim promenama.

U okviru operacija same centralne banke, Banka Engleske je dosta uradila po pitanju klimatskih promena. Te operacije se mogu podeliti na fizičke i na finansijske operacije. U okviru fizičkih operacija 2020. god. donet je cilj da se smanji apsolutna emisija gasova staklene bašte od 2016. do 2030. god. za 63%. Po pitanju finansijskih operacija u maju 2021. god. dat je predlog o „ozelenjavanju“ programa kupovine korporativnih obveznica (eng. Corporate Bond Purchase Scheme – CBPS). Nakon toga Odbor za monetarnu politiku Banke Engleske je u februaru 2022. god. saopštio da će smanjiti portfolio korporativnih obveznica i da će tu odluku da primeni do kraja 2023. god. ili najkasnije do početka 2024. god. Cilj ove odluke je diversifikacija portfolija, uključujući „ozelenjavanje“. Time centralna banka želi da pruži primer drugim investitorima kako bi podržali klimatsku tranziciju kroz veće emitovanje zelenih korporativnih obveznica.

Zaključak

Klimatske promene predstavljaju novi izazov sa kojim se suočavaju centralne banke imajući u vidu da upravo te promene utiču na postizanje i očuvanje cenovne i finansijske stabilnosti koji predstavljaju glavne ciljeve za većinu centralnih banaka. Upravo iz tog razloga centralne banke su aktivno počele da se bave problemom klimatskih promena, identifikovanjem fizičkih i tranzicionih rizika, analizom njihovog uticaja na finansijski sistem, kao i predlogom mera da se ublaži uticaj tih rizika. Pored toga, centralne banke su započele sprovođenje klimatskih stres testova, zatim aktivno promovišu najbolju praksu u rešavanju klimatskih promena, ali i daju smernice za što bezbolniju zelenu tranziciju i razvoj zelenih finansija. Sve ovo zahteva da postoji kvalitetna baza podataka o uticaju klimatskih promena na realnu ekonomiju i finansijski sistem, kao i da se razvije pravovremen instrumentarijum za upravljanje rizicima klimatskih promena. Ipak, potrebno je ukazati da pitanje rešavanja problema klimatskih promena nije samo na centralnim bankama, već je potrebna dobra koordinacija mera sa vladama, predstavnicima međunarodnih finansijskih organizacija, civilnog društva i privatnog sektora. Kako bi se smanjio uticaj klimatskih promena bilo je nekoliko inicijativa na međunarodnom nivou, poput konferencije Ujedinjenih nacija, Kjoto protokola, Pariskog sporazuma i osnivanja Mreže za ozelenjavanje finansijskog sistema.

U ovom radu analiziran je odgovor Evropske centralne banke, Banke Francuske i Banke Engleske na klimatske promene. Evropska centralna banka je od 2007. god. odlučila da se na sistemski način bavi problemom klimatskih promena i na bazi toga je 2010, 2013, 2016. i 2019. god. objavila Izveštaj o životnoj sredini u kojem je prikazala rezime napora u pogledu očuvanja životne sredine. U pogledu klimatskih promena rad Evropske centralne banke se bazira na tri glavna cilja: (1) monitoring i upravljanje klimatskim rizicima sa ciljem postizanja cenovne stabilnosti i sigurnosti bankarskog sistema; (2) podršku zelenoj tranziciji i (3) podsticanje šire akcije. Pored toga, Evropska centralna banka je pokrenula klimatske stres testove čije rezultate je objavila u julu 2022. god. i koji su pokazali da banke zone evra nisu u dovoljnoj meri klimatski rizik uključile u svoj okvir stres testova i u svoje interne modele, iako je od 2020. god. napravljen određen nivo napretka.

Okosnicu u borbi protiv klimatskih promena u Francuskoj predstavlja Nacionalna strategija za postizanje niske emisije ugljen-dioksida koja je usvojena 2015. god. Banka Francuske i Banka za međunarodna poravnanja su u januaru 2020. god. objavile zajednički izveštaj pod nazivom „Zeleni labud“ u kojem su ukazale da klimatske promene stvaraju nove izazove za centralne banke, regulatore i supervizore. Nakon toga je Banka Francuske u aprilu 2020. god. razvila scenario klimatskih promena sa nastojanjem da projektuje bruto domaći proizvod i to projekciju štete koju bi bruto domaći proizvod pretrpeo usled klimatskih promena i uticaj mera za ublažavanje tih promena na nivo bruto domaćeg proizvoda. Uprava za prudencijalni nadzor Francuske je u periodu između jula 2020. i aprila 2021. god. primenila klimatski stres test odozdo prema gore i rezultati testa su pokazali da bankarski sistem i sektor osiguranja u Francuskoj imaju umerenu izloženost klimatskim rizicima.

Na klimatske promene Banka Engleske je reagovala odlukama i merama iz domena finansijske regulacije i supervizije, potom kroz međunarodnu saradnju i inicijative, kao i u okviru operacija same centralne banke. Banka Engleske je u aprilu 2019. god. postala prva centralna banka i supervizor koji je postavio supervizorska očekivanja za banke i osiguravajuća društva u pogledu adekvatnog upravljanja klimatskim rizicima.

Zajedno sa Upravom za finansijsko ponašanje Banka Engleske je osnovala Forum za klimatske rizike sa ciljem da se podeli najbolja praksa u upravljanju finansijskim rizicima koji proističu iz klimatskih promena. Banka Engleske je imala vodeću ulogu u razvoju Mreže za ozelenjavanje finansijskog sistema, čiji je jedan od osnivača, kao i u razvoju Foruma održivog osiguranja, čiji je suosnivač. Pored navedenog Banka Engleske nastoji da diversifikuje portfolio time što bi dala podstrek investitorima da aktivno rade na većem emitovanju zelenih obveznica.

U narednom periodu može se očekivati još aktivniji rad centralnih banaka na polju objavljivanja informacija o uticaju klimatskih promena na realni i finansijski sektor, ali i nastavak primene klimatskih stres testova kako bi se kroz primenu različitih scenarija sagledao uticaj tih promena. Takođe, neophodno je meriti ekonomski trošak klimatskih promena čiji nivo će zavisiti od efikasnosti mera koje se trenutno preduzimaju i koje će u budućem periodu biti preduzete. Svakako će ekonomski trošak biti manji ukoliko centralne banke i svi ostali akteri na čije poslovanje utiču klimatske promene primene adekvatne i pravovremene mere u borbi protiv klimatskih promena.

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CLIMATE CHANGE AND THE ROLE OF CENTRAL BANKS

„Climate change poses the risk of considerable social costs and economic disruption“

Yves Mersch, Frankfurt,
27 November 2018

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Summary

In the last few years, central banks have been exposed to new challenges and tasks that they need to face. One of those challenges is climate change, which directly affects the central bank's main goals, namely achieving and maintaining price and financial stability. In order to fulfill the goals defined by the Paris Agreement, it is necessary for central banks to take a more active part in the fight against the consequences of climate change. This means that central banks are expected to adopt policies and strategies that will guide the financial sector to successfully manage the risks of climate change and encourage them to direct investments in clean technologies and low-carbon infrastructure. This would achieve sustainable economic development in the long term, which is based on the principle of reducing the risk of climate change, while at the same time preserving the environment.

Keywords: climate change; central banks; sustainable finance; green transformation

JEL classification: Q54, E58, E42

Introduction

Climate change affects the real economy, as well as the entire financial system. Although the mandate of central banks is defined by legal acts, in the last few years new challenges have been posed to these institutions, such as the rise in real estate prices, the risk of climate change and the development of digital currencies. It is necessary for central banks to deal with the analysis and adoption of adequate guidelines and policies for the financial sector in order to rehabilitate the consequences of climate change, bearing in mind the impact of those changes on price and financial stability. In order to achieve a low-carbon economy, it is necessary to change the existing way of doing business based on dirty technologies and make a turn towards building a sustainable economy that actively cares for the preservation of the environment. Aiming to achieve that goal, it is necessary for the central bank to actively work on the development of green financial instruments and the further development of financial markets. Since climate change is a global problem, it is necessary to coordinate measures of monetary, macroprudential and fiscal policy in order to neutralize the negative effects of existing and future effects of climate change. In this paper, we will analyze climate change and the role of central banks, primarily leading central banks such as the European Central Bank, the Bank of France and the Bank of England.

Literature Review

During the existence of the planet, the climate on Earth has changed many times - from ice ages to significantly higher temperatures. The last few decades have seen an increase in the average air temperature and the related effects on the climate have been discussed in a large number of forums (Moretti et al., 2010). Climate change is our reality, as increasing cyclones and prolonged dry spells lead to the destruction of infrastructure, disruption of livelihoods and contribute to mass migration (Grippa et al., 2019). Mark Carney, a former governor of the Bank of Canada and the Bank of England, was among the first to highlight the risks of climate change in September 2015 and warned that climate change could lead to a financial crisis and a reduction in living standards unless leading economies do more to ensure that their companies use clean technology (Carney, 2015).

In the last few years, central banks have been expected to actively deal with the issue of climate change, and proposals for their engagement range from adopting “green” quantitative easing programs to increasing capital requirements aimed at influencing commercial banks to reduce their lending activity towards business activities which are not in accordance with the preservation of the environment (Skinner, 2021). Central banks and financial supervisors are increasingly aware that climate change is a source of financial risk and so far, central bank efforts have largely been directed towards integrating climate change risks into prudential supervision (Oustry et al., 2020). The risk of climate change is unique in its character. It is an irreversible risk, because there is currently no technology that can correct its effect, and it is potentially systematic, bearing in mind that its materialization can transform the functioning of the entire economy. The realization of climate risks can cause climate shocks, which can be non-linear and difficult to predict (Villeroy de Galhau, 2019).

The responsibility of central banks in terms of supervision, preservation of financial stability, asset management and the implementation of monetary policy require analyzing the potential systemic

impact that climate change can have on the economy and the financial system as a whole, with an effort to incorporate climate change issues into macroprudential policy as and portfolio management (González and Núñez, 2021). It is necessary for central banks to make an assessment of the overall risk of climate change, both for monetary policy and for the preservation of financial stability, taking into account the consequences of those changes. This entails determining exactly how and to what extent different participants in the financial system are exposed to the risk of climate change, as well as how these changes affect inflation, resource use and the implementation of monetary policy (Olovsson, 2018). Analysis by Diluiso et al. (2022) showed that the participation of central banks in solving climate change issues must be adequately designed in order to be consistent with their mandate.

Breitenfellner et al. (2019) point to the significant role of central banks in the development of green finance, in order to preserve macroeconomic and financial stability. According to their analysis, the goal of green finance is to achieve a green financial system by directing financial flows towards investments that support environmental protection and limit the effects of climate change. The pioneer in supporting green finance is the central bank of China, which in 2018 implemented a policy that can be labeled as “green monetary policy” (Chen et al., 2020). The importance of developing green finance stems from the significant gap between existing opportunities and the estimated volume of new

capital needed each year to finance the transition of the economy and society to low carbon use (Langley and Morris, 2020). The role of central banks can only be effective if it is part of a well-coordinated strategy at the national and international level. At the national level, cooperation with fiscal policy representatives is key in order to implement support measures for the development of green investments, while at the international level, cooperation is necessary for the exchange of opinions on the implementation of best measures and international practices (Arndt et al., 2020). Central banks are not isolated from the effects of climate change and its consequences, and it is necessary to apply the aspect of sustainability in various areas of their operations, both in the management of their own portfolio and in the area of supervision and financial stability (González Martínez, 2021).

When it comes to the intervention of central banks in the matter of “greening” the mandate of central banks, Ramos Muñoz et al. (2022) indicate that it is necessary to look at three aspects. First, it is necessary to determine whether the central bank should intervene, that is, whether the issue of climate change can be incorporated into the definition of the mandate of central banks. Second, it is necessary to consider when the central bank should intervene (whether central banks should react immediately or wait until they collect enough data on the impact of climate change) and thirdly, it is important to determine the way of intervention. Climate change affects the financial system through financial assets that can record losses both for individuals and for the entire financial system. These changes can affect the possible bankruptcy of companies, as well as the deleveraging of banks, which can lead to financial instability (Masciandaro and Tarsia, 2021). Certain central banks have begun analyzing the implications of climate change and the transition to low carbon use for the financial sector, bearing in mind that central banks are in charge of financial regulation and supervision (Campiglio et al., 2018). Ozili (2021) suggests the following measures that central banks can implement to remedy the consequences of climate change.

First, it is possible for central banks to introduce an additional capital buffer related to climate change, then to reduce lending activity to those industries that destroy the environment and climate, then to establish a special bank that will deal with climate change issues, as well as to the central bank can ask financial institutions to reallocate their assets in order to be less exposed to the impact of climate change.

Climate Change - General Overview

In order to better understand climate change, it is necessary to specify what it represents. According to the United Nations, climate change is a long-term change in temperature and weather patterns. Moreover, these changes can be caused by natural factors, such as changes in solar cycles. However, since the 1800s, the main causes of climate change have been human activities, primarily through the burning of fossil fuels, such as gas, oil and coal. Climate change affects people's health, food production, housing construction, as well as safety and the way work activities are performed. Certain parts of the planet Earth are already more exposed to the impact of climate change, such as people living in smaller island countries and other developing countries. Due to climate change, there has been a drop in sea levels and an increase in water salinity, which has led to the necessity for people to move, and prolonged droughts have imposed the risk of famine. An increase in climate refugees can be expected in the future (United Nations). A somewhat more detailed definition of climate change is contained in the United Nations Framework Convention on Climate Change, where Article 1 states that climate change means climate change that is directly or indirectly attributed to human activities, which changes the composition of the global atmosphere and which, in addition to natural climate change, recorded in comparable time periods (United Nations Framework Convention on Climate Change). In order to translate climate changes into financial risks, it is necessary to introduce the concept of climate risks, which can be grouped into two categories - physical risks and transition risks. Physical risks include changes in weather conditions and climate that affect the economy. These risks can be categorized as acute risks related to extreme weather conditions or as chronic risks related to gradual changes in climate conditions. Acute physical hazards generally refer to heat waves, floods, fires and storms, including hurricanes, typhoons and cyclones. Transition risks imply a transition to an economy that uses less carbon dioxide. These risks relate to changes in public sector business policies, innovations and changes in the availability of existing technology (for example, technologies that use renewable energy or enable the elimination of atmospheric greenhouse gases), as well as the efforts of investors and consumers to achieve a greener environment. In addition to the two main risks of climate change, it is necessary to mention other risks caused by these changes: (1) credit risk (if there is an increase in climate risks, there may be an increase in credit risk, which consequently affects the debtor's ability to pay his obligations on time); (2) market risk (a decrease in the value of financial assets may be caused by climate risks); (3) liquidity risk (if there is a change in market conditions, caused by climate risks, banks' access to stable sources of financing may be reduced); (4) operational risk (risk arising from the necessary compliance with legal regulations) and (5) reputational risk (an increase in banks' reputational risk can be realized if there is a change in market behavior or client sentiment) (Basel Committee on Banking Supervision). In addition to physical and transition risks within the main climate risks, the Bank of England also includes liability risk, which arise from the compensation that individuals or companies seek as compensation for the losses suffered by the realization of physical or transition risks. Liability cases can involve individuals who may suffer some of the physical risks, such as flooding, and seek some form of compensation from polluting companies that are at least partially responsible (Bank of England, 2019). In an effort to reduce the impact of climate change, several protocols and agreements have been signed. In June 1992, the United Nations Conference on Environment and Development (UNCED) was held and brought together political leaders, diplomats, scientists, representatives of the media and non-governmental organizations from 179 countries with the aim of reviewing the impact of socio-economic activities on the environment (United Nations Conference

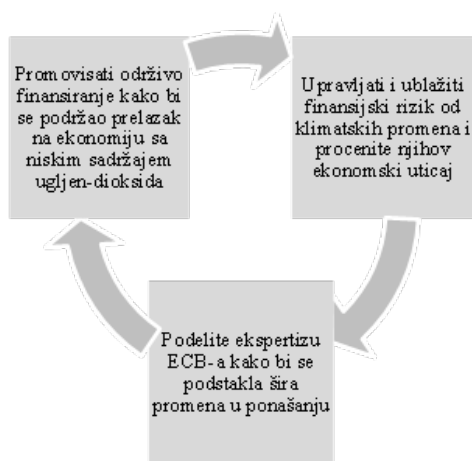
Conference on Environment and Development). After that, the Kyoto Protocol was adopted in December 1997, which after a complicated ratification process entered into force in February 2005. The Kyoto Protocol implies the operationalization of the United Nations Framework Convention on Climate Change and signifies an obligation to industrialized countries and economies in transition to limit greenhouse gas emissions in accordance with individual set goals (Kyoto Protocol). In December 2015, with implementation from November 2016, the Paris Agreement was signed as an internationally binding treaty on climate change. The agreement was signed by 196 members at the United Nations Climate Change Conference held in 2015. The goal of the Paris Agreement is to limit global warming to below 2, preferably 1.5 degrees Celsius, compared to the temperature recorded in the pre-industrial period. In order to achieve the stated temperature goal, it is necessary for countries to achieve a climate-neutral world by the middle of this century. The Paris Agreement implies economic and social transformation, which is based on the best scientific solutions (Paris Agreement). In Paris, two years later, the Network of Central Banks and Supervisors for Greening the Financial System (NGFS) was established by leading central banks and regulators with the aim of providing a more significant global response needed to meet the goals defined by the Paris Agreement (Tooze, 2019). The aim of this network is to strengthen the global response to achieve the goals defined by the Paris Agreement, as well as to improve the role of the financial system to manage risks and mobilize capital for green investments (NGFS).

Climate Change and the Role of the European Central Bank

Since 2007, the European Central Bank (ECB) has decided to take actions to address the issue of environmental sustainability in a systemic way. Then, in 2010, 2013, 2016 and 2019, it published the ECB environmental statement, in which it stated a summary of the ECB's efforts to protect the environment. The ECB is committed to participating in addressing climate change within its mandate. The ECB attaches great importance to climate change and in January 2021 it established a climate change center with the aim of unifying the work on climate change in the different organizational parts of the ECB.

The ECB's work on climate change focuses on three main objectives – Graph 1. The first objective refers to the monitoring and management of climate risks with the aim of achieving price stability and security of the banking system. The ECB has incorporated climate risks into: (1) analysis and decision-making process; (2) macroeconomic models, projections and determination of scenarios; (3) assessment of financial stability; (4) analysis of monetary policy and transmission mechanism and (5) risk management process. The measurement and monitoring of physical and transition risks are important for the ECB in order to ensure the stability and security of the banking sector of the euro zone, as well as the entire banking system. It is the responsibility of the ECB to determine whether the banks of the euro zone can recognize, manage and detect climate risks in a timely manner (ECB).

Graph 1: Three strategic objectives on climate changes



Source: ECB – European Central Bank, *ECB climate agenda 2022*, Accessed: 21.7.2022.

https://www.ecb.europa.eu/press/pr/date/2022/html/ecb.pr220704_annex-cb39c2dcbb.en.pdf

The second goal regarding climate change is related to supporting the green transition. In order to avoid the worst effects of climate change, it is necessary to reduce the emission of carbon dioxide. That is why the European Union has committed to reduce carbon dioxide emissions by 55% by 2020 and to achieve zero emissions by 2050. Although it is the primary responsibility of governments and regulators to initiate and support this transition, the ECB's role in promoting sustainable finance and "greening" monetary policy operations, without compromising the primary objective of achieving and

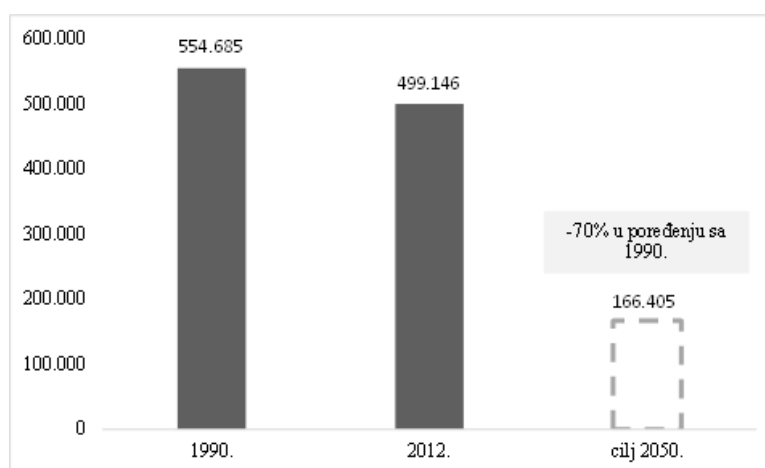
maintaining price stability, is very important. In July 2022, the ECB adopted a climate action plan to integrate the issue of climate change into the monetary policy strategy. That climate plan implies that the ECB additionally incorporates climate change into the framework of monetary policy, then expands its analytical capacity in the domain of macroeconomic modeling, statistics and monetary policy in the domain of climate change, then includes the issue of climate change in monetary policy operations (the ECB takes into account climate change when implementing the corporate bond purchase program, when determining the required collateral, as well as in the case of risk management), as well as to implement a climate action plan in accordance with the progress of the European Union in terms of applied policies and initiatives in the field of environmental sustainability disclosure and reporting (ECBb). The ECB's third objective of climate change is about encouraging broader action. Solving the problem of climate change is a global challenge and therefore requires the involvement of a large number of participants. The ECB therefore shares its expertise and actively works to adopt and promote best practice to address climate change. On this basis, the ECB actively cooperates with partners from Europe, but also at the international level, then the ECB intensively implements activities to encourage the transparency of its activities in the field of solving climate change and strives to reduce its impact on the environment in order to achieve zero carbon emissions by 2050.

In January 2022, the ECB launched climate stress tests to assess the extent to which the banking sector is prepared to cope with financial and economic shocks arising from climate change. The stress test includes three different modules: (1) a questionnaire on banks' capacity to conduct climate stress tests; (2) analysis of the sustainability of banks' models and their exposure to companies with intensive carbon dioxide emissions, and (3) the implementation of a bottom-up stress test, which implies that stress tests are carried out by individual financial institutions, using their own framework (Banking supervision, 2022). In July 2022, the ECB published the results of climate stress tests which showed that eurozone banks had not sufficiently incorporated climate risk into their stress test framework and internal models, although some level of progress had been made since 2020. The applied climate stress test, which is part of the ECB's activities regarding the climate map, was not an assessment of whether euro zone banks have a sufficient level of capital, but a demonstration exercise for banks and supervisors. The conducted stress test collected qualitative and quantitative information on the assessment of the readiness of the banking sector for climate risks, along with the collection of data on the implementation of best practices. 104 eurozone banks participated in the said climate stress test, and the results showed that based on the first module, which includes a questionnaire on banks' capacity to conduct climate stress tests, around 60% of banks have not yet included climate risks in their credit risk models and only 20% of banks take climate risk into account when approving a loan. In the second module, which presents an analysis of the sustainability banking models and their exposure to companies that have intensive carbon dioxide emissions, almost two-thirds of the banks' income comes from non-financial corporate clients that intensively use greenhouse gases. The implementation of the bottom-up stress test, as the third module, showed that banks projected losses in case of realization of extreme weather conditions. This module confirmed that physical risk has a different impact on European banks and indicated that banks are particularly vulnerable in the event of a scenario of drought and high temperatures, which depends on their sectoral activities and the geographical location of their exposure. The applied climate stress test showed the ECB's commitment to facilitate the green transition for euro zone banks. It was the results of that test that indicated the necessity for European banks to strengthen the capacity of climate stress testing and to prepare for the risks and opportunities leading to zero carbon dioxide emissions (Banking supervision, 2022a).

Climate Change and the Role of the Bank of France

In 2015, France adopted the National Low-Carbon Strategy (SNBC), which represents the backbone of the fight against climate change. The National Strategy was revised in 2018-2019, and then new versions of the National Strategy for the periods 2019-2023, 2024-2028 and 2029-2033 were adopted in April 2020. The National Strategy includes guidelines for the implementation of measures in all sectors, then the transition to low use of carbon dioxide, as well as achieving a circular and sustainable economy. In addition, the National Strategy defines timelines for the reduction of carbon dioxide emissions until 2025, and also sets goals in the short and medium term - Graph 2. The two main goals of the strategy are to achieve neutrality by 2050 in the level of carbon dioxide and to reduce the level of carbon dioxide emissions and other carbon-based components in the consumption of the French economy (National Low-Carbon Strategy - SNBC).

In January 2020, the Bank of France and the Bank for International Settlements published a joint report called "Green Swan" in which they indicated that climate change creates new challenges for central banks, regulators and supervisors. A special part of the analysis is aimed at indicating how climate risks affect financial stability. Namely, it is necessary to closely monitor climate risks in order to achieve and preserve financial stability, bearing in mind the significant uncertainty associated with social and economic factors that tend to undergo major changes. Traditional risk assessments, as well as existing climate-economic models, are not able to predict how climate risks can be realized. It actually includes what the two banks' joint analysis calls "green swan" risks, which refer to potentially significant financial instabilities that could be the source of the next systemic financial crisis. Central banks play a significant role in avoiding the realization of such a crisis, which includes their efforts to improve the understanding of climate risks due to the development of scenario-based analysis. However, it should be pointed out that central banks cannot act independently in the fight against climate change. As it is a complex problem, it is necessary to involve many participants, such as representatives of governments, the private sector, civil society and the international community. Thus, central banks get an additional role related to support in the process of coordinating measures in the fight against climate change. In this regard, it is necessary for central banks to develop a climate change mitigation policy, then to integrate the principle of sustainability in financial practice and accounting frameworks, but also to develop new financial mechanisms at the international level. The mentioned initiatives of the central banks should contribute to the preservation of financial (and price) stability in the long term at the time of pronounced climate changes (Bolton et al., 2020).

Graph 2: Evolution of CO2 emissions (in kilotonnes of CO2)

Source: Countries, Wake up! What is Being Done against Climate Change?, Accessed: 22.7.2022.
<https://www.institutmontaigne.org/en/blog/countries-wake-what-being-done-against-climate-change>

In April 2020, the Bank of France developed a scenario of climate change in an effort to project the gross domestic product, namely the projection of the damage that the gross domestic product would suffer due to climate change and the impact of measures to mitigate those changes on the level of the gross domestic product. The model, named the Advanced Climate Change Long-term Model (ACCL), includes the projection of gross domestic product for the period from 2060 to 2100 for thirty countries/regions. The model projects the long-term effect of carbon taxation on economic growth through two channels. The first refers to the negative effects of introducing a tax on carbon dioxide, which consequently leads to higher energy prices, while the second channel is based on the positive economic impact of carbon dioxide taxation, through the reduction of that emission. The analysis showed that a net loss of gross domestic product can be expected in the medium term, which is caused by climate change, while the impact is somewhat more favorable in the long term (Alestra et al., 2020).

Between July 2020 and April 2021, the French Prudential Supervision and Resolution Authority (ACPR) initiated an important step in the supervision of climate risks. It is the first time that the body in charge of supervision applied a bottom up climate stress test, which is based on a direct assessment of the financial institutions that are under its supervision. The climate stress test was conducted over a time horizon of 30 years, a methodology based on scenario analysis by economic sector, physical and transitional risks were included, and participating institutions directly assessed their risk based on common assumptions. Nine banking groups, which make up 85% of the assets of the total banking sector of France, and fifteen insurance companies, which make up 75% of the assets of the total insurance sector of France, participated in this stress test on a voluntary basis. The results of the conducted climate stress test showed that the banking system and the insurance sector have a moderate exposure to climate risks. However, this conclusion should be understood in the context of the uncertainty of both the speed and impact of climate change. Analysis of the impact of climate risks on the financial system will be applied on a regular basis, and the next climate stress tests will be conducted in

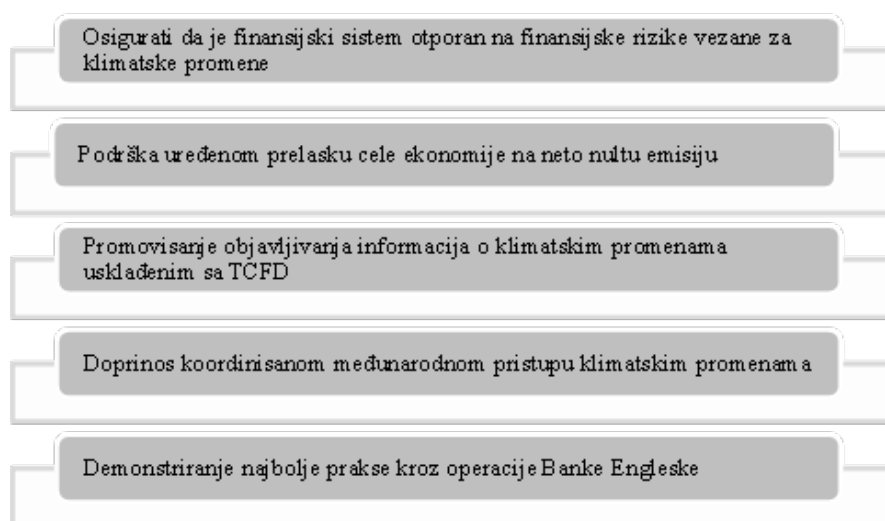
2023/2024 (ACPR). In March 2021, the Bank of France established the Climate Change Centre, as it recognized the importance of climate change and integrated ambitious actions into its corporate strategy. The Center for Climate Change acts as a hub for the central bank to coordinate the measures of the different organizational units of the Bank of France in the field of combating climate change. The Center itself reports to the Financial Stability Department and has been operational since April 1, 2021. In addition, the Center ensures that the Bank of France's initiatives align with the priorities of the Network of Central Banks and Supervisors for Greening the Financial System (NGFS), for which the Bank of France has provided the secretariat since December 2017 (Climate Change Centre).

At the end of April 2022, the Bank of France became part of the network of CDP, a non-profit charitable organization founded with the aim of communicating data to investors, companies, states, regions and cities to manage their environmental impact. This made the Bank of France the first central bank in the world to require companies to disclose their environmental impact data. By joining the CDP Bank of France was part of a group of 680 financial institutions that have assets worth 130 billion dollars. This move by the Bank of France represents an effort to achieve neutral carbon dioxide emissions by 2030, as well as to meet the goals defined by the Paris Agreement (CDP).

Climate Change and the Role of the Bank of England

The Bank of England responded to climate change with decisions and measures from the domain of financial regulation and supervision, then through international cooperation and initiatives, as well as within the operations of the central bank itself. The Bank of England continues to act proactively to respond adequately to the risks of climate change. The Bank of England's efforts are directed towards meeting climate change targets - Graph 3.

Graph 3: Climate change objectives



Note: TCFD - Task Force on Climate-related Financial Disclosures

Source: Bank of England, 2019, Climate change, Accessed: 25.7.2022. <https://www.bankofengland.co.uk/climate-change>

In terms of financial regulation and supervision, the Bank of England in April 2019, based on the 2015 Insurance Outlook and the 2018 Banking Outlook, became the first central bank and supervisor to set supervisory expectations for banks and insurance companies in terms of adequate management of climate risks. In doing so, the Bank of England has set clear expectations for a strategic approach to climate change management, including identifying current risks, as well as those that may potentially arise in the future, with the adoption of adequate measures to mitigate those risks. This was followed in 2020 by sending a letter to companies called “Dear CEO Letter”, in which the Bank of England gave detailed instructions on how companies should manage climate risks until the end of 2021. In October 2021, the Second Report on Adaptation to Climate Change (CAR) in which the progress made by companies in terms of climate risk management is stated (Climate Change Adaptation Report 2021). From 2022 onwards, the Bank of England will continue to exercise active corporate supervision and climate risks are now a core component of the central bank’s supervisory approach.

In March 2019, the Bank of England together with the Financial Conduct Authority (FCA) established the Climate Financial Risk Forum (CFRF) with the aim of sharing best practice in managing the financial risks arising from climate change. The forum includes representatives from the financial sector and is based on the work of four working groups dealing with risk management, scenario analysis, information disclosure and innovation. In June 2020, the Forum published guidance to help the financial industry adequately monitor climate risks, while in October 2021 it published a second round of guidance. In order to assess the impact of climate risks on the financial system of the United Kingdom, the Bank of England published a key element’s document in June 2021. In that document, there is a description of the stress tests that are conducted every two years, in which the resistance of the financial system to physical risks resulting from climate change is evaluated. At the same time, stress tests were carried out for banks and for insurance companies whose Bank of England was able to assess the interaction between these two sectors and to understand the present risk of climate change in the financial system.

In terms of international cooperation and initiatives, the Bank of England is one of the founders of the Network of Central Banks and Supervisors for Greening the Financial System (NGFS) and has played a leading role in the development of the NGFS in terms of a better understanding of macroeconomic and financial risks arising from climate change. In addition, the Bank of England co-founded the Sustainable Insurance Forum (SIF), a global network of insurance supervisors and regulators working together to identify challenges facing the insurance sector, including climate change. The Financial Stability Board (FSB), of which the Bank of England is a member, established the Task Force on Climate-related Financial Disclosures (TCFD) in 2015 at the request of the G20 group. The goal of this Working Group is to create global standards for climate change disclosure.

Within the operations of the central bank itself, the Bank of England has done a lot on climate change. Those operations can be divided into physical and financial operations. Enclosed by the framework of physical operations in 2020, a goal was adopted to reduce the absolute emission of greenhouse gases from 2016 to 2030 by 63%. Regarding financial operations in May 2021, a proposal was made on the “greening” of the Corporate Bond Purchase Scheme (CBPS). After that, the Bank of England’s Monetary Policy Committee announced in February 2022 that it would reduce the portfolio of corporate bonds and that it would implement this decision by the end of 2023 or the beginning of 2024 at the latest. The aim of this decision is to diversify the portfolio, including “greening”. With this, the central bank wants to set an example for other investors to support the climate transition through a larger issuance of green corporate bonds.

Conclusion

Climate changes represent a new challenge that central banks face, bearing in mind that these changes affect the achievement and preservation of price and financial stability, which are the main goals for most central banks. It is precisely for this reason that central banks actively began to deal with the problem of climate change, identifying physical and transition risks, analyzing their impact on the financial system, as well as proposing measures to mitigate the impact of those risks. In addition, central banks have started implementing climate stress tests, then actively promote the best practice in solving climate change, but also provide guidelines for a painless green transition and the development of green finance. All this requires the existence of a quality database on the impact of climate change on the real economy and financial system, as well as the development of timely instruments for managing the risks of climate change. However, it should be pointed out that the issue of solving the problem of climate change is not only up to the central banks, but requires good coordination of measures with governments, representatives of international financial organizations, civil society and the private sector. In order to reduce the impact of climate change there are several initiatives at the international level, such as the United Nations conference, the Kyoto Protocol, the Paris Agreement and the establishment of the Network for Greening the Financial System.

This paper analyzes the response of the European Central Bank, the Bank of France and the Bank of England to climate change. Since 2007, the European Central Bank has decided to address the problem of climate change in a systemic way, and based on that, on 2010, 2013, 2016 and 2019, it published an environmental statement, in which it presented a summary of efforts to preserve the environment. With regard to climate change, the work of the European Central Bank is based on three main objectives: (1) monitoring and management of climate risks with the aim of achieving price stability and security of the banking system; (2) supporting the green transition and (3) encouraging broader action. In addition, the European Central Bank launched climate stress tests, the results of which it published in July 2022, which showed that the banks of the euro zone did not sufficiently include climate risk in their stress test framework and in their internal models, although from 2020 a certain level of progress.

The backbone of the fight against climate change in France is the National Low-Carbon Strategy, which was adopted in 2015. In January 2020, the Bank of France and the Bank for International Settlements published a joint report called "The Green Swan", in which they indicated that climate change creates new challenges for central banks, regulators and supervisors. After that, in April 2020, the Bank of France developed a climate change scenario in an effort to project the gross domestic product, namely the projection of the damage that the gross domestic product would suffer due to climate change and the impact of measures to mitigate those changes on the level of the gross domestic product.

Between July 2020 and April 2021, the French Prudential Supervision and Resolution Authority applied a bottom-up climate stress test and the results of the test showed that the banking system and the insurance sector in France have a moderate exposure to climate risks.

The Bank of England responded to climate change with decisions and measures from the domain of financial regulation and supervision, then through international cooperation and initiatives, as well as within the operations of the central bank itself. In April 2019, the Bank of England became the first

central bank and supervisor to set supervisory expectations for banks and insurance companies to adequately manage climate risks. Together with the Financial Conduct Authority, the Bank of England has established a Climate Financial Risk Forum to share best practice in managing financial risks arising from climate change. The Bank of England played a leading role in the development of the Network of Central Banks and Supervisors for Greening the Financial System, of which he is one of the founders, as well as in the development of the Sustainable Insurance Forum, of which he is a co-founder. In addition to the above said, the Bank of England is trying to diversify its portfolio by giving investors an incentive to actively work on a larger emission of green bonds.

In the coming period, we can expect even more active work by central banks in the field of publishing information about the impact of climate change on the real and financial sectors, as well as the continuation of the application of climate stress tests in order to assess the impact of these changes through the application of different scenarios. Also, it is necessary to measure the economic cost of climate change, the level of which will depend on the effectiveness of the measures that are currently being taken and that will be taken in the future. Certainly, the economic cost will be lower if central banks and all other actors whose business is affected by climate change apply adequate and timely measures in the fight against climate change.

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UTICAJ MOBILNIH TEHNOLOGIJA I INTERNETA NA BUDUĆNOST POSLOVANJA BANAKA

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Rezime

Brzi razvoj informacionih tehnologija, koje su našle primjenu u svim oblastima ljudske djelatnosti, doveo je i do promjena u načinu bankarskog poslovanja. Tradicionalno bankarstvo neizostavno je podrazumijevalo odlazak u banku radi korišćenja bankarskih usluga. U današnje vrijeme usluge banaka dostupne su klijentima u njihovim domovima ili na bilo kojem drugom mjestu. To je prvenstveno rezultat razvoja interneta i mobilnih tehnologija, usljed kojeg je došlo do razvoja novih vidova bankarskog poslovanja, poznatih pod nazivom internet bankarstvo i mobilno bankarstvo. Ova dva vida bankarstva predstavljaju okosnicu buduće bankarske djelatnosti.

Ključne riječi: internet, internet bankarstvo, mobilno bankarstvo, prednosti, ograničenja, fintek kompanije

JEL klasifikacija: G21, L86

Uvod

Primjena savremenih informacionih tehnologije u bankarskom sektoru dovela je do unaprijeđenja bankarskog poslovanja. Broj informacija koje se mogu obraditi je sve veći i praktično postaje neograničen, a s obzirom na to da se one prostiru bez prostornog i vremenskog ograničenja bankarsko tržište je postalo globalno. Pored toga, došlo je i do razvoja novih proizvoda i usluga, kao i promjene u obimu i strukturu tražnje na tržištu bankarskih proizvoda i usluga. Prednosti koje su informacione tehnologije donijele bankarskom sektoru su višestruke i ogledaju se u smanjenju troškova poslovanja, unaprijeđenju svijesti klijenata o bankarskim proizvodima i uslugama, inovativnosti u poslovanju i ponudi standardnih i nestandardnih proizvoda i usluga, povećanju efikasnosti ponude, kao i stavljanju akcenta na klijenta kao pojedinca. Nova tehnološka infrastruktura dovodi do promjena u načinu vršenja komunikacionih aktivnosti, kao i u načinu građenja odnosa između klijenata i banke, što ima za posljedicu njihovu efikasniju međusobnu komunikaciju i poslovanje. Navedene prednosti uticale su na pojavu i postepeni razvoj elektronskog bankarstva, koje predstavlja skup raznovrsnih načina izvođenja finansijskih transakcija, upotrebom informacionih i telekomunikacionih tehnologija (Sanader, 2014).

U okviru razvoja elektronskog bankarstva zapaža se šest faza, koje se odnose na automatizaciju šalter-skog poslovanja; bankomate; platne kartice i POS uređaje; kućno bankarstvo (homebanking); internet bankarstvo i mobilno bankarstvo (Jokić i saradnici, 2017).

Automatizacija bankarskog poslovanja podrazumijevala je opremanje bankarskih šaltera računarskom opremom, čime je klijentima bio znatno olakšan pristup dokumentaciji, kao i njeno popunjavanje.

Uvođenje bankomata imalo je za cilj da klijentima omogući pristup servisima banke u bilo koje vrijeme, odnosno da koristi svoj račun 24 sata na dan.

Za POS terminale je karakteristično to što omogućavaju dostupnost bankarskih usluga na mjestu plaćanja proizvoda.

Kućno bankarstvo (homebanking) omogućava velikim korisnicima iznajmljivanje linija i direktnu konekciju sa bankarskim aplikacijama, u cilju jednostavnijeg plaćanja i transakcija, pri čemu telefonski servis obezbjeđuje brzo dobijanje svih potrebnih informacija (Isto).

O internet bankarstvu i mobilnom bankarstvu, kao najnovijim fazama elektronskog bankarstva, biće riječi u narednom izlaganju.

Internet bankarstvo

Razvoj internet bankarstva

Razvoj internet bankarstva, koje se može definirati kao proces u kojem je klijent u mogućnosti da pristupi, kontroliše i koristi svoj račun putem interneta,¹ usko je povezan s razvojem World Wide Web-a (WWW) (Brčić, 2018).

Počeci internet bankarstva vežu se za 1983. godinu, kada je Škotska banka korisnicima NBS10 (Nottingham Building Society) mreže, ponudila na korištenje internet bankarski servis u Velikoj Britaniji, poznat pod nazivom Homelink. Upotreba ovog servisa, koji je bio dostupan malom broju korisnika, ostvarena je pomoću televizora i telefona, na način što su se preko telefonske linije na televizoru tražili i listali podaci iz baze podatke.

U oktobru 1994. godine, internet bankarstvo, kojeg je razvila financijska institucija Stanford Federal Credit Union¹¹, prvi put se javlja u Sjedinjenim Američkim Državama. Usluge internet bankarstva mogli su da koriste svi klijenti ove finansijske institucije.

Maja 1995. godine Wells Fargo banka izradila je prvi web bankarski program za poslovanje na internet (Mihailović, 2009). Iste godine, u Atlanti (SAD) osnovana je Security First Network Bank (SFNB), prva banka koja je svoje poslovne aktivnosti obavljala isključivo putem interneta (Isto; Brčić, 2018).

U aprilu 1996. godine, prema podacima Online Banking Reporta, u Sjedinjenim Američkim Državama zabilježeno je milion korisnika internet bankarstva. Naredne godine internet bankarstvo imalo 4,2 miliona korisnika, da bi se 2001. godine taj broj povećao na 19 miliona. Svakako, trend rasta internet bankarstva zastupljen je u svim državama svijeta, a sve je više banaka koje se opredjeljuju da svoje poslovne aktivnosti obavljaju samo preko interneta (Brčić, 2018).

¹ Ovo je jedna od mnogih definicija internet bankarstva, pošto različiti autori ovaj pojam opisuju na različite načine. Ipak, suština ovih opisa u osnovi je ista i svodi se na predstavljanje internet bankarstva, kao čina sprovođenja finansijskog posredovanja na internetu. (Ibok i Ikoš, 2014).

Vrste internet bankarstva

Postoje tri vrste Internet bankarstva i to: informaciono, komunikativno i transakciono internet bankarstvo (Mihailović, 2009).

Informaciono internet bankarstvo (poznato i kao basic level service) predstavlja prenošenje informacija o proizvodima i uslugama, koji se nude klijentima i javnosti uopšte. Komunikacija na relaciji banka-klijent odvija se putem e-mail-ova, pri čemu se ovaj vid prenošenja marketinških informacija može obavljati preko servera banke ili web sajta.

Ranjivost komunikacija koje se vrše preko servera je relativno niska, što nije slučaj ukoliko je web sajt glavni komunikacioni kanal između banke i klijenta. Stoga banka preduzima razne preventivne mjere kako bi se rizici preduprijedili. Komunikativno internet bankarstvo, koje se još naziva i simple transactional websiter, omogućava interakciju između sistema banke i klijenata. Klijenti mogu da primaju uputstva, kao i informacije o proizvodima i uslugama. Pored toga, oni mogu da prave upit stanja po tekućem računu, popunjavaju zahtjev za zajam, te da primaju i šalju e-mail-ove, ali ne mogu da obave ni jednu novčanu transakciju sa svoga računa. Ovi servisi su povezani sa internim sistemom banke, pa su usljed toga i rizici veći. Zato je potrebno da menadžment razvije odgovarajuće mjere prevencije, a da kontrolori nadgledaju sistem i upozoravaju na neovlašćene upade u internu mrežu banke (Isto).

Transakciono internet bankarstvo ili, kako se još naziva, full transactional websiter, omogućava klijentima da izvršavaju transakcije. Klijenti imaju mogućnost da koriste svoje račune na način da mogu da transferišu novac, plaćaju različite račune, kupuju i prodaju hartije od vrijednosti i sl. Kako je veza između servera interne mreže internet banke i spoljašnje mreže direktna, ovakav oblik povezanosti je najranjiviji, te stoga mora biti podložen najjačoj kontroli (Isto).

Vrste usluga u internet bankarstvu

Većina svjetskih banaka u svom internet poslovanju nudi sljedeće poslove i usluge: mjenjački poslovi; otvaranje i korišćenje zajmovnih računa; provjera stanja na računima klijenata; otvaranje i korišćenje čekovnih računa; plaćanje računa elektronskim putem; korišćenje sistema kreditnih kartica; trgovina hartijama od vrijednosti; obustave plaćanja; otvaranje i korišćenje tekućih računa; provjera transakcija iz prethodnog perioda na svim računima klijenta; elektronski transferi između računa; e-mail korespondencija; otvaranje i korišćenje depozitnih računa; obavljanje brokerskih usluga za klijente banke; odobravanje hipotekarnih i ostalih kredita; te usluge savjetodavne prirode (Radojević, 2009).

U smislu sistematizacije usluga internet bankarstva mogu se izdvojiti tri osnovne vrste usluga i to: konsolidovanje računa i obavljanje plaćanja; obavljanje finansijskog transfera između različitih računa i podnošenje aplikacija za kredite, osiguranja i sl.

Prva vrsta usluga je najpopularnija i omogućava klijentima banke da izvrše konsolidaciju većeg broja računa koje plaćaju svakog mjeseca, kao i da putem jedinstvenog naloga izvrše skidanje sredstava sa svojih bankarskih računa.

Druga vrsta usluga omogućava klijentima da vrše prenos sredstava sa računa na račun, bez odlaska u poslovnice ili mjesta gdje se nalaze ATM-ovi.

Slično kao i prethodnu, treću vrstu usluga takođe karakterišu efekti koji se odnose na uštedu vremena klijenata (Isto).

Prednosti internet bankarstva

U odnosu na tradicionalno bankarsko poslovanje, internet bankarstvo pruža brojne prednosti, kako za banke, tako i za korisnike njihovih usluga. Navešćemo neke od njih, za koje smatramo da su najvažnije:

Niži troškovi poslovanja

Banke snižavaju troškove poslovanja tako što zatvaraju određeni broj poslovnica, a klijenti na način što plaćaju nižu proviziju na bankarske usluge, koje su kod internet bankarstva, često i besplatne (Isto, Mihailović, 2009).

Prostorna neograničenost

Internet bankarstvo omogućava klijentu da koriste usluge neke banke bez obzira na mjesto njegovog trenutno boravka. Naravno, potrebno je da korisnik ima otvoren račun u toj banci, da na mjestu iz kojeg obavlja poslovanje postoji računar sa pristupom internetu, te da korisnik zna sve šifre koje su mu potrebne za ulazak u internet banku i svoj račun. U tradicionalnom bankarstvu klijent je vezan za mjesto i zemlju u kojoj postoje filijale banke u kojoj ima otvorene račune (Radojević, 2009).

Vremenska neograničenost internet banaka

Za razliku od klasičnog bankarstva koje podrazumijeva obavljanje bankarskih poslova u toku radnog vremena banke, kod internet bankarstva to nije slučaj, jer se transakcije mogu obavljati 24 sata, tokom svakog dana u godini. To znači da korisnici, ukoliko imaju internet konekciju, mogu pristupiti banci kad god to poželeva (Brčić, 2018; Mihailović, 2009).

Širok asortiman bankarskih usluga

Sve veća prisutnost informacionih tehnologija u savremenom svijetu uslovljava da banke, ukoliko žele da ostanu konkurentne na tržištu, razvijaju i pružaju netradicionalne usluge, što je dovelo do toga da je broj usluga koje banke nude svojim klijentima putem interneta prilično veliki. Tako, banke imaju korist od razvoja novih usluga, a klijenti od proširenja ponude banaka, u smislu boljeg zadovoljenja sopstvenih potreba (Isto).

Brzina obavljanja transakcija

U tradicionalnom bankarstvu potrebno je utrošiti vrijeme vezano za dolazak u filijalu i povratak iz nje. Pored toga, klijenti troše vrijeme dok čekaju u redu, popunjavaju razne formulare, kao i dok čekaju da se obave odgovarajuće transakcije (Radojević, 2009). Internet bankarstvo predstavlja daleko brži način za obavljanje bankarskog poslovanja, pošto u ovom slučaju klijenti troše vrijeme samo prilikom prijave na svoj račun i dok čekaju završetak transakcije (Isto; Brčić, 2018).

Fleksibilnost

U odnosu na tradicionalne, internet banke su puno fleksibilnije i lakše im je da izvrše potrebne promjene po pitanju svojih usluga, pošto imaju mogućnost da kroz stalnu interakciju sa klijentima, osluškujući njihove predloge i mišljenja, veoma dobro reaguju na njihove potrebe i želje. Na taj način klijentima se pruža potpunija usluga i utvrđuje njihova lojalnost prema banci (Mihailović, 2009).

Bolje upravljanje novčanim sredstvima

Kako je svaka transakcija zabilježena u digitalnom obliku, klijenti mogu da vide njihovu istoriju, te da ih analiziraju prije pokretanja nove transakcije. To, svakako, doprinosi boljem administriranju sopstvenih sredstava (Kulshrestha i Dave, 2016; Brčić, 2018; Rončević, 2006; Chavan, 2013).

Razvoj marketinga

Kroz interaktivan odnos sa klijentima banke formiraju baze podataka klijenata, koje se najčešće koriste u marketinške svrhe (Mihailović, 2009).

Ograničenja internet bankarstva

U vezi sa ograničenjima internet bankarstva, izdvojili bismo pitanja koja se tiču sigurnosti prilikom korišćenja bankarskih usluga, nepostojanju jedinstvene zakonske regulative u ovoj oblasti i odbojnosti prema inovacijama (Radojević, 2009).

Sigurnosna pitanja

Sistem internet bankarstva ne uliva potpunu sigurnost korisnicima, pošto su oni veoma osjetljivi po pitanju njihovog novca i teško prihvataju bilo kakav rizik od krađe i zloupotrebe njihovih podataka (Brčić, 2018).

Sa rastućom popularnošću otvorenih mreža kao što je internet i elektronskom razmjenom informacija i novca između geografski udaljenih lokacija, sigurnost transakcije ima ključni značaj za rast i razvoj ovog servisa. Banke koje upotrebljavaju elektronsku razmjenu podataka u zatvorenim mrežama (intranet) obezbjeđuju sigurnost utvrđivanjem identiteta i autorizacijom ljudi koji pristupaju mreži. Kad je riječ o otvorenim mrežama, postoje mehanizmi tehničke i pravne zaštite da spriječe neautorizovani pristup i hakerske napade. Međutim, određenim kriptografskim tehnologijama koje uključuju digitalni potpis, definiše se nova infrastruktura čija je glavna prednost viši nivo integriteta poruke i verifikacija pristupa (Milutinović, 2012).

Nepostojanje jedinstvene zakonske regulative

Internet, kao globalni sistem komuniciranja, zahtjeva postojanje odgovarajuće pravne regulacije, koja treba da definiše potrebe poslovnih subjekata i korisnika usluga. Zakonska regulativa koja se tiče

interneta, kao i poslovanja putem ove globalne računarske mreže, razlikuje se od zemlje do zemlje. Sjedinjene Američke Države i Evropska unija, kao dva najrazvijenija dijela svijeta, imaju različita stavove po ovom pitanju, pri čemu Evropska unija ima daleko liberalnije gledište u vezi sa privatnošću poslovanja u odnosu na SAD. Pristup EU bazira se na potpunoj anonimnosti i privatnosti poslovanja, dok se pristup SAD zasniva na potpunoj kontroli poslovanja, transakcija i podataka od strane državnih organa.

Odbojnost prema inovacijama

Svakako da postoji veliki broj ljudi koji se teško odlučuju da promjene ustaljene navike, pa tako i one koje se tiču načina korišćenja bankarskih usluga. Oni su jednostavno takvog psihološkog profila da zaziru od bilo kakvih noviteta i potrebno im je puno vremena dok odluče da se pozabave novim stvarima. To najčešće biva tek onda kad nemaju drugog izbora, odnosno kad ih životne okolnosti natjeraju da tako nešto učine. Pored toga, još uvijek postoji značajan postotak stanovništva, posebno kad se radi o starijoj populaciji, koja nema dovoljno iskustva u korišćenju interneta, ali i samih računara. Tim prije što je riječ o savremenim tehničko-tehnološkim dostignućima sa kojima nijesu imali prilike da se sretnu tokom svoga školovanja. Stoga je sasvim jasno zašto internet bankarstvo nije njihov izbor. Isto tako, potrebno je obratiti pažnju i na jedan aspekt, koji je, reklo bi se, naročito karakterističan za naše prostore, a koji se tiče odnosa korisnika i bankarskog službenika. Službenici su tu da svojim savjetima i pojašnjenjima pomognu korisnicima u vezi bilo koje stvari, koja kod njih izaziva nedoumice i poteškoće (uplate, isplate, podizanje novca i sl). Tako se dešava da dođe do promjene postojećih uslova za pojedine bankarske usluge, tj. da se klijantima izađe u susret po osnovu raznih pitanja (vraćanje pozajmica, odlaganje rokova i dr), što kod internet bankarstva jednostavno nije moguće.

Mobilno bankarstvo

Pojam mobilnog bankarstva

Mobilno bankarstvo, kao najnovija faza u razvoju elektronskog bankarstva, odnosi se na pružanje i korišćenje bankarskih usluga posredstvom mobilnih telekomunikacionih uređaja (Okiro i Ndungu, 2013; Jokić i saradnici, 2017). Najšire posmatrano, mobilno bankarstvo obuhvata tri vrste usluga i to: mobilno računovodstvo, mobilne brokerske usluge i mobilne finansijske informacije (Mladenović, 2014).

Mobilno računovodstvo odnosi se na mogućnost klijenata da koriste usluge vezane za račun koji posjeduju kod banke. Ovdje nije riječ samo o transakcijama, već i o drugim bankarskim uslugama. Shodno tome, bankarske usluge koje se mogu obavljati uz pomoć mobilnih telefona su: transferi novca, trajni nalog za plaćanje računa, prenos novca na podračune, prijavljivanje polise osiguranja i drugo. Mobilne brokerske usluge podrazumijevaju kupovinu ili prodaju finansijskih instrumenata kao što su hartije od vrijednosti, akcije i sl.

Mobilne finansijske informacije odnose se na informativne poruke koje mogu biti ponuđene klijentu, posebno ili zajedno sa brokerskim i transakcionim bankarskim uslugama. Radi se o informacijama koje se tiču računa klijenata (upiti stanja, posljednje transakcije, informacije o kreditnim karticama, lokacije ekspozitura i bankomata) i informacijama koje su vezane za finansijska tržišta (kursna lista, tržišne kamatne stope, izvještaji o akcijama, informacije o bankarskim proizvodima i ponudama) (Sanader, 2014).

Načini realizacije mobilnog bankarstva

Mobilno bankarstvo moguće je realizovati preko govorne pošte (Interactive Voice Response), poruka (Short Messaging Service), bežičnog pristupa (Wireless Access Protocol) i samostalne klijentske mobilne aplikacije (Standalone Mobile Application Clients) (Isto).

Govorna pošta (IVR) omogućava interakciju klijenta i banke kroz pozivanje IVR broja koji prati meni sa različitim opcijama biranja poruka i čitanja informacija (Isto). Govorna pošta je bila u upotrebi i prije postojanja mobilnih telefona, kada se IVR broj pozivao preko fiksnog telefona, što je i danas čest slučaj (Kasumović, 2019).

Sljedeći način realizacije mobilnog bankarstva podrazumijeva da klijenti bankama šalju tekstualne poruke preko SMS centra, a da banke na isti način odgovaraju, pružajući klijentima odgovarajuće specifične informacije.

Koncept korišćenja bežičnog pristupa (WAP), odnosno WAP kanala je sličan internet bankarstvu. Tako klijenti putem WAP pretraživača na mobilnom uređaju, dobijaju potrebne informacije po pitanju bankarskih proizvoda i usluga.

Samostalne klijentske mobilne aplikacije (SMAC) omogućavaju klijentima da vrše složene bankarske transakcije, sa visokim stepenom pouzdanosti i bezbjednosti (Isto).

Prednosti mobilnog bankarstva

U vezi sa prednostima i ograničenjima mobilnog bankarstva, treba reći da se oni u suštini poklapaju sa prednostima i ograničenjima koji su karakteristični za internet bankarstvo, s obzirom na činjenicu da korisnici mobilne telefonije danas uglavnom posjeduju pametne telefone, čija je upotreba praktično nezamisliva bez njegove povezanosti sa internetom. Stoga ćemo u daljem izlaganju istaći ono što u vezi sa odnosnim pitanjem, u mobilnom bankarstvu posebno dolazi do izražaja.

Jedna od najvažnijih prednosti mobilnog bankarstva je potpuna nezavisnost u odnosu na lokaciju, što znači da je pristup sopstvenom bankovnom računu moguć bukvalno na bilo kom mjestu i u bilo koje vrijeme (Sirovica, 2020).

Iz navedene činjenice da pametni telefoni imaju pristup internetu, slijedi prednost mobilnog bankarstva koja se odnosi na automatsku i trenutnu povezanost klijenta sa bankom.

Proaktivna funkcionalnost takođe predstavlja preimućstvo mobilnog bankarstva, a tiče se činjenice da savremene informacione tehnologije omogućavaju klijentima da izaberu uslugu ili proizvod o kojima bi željeli da budu informisani (uglavnom putem SMS-a) (Sanader, 2014).

Preko mobilnog bankarstva i mobilne tehnologije banke imaju bolji uvid u ponašanje klijenata tokom korišćenja bankarskih proizvoda i usluga. Tako, na primjer, ukoliko klijent koristi karticu prilikom plaćanja, uvijek je informisan kada je transakcija izvršena i za koji iznos je zadužen račun. Pored toga, banka može da obavijesti klijenta o stanju kredita, datumu kada rata dospijeva za plaćanje ili da je račun dospio za plaćanje i nizu drugih transakcija i informacija od značaja za klijenta. Sa druge strane, klijentima je omogućen uvid u svoje depozite i plaćanja koja dospijevaju (Isto).

Ograničenja mobilnog bankarstva

U smislu ograničavajućih faktora mobilnog bankarstva, koji često onemogućavaju njegovu široku upotrebu izdvojili bi nebezbednost, nelagodnost (usljed nedostupnosti i preopterećenosti sistema) i visoke troškove korišćenja (zbog cijena interneta na mobilnom uređaju).

Pitanja vezana za bezbednost korišćenja mobilnih uređaja za mobilno bankarstvo ogledaju se u fizičkoj sigurnosti mobilnog uređaja (krađa), sigurnosti otvaranja bankarske aplikacije (nepostojanje lozinke), autentifikaciji uređaja od strane provajdera usluga, preinicijaciji transakcije, kao i zaštiti podataka koji se transmituju i koji se čuvaju na mobilnom uređaju.

Istraživanja su pokazala da oko 51 % klijenata nema povjerenja u bezbednost vršenja bankarskih usluga preko mobilnih telefona, dok njih 74% smatra da je korišćenje mobilnih kanala povezano sa brojnim rizicima. Isto tako, 88% klijenata je ubjeđenja da postoji mogućnost prevarnih radnji putem mobilnih uređaja.

Kad je riječ o ograničenjima mobilnog bankarstva treba pomenuti i probleme koji se tiču tehničkog aspekta, a vezani su za korišćenje raznovrsnih aplikacija na istom mobilnom uređaju, koje nijesu autentifikovane i zaštićene; neobezbedenost Wi-Fi konekcija, kao i viruse koji se šire mrežom (Isto).

Strategijske opcije mobilnih distributivnih kanala banke

Postoje tri vrste strategija za izlazak banaka na mobilno tržište i to: Super operator, Prodavac specijalista i Brend biro strategija (Đorđević, 2007).

Kod Super operater strategije mobilni operater povećava svoje kapacitete (mreže, infrastrukturu, broj korisnika) i proširuje svoje usluge, dobijajući ulogu agenta za plaćanje. Banke zavise od distribucije mobilnog operatera, koji, s druge strane, mora biti tijesno povezan sa njima. Ova strategija je dominantna na japanskom tržištu.

Prodavac specijalista strategija pretpostavlja postojanje velikog raznovrsnog tržišta, na kome kupci pokušavaju da pronađu željene proizvode, pri čemu oni žele da se obrate odgovarajućem specijalisti, koji bi im pomogao prilikom obavljanja transakcije. Naravno, ova strategija podrazumijeva da banke pronalaze mogućnost za uspostavljanje mobilnih prodajnih kanala.

U okviru Brend biro strategije zadatak banke je da agregira različite ponude i napravi homogeno tržište za svoje korisnike. Najveću korist banke mogu imati od ove strategije, pošto njenom primjenom mobilni operater gubi dominantnu ulogu, koju naročito ima u Super operater strategiji (Isto).

Pošto identifikuje najpovoljniju strategiju, banka razvija potrebnu tehnologiju i ispituje tržišta, kako bi izvukla maksimalnu korist iz cijelog procesa. U tom cilju, banka mora da identifikuje partnere koji imaju slične ciljeve sa ciljevima banke, kao i da uspostavi saradnju sa njima.

Pored toga, potrebno je da banka kreira različite portfolio usluge za različite segmente tržišta. To znači da na svakom segmentu tržišta treba ispitati koji su pravi, a koji potencijalni korisnici, te koje su njihove potrebe.

Isto tako, svim zaposlenim banka treba da omogući lak pristup informacijama o klijentima, koje su uglavnom razbacane na više mjesta, odnosno nalaze se u više različitih sistema. To se postiže primjenom data mining tehnika.

Takođe, treba naznačiti da uspješnost mobilnog poslovanja, odnosno investiranja u ovakav vid pružanja bankarskih usluga, zahtjeva usklađenost sa opštom strategijom banke. To znači da prelazak banke na novu tehnologiju mora biti precizno definisan i usaglašen sa dotadašnjom informacionom infrastrukturom banke (Isto).

Od posebnog značaja je da banka sprovede detaljnu analizu u vezi sa povraćajem investiranih sredstava (Return on Investment-ROI). Da bi se odredio ROI najprije je potrebno da se izračunaju, koliko je to moguće, troškovi i koristi projekta. Zatim se računa neto sadašnja vrijednost projekta (NSV), da bi se potom podjelom neto sadašnje vrijednosti sa ukupnim troškovima dobila vrijednost koja se odnosi na povraćaj investiranih sredstava.

Na osnovu navedenih pokazatelja banka se odlučuje da li će se, i uolikoj mjeri, opredijeliti za pružanje usluga putem mobilnih uređaja. Nije lako dati generalni sud o tome da li uvođenje mobilnog bankarstva donosi banci pozitivan povraćaj uložених sredstava. To najviše zavisi od toga koliko je rješenje prihvaćeno na tržištu (Isto).

Na strani ROI jednačine koja se odnosi na korist, valja konstatovati da mobilne aplikacije mogu poboljšati lojalnost kupca, povećati prodaju i prihode, te smanjiti operativne troškove drugih kanala usluživanja. U početku je većinu od ovih koristi vrlo teško prikazati, a većina od njih se osjeti tek na duže staze.

Troškovna strana ROI može široko varirati, što zavisi od načina implementacije mobilnog rješenja, cijene licenciranog softvera i tome slično. Međutim, uopšteno posmatrano može se govoriti o troškovima koji se tiču hardvera, a koji obuhvataju mobilne terminale (telephone, PDA uređaje i sl), servere, WLAN mreže i drugo, kao i troškove koji se odnose na softver, razvoj i integraciju, a uključuju licencu za platforme, razvojni alat, troškove razvoja i integracije sa back-end sistemima i postojećim WEB aplikacijama.

Da bi smanjila operativne troškove i maksimizirala ROI, potrebno je da banka preduzme mjere koje podrazumijevaju analizu investiranja, podjelu rizika sa proizvođačima softvera, korišćenje postojeće infrastructure i obezbjeđivanje odgovarajuće podrške za mobilno rješenje. Analiza investiranja pretpostavlja upoznavanje sa svim raspoloživim mobilnim rješenjima, u smislu ispitivanja njihove funkcionalnosti i mogućeg stepena prihvatanja od strane korisnika.

U okviru podjele rizika sa proizvođačima softvera, treba istaći da neke softverske kuće kao zamjenu za vrijednost softvera dobijaju prihod u zavisnosti od uspjeha implementiranog rješenja, koja se, na primjer, može određivati prema broju korisnika ili, pak, vrijednosti obavljenih transakcija.

Korišćenje postojeće infrastructure, sasvim je jasno, znači da mobilno rješenje treba da se oslanja na postojeću IT strukturu banke, što pored smanjenja troškova implementacije rješenja, olakšava i njegovu samu implementaciju.

Obezbjeđivanje odgovarajuće podrške za mobilno rješenje podrazumijeva, recimo, da banka, u cilju osiguravanja da se njena aplikacija izvršava na odgovarajućim uređajima, što dovodi do ostvarenja dodatog prihoda, obezbjedi mobilne uređaje za svoje korisnike (Isto).

Veoma je važno naglasiti da izračunavanje povraćaja investiranih sredstava za mobilno bankarstvo nije linearan proces. U svrhu određivanja koristi koje neka banka ima od mobilnog rješenja mogu se koristiti tehnike operacionog istraživanja, kao što je to, na primjer, teorija igara. U tim istraživanjima najznačajniji parametar kojeg je potrebno pratiti je lojalnost klijenata. Ukoliko klijent dobija pravu informaciju u pravo vrijeme, njena vrijednost se povećava. U tom smislu moguće je govoriti o lokacijskoj, personalizacijskoj i vremenskoj vrijednosti informacije.

Kod lokacijske vrijednosti informacije, vrijednost informacije se povećava ako se ona isporučuje na pravu lokaciju, tj. lokaciju na kojoj treba da se preduzme odgovarajuća akcija.

Personalizacijska vrijednost informacije ukazuje na činjenicu da je vrijednost informacije povećana, ukoliko je ona upodobljena prema očekivanjima primalaca i ukoliko oni mogu efikasno da je upotrijebe.

U vezi sa vremenskom vrijednošću informacije treba reći da povećanje vrijednosti informacije zavisi od njenog pravovremenog isporučivanja, tj. od vremena kada akcija treba da se preduzme (Đorđević, 2007).

Fintek kompanije

Fintek kompanije su organizacije koje koriste savremene tehnologije, u svrhu efikasnijeg pružanja finansijskih usluga (Lekić, 2020). Smatra se da ove organizacije imaju veliki potencijal da izvrše radikalne promjene čitavog finansijskog sektora (Krstić i Tešić, 2016).

Usluge, odnosno područja poslovanja koje pokrivaju fintek kompanije su sljedeće:

- Zajmovi – kreiraju se platforme koje mijenjaju način na koji se zajmovi uzimaju, npr. platforme koje spajaju zajmodavce s ljudima kojima su zajmovi potrebni.
- Blockchain tehnologija/kriptovalute – koriste se moderne blockchain tehnologije u cilju pružanja finansijskih usluga.
- Regtech – korištenje softvera kako bi se upravljalo rizicima, kontrolisala usklađenost sa regulativom, kao i u revizorske svrhe.
- Lične finansije – uvođenje različitih alata s namjenom upravljanja računima i praćenjem ličnih finanija.
- Plaćanje/naplata – pojava kompanija koje na brz i jednostavan način omogućuju plaćanje i naplatu.
- Osiguranje – kompanije prodaju osiguranje preko digitalnih kanala ili kreiraju softver za upravljanje osiguranicima.
- Tržišta kapitala – prodaja i trgovina tržišnim papirima, kreiranje analiza i alata za finansijske institucije.
- Upravljanje imovinom – kreiraju platforme za upravljanje imovinom, kao i analitičkih alata koji to omogućavaju.
- Prenos novca – kreiraju se softver za međunarodni prenos novca.
- Nekretnine – kreditiranje hipoteka, alati za finansiranje hipoteka i dr. (Petruša, 2020).

Za usluge Fintek kompanija klijenti se odlučuju iz nekoliko razloga, kao što su: jednostavno otvaranje i podešavanje računa za željena plaćanja, niže naknade, pristup razvijenim proizvodima i uslugama, bolju internet podršku i usluge, bolji kvalitet usluga i dr. Fintek kompanije konstantno rade na unapređenju i pojednostavljenju svojih usluga i inovacija, što utiče na njihov rast, ali istovremeno i pad korisnika bankarskih usluga (Krstić i Tešić, 2016).

Jasno je da su fintek kompanije fleksibilnije i inovativnije od banaka, međutim, banke takođe imaju neke značajne prednosti u odnosu na fintek kompanije, kao što su: visok nivo povjerenja klijenata, stručnost, veliku bazu podataka o klijentima, resurse, iskustvo (naročito u pravnom dijelu) i sl. Stoga se smatra da će u budućnosti preovladati partnerstvo i udruživanje ovih dviju finansijskih organizacija, a ne rivalstvo među njima (Vasić, 2019).

Tako, banke mogu fintek kompanijama obezbjediti kapital i pristup njihovoj velikoj bazi korisnika, dok fintek kompanije mogu ponuditi bankama inovativne i korisne tehnologije, koje bi im pomogle u poboljšanju bankarskog iskustva za klijente. To znači da će banke koje se opredjele za ovaj vid saradnje, moći da uz manje troškove pružaju novu vrijednost i usluge, sa većom brzinom njihove realizacije, i na taj način povećaju svoju konkurentnost (Maričić, 2018).

Neke od najznačajnijih Fintech kompanija su: PayPal, Amazon, Facebook, Apple, Walmart, Google i dr. (Lekić, 2020).

Zaključak

Brza ekspanzija informacionih tehnologija, koje su našle primjenu u svim sferama ljudske djelatnosti i koje u savremenom svijetu predstavljaju osnovnu pokretačku snagu privrednog razvoja, neizbežno su morale dovesti i do promjena u načinu poslovanja bankarskog sektora. Od tradicionalnog bankarstva, koje je neizostavno podrazumijevalo odlazak na bankarske šaltere radi korišćenja bankarskih usluga, došlo se do toga da su one danas dostupne klijentima u njihovim domovima ili na bilo kojem drugom mjestu. Sve to, prvenstveno kao rezultat razvoja interneta i mobilnih tehnologija, koji je doveo i do razvoja novih formi bankarskog poslovanja, poznatih pod nazivom internet bankarstvo i mobilno bankarstvo.

Internet bankarstvo, kao proces u kojem je klijent u mogućnosti da pristupi, kontroliše i koristi svoj račun putem interneta, pojavljuje se u vidu informacionog (prenošenje informacija o proizvodima i uslugama, koji se nude klijentima i javnosti uopšte), komunikativnog (omogućava interakciju između sistema banke i klijenata) i transakcionog (omogućava klijentima da izvršavaju transakcije) internet bankarstva.

U okviru internet bankarstva mogu se izdvojiti tri osnovne vrste usluga: konsolidovanje računa i obavljanje plaćanja; obavljanje finansijskog transfera između različitih računa i podnošenje aplikacija za kredite, osiguranja i sl.

Mobilno bankarstvo odnosi se na pružanje i korišćenje bankarskih usluga posredstvom mobilnih telekomunikacionih uređaja. Riječ je o uslugama mobilnog računovodstva (usluge vezane za račun koji posjeduju kod banke), mobilnim brokerskim uslugama (kupovinu ili prodaju finansijskih instrumenata kao što su hartije od vrijednosti, akcije i sl) i mobilnim finansijskim informacijama (informativne poruke koje mogu biti ponuđene klijentu, posebno ili zajedno sa brokerskim i transakcionim bankarskim uslugama).

Mobilno bankarstvo moguće je realizovati preko govorne pošte (Interactive Voice Response), poruka (Short Messaging Service), bežičnog pristupa (Wireless Access Protocol) i samostalne klijentske mobilne aplikacije (Standalone Mobile Application Clients).

Strategijskim opcijama mobilnih distributivnih kanala banke su: Super operator (mobilni operator povećava svoje kapacitet i proširuje svoje usluge, dobijajući ulogu agenta za plaćanje), Prodavac specijalista (klijenti se obraćaju specijalisti radi pomoći prilikom obavljanja transakcije) i Brend biro scenario (banka agregira različite ponude i pravi homogeno tržište za svoje korisnike).

S obzirom na sve veći broj korisnika interneta i mobilnih uređaja, kao i sve veću informatičku pismenost populacije, sasvim je jasno da će se buduće poslovanje banaka bazirati na internet i mobilnom bankarstvu. Tome svakako doprinosi i savremeni, ubrzani i stresni, način života, kojeg karakteriše krilatica „vrijeme je novac“, tako da ljudi ne žele da gube svoje dragocjeno vrijeme na bespotrebni odlazak u banku i čekanje u redovima pred šalterom, a sve uz obostrano zadovoljstvo, kako klijenta, tako i banke.

Upotreba interneta i mobilnih uređaja takođe je neizostavna i u poslovanju fintek kompanija, koje još uvijek predstavljaju konkurenciju bankarskom sektoru, ali s tendencijom prevladavanja konkurentskih i uspostavljanja partnerskih odnosa među njima.

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THE IMPACT OF MOBILE TECHNOLOGIES AND THE INTERNET ON THE FUTURE OF BANKING OPERATIONS

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Summary

The rapid development of information technologies, which have found application in all areas of human activity, has also led to changes in the way of banking operations. Traditional banking inevitably involved going to the bank to use banking services. Nowadays, bank services are available to clients in their homes or anywhere else. This is primarily the result of the development of the Internet and mobile technologies, which has led to the development of new types of banking operations, known as internet banking and mobile banking. These two types of banking will represent the backbone of future banking activity.

Keywords: internet; internet banking; mobile banking; advantages; limitations; fintech companies

JEL classification: G21, L86

Introduction

The application of modern information technologies in the banking sector has led to the improvement of banking operations. The number of information that can be processed is increasing and practically becoming unlimited, and given that it spreads without space and time limitations, the banking market has become global. In addition, there was also the development of new products and services, as well as changes in the volume and structure of demand on the market for banking products and services. The advantages that information technology has brought to the banking sector are multiple and are reflected in the reduction of business costs, the improvement of clients' awareness of banking products and services, innovation in business and the offer of standard and non-standard products and services, increasing the efficiency of the offer, as well as placing emphasis on the client as an individual. The new technological infrastructure leads to changes in the way of performing communication activities, as well as in the way of building relationships between clients and the bank, which results in more efficient mutual communication and business. The aforementioned advantages influenced the emergence and gradual development of electronic banking, which include a set of diverse ways of performing financial transactions, using information and telecommunication technologies (Sanader, 2014).

Six phases can be observed in the framework of the development of electronic banking, which relate to the automation of counter operations; ATMs; payment cards and POS devices; home banking; internet banking and mobile banking (Jokić et al., 2017).

The automation of banking operations meant equipping bank counters with computer equipment, which made it much easier for clients to access documentation, as well as to fill it out.

The purpose of introducing ATMs was to enable clients to access the bank's services at any time, that is, to use their account 24 hours a day.

POS terminals are characterized by the fact that they enable the availability of banking services at the point of product payment.

Home banking allows large users to rent lines and maintain a direct connection with banking applications, in order to make payments and transactions easier, while the telephone service provides quick access to all necessary information (Ibid.).

Internet banking and mobile banking, as the latest stages of electronic banking, will be discussed in the following presentation.

Internet banking

The Development of Internet Banking

The development of Internet banking, which can be defined as a process in which the client is able to access, control and use his account via the Internet, is closely related to the development of the World Wide Web (WWW) (Brčić, 2018).¹

The beginnings of internet banking date back to 1983, when the Bank of Scotland offered users of the NBS10 (Nottingham Building Society) network an internet banking service in Great Britain, known as Homelink. The use of this service, which was available to a small number of users, was achieved using a television and a telephone, in such a way that data from the database was searched for and browsed through the telephone line on the television.

In October 1994, Internet banking, developed by the financial institution Stanford Federal Credit Union¹¹, appeared for the first time in the United States of America. Internet banking services could be used by all clients of this financial institution.

In May 1995, Wells Fargo Bank created the first web banking program for doing business on the Internet (Mihailović, 2009). In the same year, Security First Network Bank (SFNB) was founded in Atlanta (USA), the first bank that conducted its business activities exclusively via the Internet (Ibid; Brčić, 2018).

In April 1996, according to the Online Banking Report, there were one million Internet banking users in the United States. The following year, internet banking had 4.2 million users, and in 2001, that number increased to 19 million. Certainly, the growth trend of internet banking is present in all countries of the world, and there are more and more banks that decide to conduct their business activities only via the internet (Brčić, 2018).

¹ This is one of the many definitions of internet banking, as different authors describe this term in different ways. Nevertheless, the essence of these descriptions is basically the same and boils down to the presentation of Internet banking, as the act of conducting financial mediation on the Internet. (Ibok i Ikoh, 2014).

Types of Internet Banking

There are three types of Internet banking: informational, communicative, and transactional Internet banking (Mihailović, 2009).

Informational internet banking (also known as basic level service) is the transmission of information about products and services offered to clients and the public in general. Communication between the bank and the client takes place via e-mails, and this type of transmission of marketing information can be done via the bank's server or website. The vulnerability of communications made via the server is relatively low, which is not the case if the website is the main communication channel between the bank and the client. Therefore, the bank undertakes various preventive measures in order to prevent risks.

Communicative internet banking, which is also called simple transactional websiter, enables interaction between the bank's system and clients. Clients can receive instructions, as well as information about products and services. In addition, they can inquire about the current account balance, fill out a loan application, and receive and send e-mails, but they cannot make a single monetary transaction from their account. These services are connected to the bank's internal system, so the risks are higher as a result. That is why it is necessary for management to develop appropriate prevention measures, and for controllers to monitor the system and warn of unauthorized intrusions into the bank's internal network (Ibid).

Transactional internet banking or, as it is also called, full transactional websiter, enables clients to carry out transactions. Clients have the possibility to use their accounts in such a way that they can transfer money, pay various bills, buy and sell securities, etc. As the connection between the server of the Internet bank's internal network and the external network is direct, this form of connection is the most vulnerable, and therefore must be subject to the strongest control (Ibid).

Types of Services in Internet Banking

Most of the world's banks offer the following business and services in their online business: exchange business; opening and using loan accounts; checking balances on clients' accounts; opening and using checking accounts; paying bills electronically; using the credit card system; securities trading; suspension of payments; opening and using current accounts; verification of transactions from the previous period on all client accounts; electronic transfers between accounts; e-mail correspondence; opening and using deposit accounts; performing brokerage services for bank clients; approval of mortgage and other loans; and advisory services (Radojević, 2009).

In terms of the systematization of Internet banking services, three basic types of services can be singled out, namely: account consolidation and making payments; making financial transfers between different accounts and submitting applications for loans, insurance, etc.

The first type of service is the most popular and allows the bank's clients to consolidate a large number of bills they pay each month, as well as withdraw funds from their bank accounts through a single order. Another type of service allows clients to transfer funds from account to account, without going to branches or places where ATMs are located.

Similar to the previous one, the third type of services is also characterized by effects related to saving clients' time (Ibid).

Advantages of Internet Banking

Compared to traditional banking, internet banking offers numerous advantages, both for banks and for users of their services. We will list some of them, which we consider to be the most important:

Lower operating costs

Banks lower operating costs by closing a certain number of branches, and clients pay a lower commission for banking services, which are often free with internet banking (Ibid, Mihailović, 2009).

No spatial limit

Internet banking allows the client to use the services of a bank regardless of his current location. Of course, it is necessary that the user has an open account in that bank, that there is a computer with Internet access at the place from which they conduct business, and that the user knows all the codes they need to access the online bank and their account. In traditional banking, the client is tied to the place and country where there are branches of the bank where they have an open account (Radojević, 2009).

No time limit on Internet banks

Unlike traditional banking, which involves performing banking operations during the bank's working hours, this is not the case with internet banking, because transactions can be performed 24 hours a day, every day of the year. This means that users, if they have an internet connection, can access the bank whenever they want (Brčić, 2018; Mihailović, 2009).

A wide range of banking services

The increasing presence of information technologies in the modern world has caused banks, if they want to remain competitive in the market, to develop and provide non-traditional services, which has led to the fact that the number of services offered by banks to their clients via the Internet is quite large. Thus, banks benefit from the development of new services, and clients benefit from the expansion of the banks' offer, in terms of better satisfaction of their own needs (Ibid).

Speed of transactions

In traditional banking, it is necessary to spend time arriving at the branch and returning from it. In addition, clients waste time while waiting in line, filling out various forms, as well as while waiting for appropriate transactions to be made (Radojević, 2009). Internet banking represents a much faster way to perform banking business, since in this case clients spend time only when logging into their account and while waiting for the completion of the transaction (Ibid; Brčić, 2018).

Flexibility

Compared to traditional banks, internet banks are much more flexible and it is easier for them to make the necessary changes in terms of their services, since they have the ability to respond very well to their needs and wishes through constant interaction with clients, listening to their suggestions and opinions. In this way, clients are provided with a more complete service and their loyalty to the bank is established (Mihailović, 2009).

Better cash management

As each transaction is recorded digitally, clients can see their history and analyze them before starting a new transaction. This, of course, contributes to better administration of one's own funds (Kulshreshta & Dave, 2016; Brčić, 2018; Rončević, 2006; Chavan, 2013).

Development of marketing

Through an interactive relationship with clients, banks form client databases, which are most often used for marketing purposes (Mihailović, 2009).

Internet Banking Limitations

In connection with the limitations of internet banking, we would single out issues related to security when using banking services, the absence of a single legal regulation in this area and aversion to innovation (Radojević, 2009).

Safety questions

The internet banking system does not instil complete security in users, since they are very sensitive about their money and hardly accept any risk of theft and misuse of their data (Brčić, 2018).

With the growing popularity of open networks such as the Internet and the electronic exchange of information and money between geographically distant locations, transaction security is of key importance for the growth and development of this service. Banks that use electronic data exchange in closed networks (intranet) provide security by establishing the identity and authorization of people accessing the network. When it comes to open networks, there are technical and legal protection mechanisms to prevent unauthorized access and hacker attacks. However, certain cryptographic technologies that include a digital signature define a new infrastructure whose main advantage is a higher level of message integrity and access verification (Milutinović, 2012).

Absence of uniform legislation

The Internet, as a global communication system, requires the existence of appropriate legal regulation, which should define the needs of business entities and users of services. Legal regulations regarding the Internet, as well as business through this global computer network, differ from country to country. The United States and the European Union, as the two most developed parts of the world, have different views on this issue, with the European Union having a far more liberal view of business privacy than the US. The EU approach is based on complete anonymity and privacy of business, while the US approach is based on complete control of business, transactions and data by state authorities.

Aversion to innovation

Certainly, there is a large number of people who have a hard time deciding to change established habits, including those concerning the way of using banking services. They simply have such a psychological profile that they shy away from any novelties, and it takes them a long time before they decide to deal with new things. This usually only happens when they have no other choice, that is, when life

circumstances force them to do something like that. In addition, there is still a significant percentage of the population, especially when it comes to the elderly population, who do not have enough experience in using the Internet, as well as the computers themselves. Especially since this concerns modern technical and technological achievements that they did not have the opportunity to learn during their schooling. Therefore, it is quite clear why internet banking is not their choice.

In the same way, it is necessary to pay attention to one aspect, which, one would say, is particularly characteristic of our premises, which concerns the relationship between the user and the bank employee. The officials are there to help users with their advice and clarifications regarding any matter that causes doubts and difficulties for them (payments, withdrawals, withdrawals, etc.). This is how it happens that there is a change in the existing conditions for certain banking services, i.e., to meet clients on the basis of various issues (repayment of loans, postponement of deadlines, etc.), which is simply not possible with internet banking.

Mobile Banking

The Concept of Mobile Banking

Mobile banking, as the latest stage in the development of electronic banking, refers to the provision and use of banking services through mobile telecommunication devices (Okiro and Ndungu, 2013; Jokić et al., 2017). Broadly speaking, mobile banking includes three types of services: mobile accounting, mobile brokerage services and mobile financial information (Mladenović, 2014).

Mobile accounting refers to the ability of clients to use services related to the account they have with the bank. This is not only about transactions, but also about other banking services. Consequently, banking services that can be performed with the help of mobile phones are: money transfers, standing order for bill payment, money transfer to sub-accounts, applying for an insurance policy and others.

Mobile brokerage services include the purchase or sale of financial instruments such as securities, shares, etc.

Mobile financial information refers to informative messages that can be offered to the client, separately or together with brokerage and transaction banking services. This includes information related to customer accounts (balance inquiries, recent transactions, credit card information, locations of branches and ATMs) and information related to financial markets (exchange rates, market interest rates, stock reports, information on banking products and offers) (Sanader, 2014).

Ways of Implementing Mobile Banking

Mobile banking can be implemented via voicemail (Interactive Voice Response), messages (Short Messaging Service), wireless access (Wireless Access Protocol) and Standalone Mobile Application Clients (Ibid).

Voicemail (IVR) enables interaction between the client and the bank by calling the IVR number followed by a menu with various options for selecting messages and reading information (Ibid). Voice-mail was in use even before the existence of mobile phones, when the IVR number was called through a landline, which is still a common case today (Kasumović, 2019).

Such a way of realizing mobile banking implies that clients send text messages to banks via the SMS centre, and that banks respond in the same way, providing clients with appropriate specific information.

The concept of using wireless access, or WAP channels, is similar to internet banking. Thus, clients receive the necessary information about banking products and services through a WAP browser on a mobile device.

Stand-alone client mobile applications (SMAC) enable clients to perform complex banking transactions, with a high degree of reliability and security (Ibid).

Advantages of Mobile Banking

Regarding the advantages and limitations of mobile banking, it should be said that they essentially coincide with the advantages and limitations that are characteristic of internet banking, given the fact that mobile phone users today mostly own smartphones, the use of which is practically unimaginable without its connection with the internet. Therefore, we will further highlight what is especially prominent in mobile banking in connection with the relevant issue.

One of the most important advantages of mobile banking is its complete independence in relation to location, which means that access to one's own bank account is possible literally in any place and at any time (Sirovica, 2020).

From the mentioned fact that smartphones have access to the Internet, the advantage of mobile banking follows, which refers to the automatic and immediate connection of the client with the bank.

Proactive functionality is also an advantage of mobile banking, and it concerns the fact that modern information technologies allow clients to choose a service or product about which they would like to be informed (mainly via SMS) (Sanader, 2014).

Through mobile banking and mobile technology, banks have a better insight into the behaviour of clients when using banking products and services. So, for example, if the client uses a card when paying, they are always informed about when the transaction was made and for what amount the account was debited. In addition, the bank can inform the client about the status of the loan, the date when the instalment is due for payment or that the account is due for payment, and a number of other transactions and information of importance to the client. On the other hand, clients are given insight into their deposits and payments that are due (Ibid).

Limitations of Mobile Banking

In terms of the limiting factors of mobile banking, which often prevent its wide use, we would single out insecurity, discomfort (due to the unavailability and overload of the system) and high costs of use (due to the prices of the Internet on a mobile device).

Issues related to the security of using mobile devices for mobile banking are reflected in the physical security of the mobile device (theft), the security of opening the banking application (absence of a password), the authentication of the device by the service provider, the pre-initiation of the transaction, as well as the protection of data that is transmitted and stored on the mobile device.

Research has shown that around 51% of clients do not trust the security of banking services via mobile phones, while 74% of them believe that the use of mobile channels is associated with numerous risks. Likewise, 88% of clients are convinced that there is a possibility of fraudulent actions via mobile devices.

When it comes to the limitations of mobile banking, we should also mention problems related to the technical aspect, which are related to the use of various applications on the same mobile device, which are not authenticated and protected; unsecured Wi-Fi connections, as well as viruses that spread over the network (Ibid).

Strategic Options of the Bank's Mobile Distribution Channels

There are three types of strategies for banks to enter the mobile market: Super operator, Specialist seller and Brand bureau strategy (Đorđević, 2007).

With the Super operator strategy, the mobile operator increases its capacities (networks, infrastructure, number of users) and expands its services, taking on the role of payment agent. Banks depend on the distribution of the mobile operator, which, on the other hand, must be closely related to them. This strategy is dominant in the Japanese market.

The specialist seller strategy assumes the existence of a large diverse market, in which customers try to find the desired products, where they want to contact the appropriate specialist, who would help them during the transaction. Of course, this strategy implies that banks find the opportunity to establish mobile sales channels.

Within the Brand Bureau strategy, the bank's task is to aggregate different offers and create a homogeneous market for its users. Banks can benefit the most from this strategy, since by applying it, the mobile operator loses its dominant role, which it especially has in the Super operator strategy (Ibid.).

Having identified the most advantageous strategy, the bank develops the necessary technology and examines the markets, in order to extract the maximum benefit from the whole process. To this end, the bank must identify partners that have similar goals to the bank's goals, as well as establish cooperation with them.

In addition, it is necessary for the bank to create different portfolio services for different market segments. This means that in each segment of the market it is necessary to examine which are the real and which are the potential users, and what are their needs.

Likewise, the bank should provide all employees with easy access to customer information, which is generally scattered in several places, i.e., found in several different systems. This is achieved by applying data mining techniques.

Also, it should be noted that the success of mobile business, i.e., investing in this type of providing banking services, requires compliance with the bank's general strategy. This means that the bank's transition to new technology must be precisely defined and harmonized with the bank's previous information infrastructure (Ibid).

It is of particular importance that the bank conducts a detailed analysis regarding the return on investment (ROI). In order to determine the ROI, it is first preferable to calculate, as far as possible, the costs and benefits of the project. Then the net present value of the project (NPV) is calculated, and then by dividing the net present value by the total costs, a value related to the return of invested funds is obtained.

Based on the aforementioned indicators, the bank decides whether, and to what extent, it will decide to provide services via mobile devices. It is not easy to make a general judgment about whether the introduction of mobile banking brings the bank a positive return on invested funds. It mostly depends on how well the solution is accepted on the market (Ibid).

On the benefit side of the ROI equation, it should be noted that mobile applications can improve customer loyalty, increase sales and revenues, and reduce operational costs of other service channels. In the beginning, most of these benefits are very difficult to show, and most of them are felt only in the long run.

The cost-side ROI can vary widely, depending on the way the mobile solution is implemented, the price of the licensed software, and the like. However, in general, we can talk about costs related to hardware, which include mobile terminals (telephones, PDA devices, etc.), servers, WLAN networks, etc., as well as costs related to software, development and integration, which include platform license, development tool, development costs and integration with back-end systems and existing WEB applications.

In order to reduce operational costs and maximize ROI, it is necessary for the bank to undertake measures that include investment analysis, risk sharing with software manufacturers, use of existing infrastructure and provision of appropriate support for the mobile solution.

The investment analysis assumes familiarity with all available mobile solutions, in terms of testing their functionality and the possible level of acceptance by users.

As part of risk sharing with software manufacturers, it should be noted that some software companies receive income as a substitute for the value of the software depending on the success of the implemented solution, which, for example, can be determined by the number of users or the value of the transactions performed.

Using the existing infrastructure clearly implies that the mobile solution should rely on the existing IT structure of the bank, which, in addition to reducing the costs of implementing the solution, also facilitates its implementation itself.

Providing adequate support for a mobile solution implies, for example, that the bank, in order to ensure that its application is executed on appropriate devices, which leads to the realization of additional income, should provide mobile devices for its users (Ibid).

It is very important to emphasize that calculating ROI for mobile banking is not a linear process. Operational research techniques, such as game theory, can be used to determine the benefits of a mobile solution for a bank. In those studies, the most important parameter that needs to be monitored is client loyalty. If the client receives the right information at the right time, its value increases. In this sense, it is possible to talk about the locational, personalization and time value of information.

With the locational value of information, the value of information increases if it is delivered to the right location, i.e., the location where appropriate action should be taken.

The personalization value of the information indicates the fact that the value of the information is increased, if it is adapted to the expectations of the recipients and if they can use it effectively. Regarding the time value of information, it should be said that increasing the value of information depends on its timely delivery, i.e., on the time when the action should be taken (Đorđević, 2007).

Fintech companies

Fintech companies are organizations that use modern technologies for the purpose of more efficient provision of financial services (Lekić, 2020). It is believed that these organizations have a great potential to make radical changes in the entire financial sector (Krstić and Tešić, 2016). The services, i.e., business areas covered by fintech companies are as follows:

- Loans - platforms are created that change the way loans are taken, e.g., platforms that connect lenders with people who need loans.
- Blockchain technology/cryptocurrencies – modern blockchain technologies are used in order to provide financial services.
- Regtech – the use of software to manage risk, control regulatory compliance, and for audit purposes.
- Personal finances – introduction of various tools aimed at managing accounts and monitoring personal finances.
- Payment/billing – emergence of companies that enable payment and billing in a quick and simple way.

- Insurance – companies sell insurance through digital channels or create software to manage policyholders.
- Capital markets – sales and trading of marketable securities, creation of analyses and tools for financial institutions.
- Asset management – they create platforms for asset management, as well as analytical tools that enable this.
- Money transfer – software is created for international money transfer.
- Real estate - mortgage lending, mortgage financing tools, etc. (Petruša, 2020).

Clients choose the services of Fintech companies for several reasons, such as: easy opening and setting up of accounts for desired payments, lower fees, access to developed products and services, better internet support and services, better quality of services, etc. Fintech companies constantly work on improving and simplifying their services and innovations, which affects their growth, but at the same time the decline of users of banking services (Krstić and Tešić, 2016).

It is clear that fintech companies are more flexible and innovative than banks, however, banks also have some significant advantages compared to fintech companies, such as: high level of customer trust, expertise, large customer database, resources, experience (especially in legal part) etc. Therefore, it is considered that in the future, partnership and association of these two financial organisations will prevail, rather than the rivalry between them (Vasić, 2019). Thus, banks can provide fintech companies with capital and access to their large customer base, while fintech companies can offer banks innovative and useful technologies that would help them improve the banking experience for customers. This means that banks that have opted for this type of cooperation will be able to provide new value and services at lower costs, with a higher speed of their realization, and thus increase their competitiveness (Maričić, 2018).

Some of the most important Fintech companies are: PayPal, Amazon, Facebook, Apple, Walmart, Google and others. (Lekić, 2020).

Conclusion

The rapid expansion of information technologies, which have found application in all spheres of human activity and which in the modern world represent the basic driving force of economic development, inevitably had to lead to changes in the way the banking sector operates. From traditional banking, which inevitably involved going to bank counters to use banking services, it has come to the point that today they are available to clients in their homes or in any other place. All this, primarily as a result of the development of the Internet and mobile technologies, which led to the development of new forms of banking business, known as internet banking and mobile banking.

Internet banking, as a process in which the client is able to access, control and use his account via the Internet, appears in the form of information (transmitting information about products and services offered to clients and the public in general), communicative (enables interaction between systems banks and clients) and transactional (enables clients to carry out transactions) internet banking.

Three basic types of services can be distinguished within internet banking: consolidating accounts and making payments; making financial transfers between different accounts and submitting applications for loans, insurance, etc.

Mobile banking refers to the provision and use of banking services through mobile telecommunication devices. These are mobile accounting services (services related to the account they have with the bank), mobile brokerage services (purchase or sale of financial instruments such as securities, shares, etc.) and mobile financial information (informational messages that can be offered to the client, separately or together with brokerage and transaction banking services).

Mobile banking can be implemented via voice mail (Interactive Voice Response), messages (Short Messaging Service), wireless access (Wireless Access Protocol) and Standalone Mobile Application Clients.

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Mobile banking can be implemented via voice mail (Interactive Voice Response), messages (Short Messaging Service), wireless access (Wireless Access Protocol) and Standalone Mobile Application Clients.

The strategic options of the bank's mobile distribution channels are: Super operator (the mobile operator increases its capacity and expands its services, taking on the role of a payment agent), Specialist seller (clients turn to a specialist for help when performing a transaction) and Brand Bureau scenario (the bank aggregates various offers and creates a homogeneous market for its users).

Considering the increasing number of internet and mobile device users, as well as the increasing information literacy of the population, it is quite clear that the future business of banks will be based on internet and mobile banking. The modern, fast-paced and stressful way of life, which is characterised by the catchphrase "time is money", certainly contributes to this, so that people do not want to waste their precious time unnecessarily going to the bank and waiting in lines in front of the counter, all with the mutual satisfaction of both the client and the bank.

The use of the Internet and mobile devices is also indispensable in the business of fintech companies, which still represent competition to the banking sector, but with a tendency to overcome competition and establish partnership relations between them.

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KAKO BIG DATA ANALITIKA TRANSFORMIŠE FINANSIJSKU INDUSTRIJU

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Rezime

Revolucija podataka koja se dešava širom sveta donela je transformaciju u sektoru finansijskih usluga. Ove ogromne količine informacija otvorile su vrata razumevanju potreba kupaca, pronalaženju uvida i smanjenju rizika. Pored toga, pomažu industriji finansijskih usluga da preduzme mere za poboljšanje zadovoljstva klijenata brže nego što je to ranije bilo moguće. Finansijske firme mogu da razviju nove uvide koristeći BD jer sada mogu da prikupe veliku količinu podataka o svojim klijentima i njihovom obrascu potrošnje, a mogu da pružaju usluge koje su korisne, pogodne i brze za klijente. Oni mogu proširiti upotrebu tih uvida ne samo za svoje potrošače, već i za njihovu internu optimizaciju procesa, što je od koristi svima u procesu. Iako je uticaj BDA na kompanije za finansijske usluge sveprisutan, nije objavljeno toliko studija da bi se razumelo koji aspekti industrije finansijskih usluga mogu imati velike koristi od uspona tehnologije i BDA. Nekoliko objavljenih studija bavi se izazovima sa kojima se banke suočavaju u ovoj tehnološkoj eri ako nemaju implementirane BD alate. Ovo istraživanje obuhvata podatke iz banaka od januara 2019. do januara 2022. god. kako bi se rešio taj jaz od nekoliko banaka iz Amerike i Evrope koje su se suočile sa opadanjem zadovoljstva klijenata. Ovo istraživanje otkriva i najbolje metode koje finansijske kompanije širom sveta koriste za implementaciju BDA radi poboljšanja usluga. Ovaj rad će takođe razmotriti kako je BDA uspešno korišćen u bankarskoj industriji, a u vezi sa sledećim elementima: ponašanje potrošača, korišćenje kanala, obrazac potrošačke potrošnje i kreiranje profila, unakrsna prodaja proizvoda zasnovana na profilisanju korisnika, analiza povratnih informacija i raspoloženja, upravljanje sigurnim transakcijama i prevarama itd. Ova studija pomaže da se otkrije i da doprinos o tome kako industrija finansijskih usluga, kao što su banke, može da iskoristi BDA i pruži superiorne usluge. Dalja istraživanja bi se mogla sprovesti među drugim igračima u finansijskoj industriji kako bi se saznalo kako na njih utiče BDA.

Ključne reči: Analitika velikih podataka, finansije, aplikacije, banke, mašinsko učenje**Skraćenice:** BDA (Big Data Analytics) – Analitika velikih podataka, BD (Big Data) – Veliki podaci, CS (Customer Satisfaction) – Zadovoljstvo kupaca**JEL klasifikacija:** C55, G20, G21

Uvod

Revolucija podataka je zabeležila ogroman rast kod finansijskih kompanija. Iako je prikupljanje ovih informacija bilo improvizovano, s obzirom na to da finansijski sistem obično prikuplja mnogo podataka, mogućnosti koje otvara BDA prevazilaze sva očekivanja koja su prethodno bila predviđena u vezi sa ovim istorijskim rekordom. Ove informacije su takođe pomogle da se otkriju tajne tokova novca, izbegnu rizici i razume ponašanje potrošača. BD bankama pruža mogućnost da efikasnije i brže izvuku vredne informacije od svojih klijenata kao i iz sopstvenih podataka. Banke već osećaju prednosti korišćenja ovakve analitike.

Izveštaj Munara i dr. je otkrio da su kompanije u sektorima finansijskih usluga koje su implementirale BDA postigle više uspeha od drugih koje ga nisu koristile (Munar, Chiner, & Sales, 2014). Korist nije ograničena na industriju finansijskih usluga, već na sve industrije. BDA neće samo podržati finansijske institucije da imaju koristi od velikih količina podataka, već će im pomoći i da ostvare prednost nad konkurencijom, smanje troškove i transformišu izazove u prilike. Banke koriste BDA da razviju uvid i poboljšaju upravljanje kapitalom, alokaciju kapitala i kontrolu resursa. Jedno istraživanje (Munar, Chiner, & Sales, 2014) je otkrilo da 59,3% finansijskih i nefinansijskih firmi u Americi i Evropi koristi BDA i analitiku informacija, pokazujući veliku prednost u odnosu na konkurenciju, a 91,2% misli da će prosperitetna primena BDA dugoročno odrediti pobednike (Gupta, Gupta, Agraval i Kansal, 2019). Ali samo 32,3% finansijskih kompanija ima solidno razumevanje BDA, a ostatak se redovno fokusira na pilote i eksperimente na tu temu (Gupta, Gupta, Agraval, & Kansal, 2019).

Dok korišćenje BDA donosi značajnu korist svetu poslovanja u bilo kojoj industriji, mnoge banke i dalje zaostaju u pogledu implementacije najnovijih BD alata. Tako neki od njih ne ispunjavaju očekivanja svojih kupaca. Ova studija razmatra neke takve banke i procenjuje kako bi se one mogle poboljšati. Studija daje značajan doprinos razumevanju izazova nedostatka BD metode analize. Studija takođe pokazuje prednosti posedovanja BDA alata.

Pregled literature

Šta je BDA?

BD se definiše kao ogroman rast i dostupnost podataka, organizovanih i neorganizovanih (Gupta, Gupta, Agraval, & Kansal, 2019). Autor dodaje da je BD čista masa podataka koji se dnevno proizvode unutar globalnih mreža tempom koji prevazilazi kapacitet trenutnih baza podataka. Istraživanja (Bedelei & Iier, 2014) su definisala BD ne samo po količini informacija, već i po njihovoj raznovrsnosti, složenosti i brzini kojom se podaci moraju analizirati ili dostaviti; 3V je naime:

- **Obim (Volume):** Obim se odnosi na količinu podataka izvan mogućnosti analize putem konvencionalnih alata, kao što su statistički analitički alati ili standardni analitički alati. Hasani i dr. (Hassani, Huang, & Silva, 2018) dodaju da obim uskladištenih podataka brzo raste, a Indriasari i dr. (Indriasari, Gaol, & Matsuo, 2019) predviđaju da će do 2022. godine biti uskladišteno 90 zetabajta podataka svake godine.
- **Brzina (Velocity):** Odnosi se na brzinu prikupljanja podataka. Konvencionalne obaveštajne aplikacije koriste prethodne podatke iz dana, meseci ili kvartala unazad, dok se BD oslanja na podatke u realnom vremenu kako bi brzo pružio uvid. Sproviero (Sproviero, 2020) navodi da brzina BD zavisi ne samo od brzine protoka podataka, već i od tempa kojim se oni prikupljaju, analiziraju i preuzimaju.
- **Raznolikost (Variety):** BD pristupa svim vrstama informacija izvan tradicionalnih strukturiranih i nestrukturiranih podataka i onih uskladištenih u skladištu podataka. Takođe može da asimiluje uskladištene i strukturirane i nestrukturirane podatke dobijene od eksternih izvora (Amakobe, 2015).

Radmer i dr. (Radmehr & Bazmara, 2017) pominju da mogućnost primene sofisticiranih algoritama i moćnih računara na velike skupove podataka, otkrivajući korelacije i uvide koji su ranije bili nedostupni kroz konvencionalno skladište podataka ili BI alate, čini BD drugačijim od samo „više podataka“.

Prema novoj studiji (Delgosha, Hajiheidari, & Fahimi, 2020), različite industrije, uključujući bankarstvo i finansijske usluge, iskusile su ogroman potencijal koji nudi kombinacija uspona tehnologije i analitike. Izveštaj je otkrio da kompanije moraju da usvoje BDA da bi unapredile svoju ponudu. Istraživanje (Lu & Song, 2021) je pokazalo da je 37% organizacija prijavilo da koristi naprednu analitiku, dok je 85% reklo da će se time baviti u roku od tri godine. Istraživanje (Gupta, Gupta, Agraval, & Kansal, 2019) dodaje da je žurba ka implementaciji BDA posledica promena u poslovnom okruženju i potrebe da se iskoristi više poslovnih prilika. Napredna analitika je postala najbolji način za otkrivanje novih segmenata kupaca, identifikaciju dobavljača, povezivanje proizvoda i afiniteta i razumevanje prodaje. San i dr. (Sun, Morris, Ksu, Zhu, & Ksie, 2014) citirali su istraživanje 550 donosilaca odluka u preduzećima, koji su izjavili da su usvojili BD i analitiku kako bi poboljšali privlačenje kupaca, pomogli u razvoju novih proizvoda i upravljali i stekli konkurentsku prednost.

Firme kao što je Fejsbuk su uspešno stekle konkurentsku prednost, posebno zato što je analitika osnova poslovnog okruženja u kojem posluju. Prema istraživanju (Srivastava, Singh, Tanvar, & Tiagi, 2017), Fejsbuk je razvio sofisticirane profile potrošača koji pomažu organizaciji da cilja oglašavanje sa takvom preciznošću da se novi rivali ne mogu ni nadati da će ih sustići.

Majkrosoft je takođe, prema istraživanju (Sproviero, 2020), redefinisao upravljanje ljudskim resursima koristeći socijalnu analitiku, primoravajući mnoge organizacije da shvate da postoji novi put ka uspehu.

BD omogućava finansijskim firmama da usvoje inovacije na više frontova, donoseći nove proizvode i usluge na tržište (Boumlik & Bahaj, 2017). Većina proizvoda koje finansijske kompanije nude omogućavaju im da prikupljaju detaljne podatke o svojim klijentima, što zauzvrat hrani BDA alate koje koriste za dalje poboljšanje proizvoda. Stručnjaci za finansije definišu BD kao alat koji omogućava organizaciji da proizvodi, manipuliše i upravlja velikim skupovima informacija u određenom vremenskom okviru, kao i skladišnim prostorom potrebnim da podrži količinu informacija koju karakterišu raznovrsnost, brzina i obim (Munar, Chiner, i prodaja, 2014). Naš fokus u ovom izveštaju je da ispitamo oblasti u kojima finansijske institucije koriste BD da poboljšaju svoje okvire za upravljanje poslovnim rizicima kako bi poboljšali izvršni, revizijski i transparentni nadzor rizika (Mungai & & Baiat, 2018). Jedan od najvažnijih aspekata korišćenja BDA u finansijskim firmama je smanjenje rizika (Hassani, Huang, & Silva, 2018). Ovde će studija istražiti metode u kojima se koristi analiza podataka da bi se otkrio obrazac ponašanja potrošača korišćenjem BDA i otkrivanje korelacije između krađe novca i karakteristika transakcije i različitih tipova transakcija (Wong & Wong, 2020).

Prikaz problema i upotreba BD-a

Studija uzima u obzir podatke iz više banaka širom SAD i Evrope.

Odabrani su na osnovu opadanja zadovoljstva njihovih klijenata tokom određenog vremenskog perioda. Većina ovih banaka radi više od dvadeset godina i imale su poteškoća da ožive profitne marže nakon ekonomske krize nakon 2008. godine. Od 2012. godine pa nadalje, mnoge od njih su počele da prikupljaju što više podataka od potrošača do različitih aspekata potrošačke potrošnje.

Takođe su prikupile povratne informacije od potrošača kako bi prepoznale i rešile probleme sa svim problemima vlasnika bankovnih računa. Neke od njih su doživele pad u merenju zadovoljstva kupaca, zajedno sa smanjenjem zadržavanja klijenata. Prikupili smo podatke od banaka da bismo razumeli sledeće:

- Utvrđivanje pravog uzroka smanjenja zadovoljstva klijenata u više banaka
- Analiziranje obrasce potrošnje korisnika kartica
- Procena korišćenja kanala – zaduživanje i kredit itd.
- Razumevanje ponašanja potrošača

U našem slučaju, razmatraju se sledeće tačke:

- Detalji transakcije za vlasnike kartica (skup od oko 25.000 zapisa), za vremenski period januar 2019. - januar 2022.
- Lako dostupan pristup za 25.000 fajlova koji se čuvaju kod treće strane, a koje banke koriste za prikupljanje povratnih informacija.

Metodologija

Studija počinje analizom merenja zadovoljstva klijenata. Podaci su prikupljeni od više banaka širom sveta, od SAD do Evrope.

Podaci se koriste za razumevanje ponašanja potrošača, obrazaca potrošnje i korišćenja bankarskih usluga. Studija takođe analizira kako su banke koristile BDA za rešavanje zabrinutosti bankarskih klijenata. Pošto veliki deo uloge potrošača zavisi od usluga, studija će koristiti skup metrika da bi se razumeo kvalitet usluga koje banke pružaju i brzina kojom su problemi rešeni. Ovo će nam pomoći da shvatimo da li su problemi sa kojima su se banke suočile nastali zbog loših usluga ili možda drugih problema. Odmah nakon segmentiranja problema analizom povratnih informacija, studija će pokušati da pronađe objašnjenje zašto je do toga došlo, kao i da predloži poboljšanja.

Nalazi i analiza

Analiza odgovora

Postupci za dobijanje povratnih informacija su od suštinskog značaja za svaku grupu kako bi vam pomogli da razumete pogodne oblasti za razvoj. Naravno, ako se obavljaju redovno, pomažu u identifikaciji nedostataka u pruženim uslugama. Banke su dodatno počele da prikupljaju odgovore od svojih klijenata; od ljudi koji su posetili banke i od ljudi koji su koristili internet usluge.

Prikupljanje podataka i veličina uzorka

Procena u nastavku je sprovedena korišćenjem celokupnih prikupljenih podataka, koji sadrže povratne informacije od približno 25.000 kupaca. Sledeći podaci su prikupljeni i objedinjeni tokom dve godine. Od klijenata koji pristupaju nekim bankama zatraženo je da anonimno ocene banku na skali od jedan do pet prema sledećim parametrima:

- Da li je kupac zadovoljan kvalitetom usluge?
- Da li je kupac zadovoljan brzinom usluge?
- Da li se upiti potrošača efikasno rešavaju?

Analiza odgovora i zaključivanje

Rezultati neposredno pre februara 2019. su stabilni i spori. Zadovoljstvo programom, kvalitet usluge i brzina obrade upita su skoro svi uračunati sa istom težinom. Klijenti su rangirali proizvode finansijskih firmi kao normalne, a takođe finansijske firme nisu učinile korektivne korake za poboljšanje rejtinga klijenata.



Grafikon 1: Povratne informacije prema različitim parametrima

Ipak, između januara 2018. i marta 2019, „kvalitet usluge“ zajedno sa „efikasnim rešavanjem upita“ imaju nisku korelaciju = 0,401. To znači da kvalitet usluge nije bio u korelaciji sa rešavanjem upita. U istom periodu, „kvalitet pružene usluge“ i „brzina pružanja usluge“ imaju veliku korelaciju = 0,692, što pokazuje da su kvalitet i brzina usluge bili u korelaciji, dok je opšti rezultat ostao tipičan. To implicira da je kvalitet postao neposredna manifestacija brzine kvalitetne usluge. Ukoliko je tempo usluge poboljšan, klijenti su uočili odgovarajući razvoj u okviru kvaliteta usluge. To znači da ljudi vide tempo kao sve važniji parametar. Brzina i rešenje imaju nisku korelaciju od 0,365.

Korelacija	Kvalitet	Rešenje	Brzina
Kvalitet	1,000	0,401	0,692
Rešenje	0,401	1,000	0,365
Brzina	0,692	0,365	1,000

Tabela 1: Korelacija

Postoje određena poboljšanja u okviru metode od januara 2019. do aprila 2019. Retki skokovi čine da finansijska firma zahteva različite korake kako bi povećala zadovoljstvo klijenata. Ako iz studije izvučemo znatno jednostavniji pogled na tri nedelje od aprila 2019. do juna 2019. godine, može se utvrditi da redovni kupac obavi najmanje tri transakcije u nekom periodu dana. Drugi deo studije će pokušati da izoluje pravi uzrok pada ocena zadovoljstva klijenata banaka i proceniće i razmotriti različite strategije koje se koriste u analitici. Kao što je ranije rečeno, sledeće će biti osnova dela studije: skup podataka o bankama uključuje istoriju transakcija korisnika kartica od januara 2019. do januara 2022. godine i takođe će biti ispitani prema dole navedenim glavama.

Obrazac transakcije

Pogledajmo uobičajenu upotrebu kartica po mesecima svake sezone, u periodu od 2019. do 2022. Studija će analizirati veb transakcije preko kartica i ispitati modne trendove u obrascima kreditiranja i debitnih obrazaca vlasnika kartica.

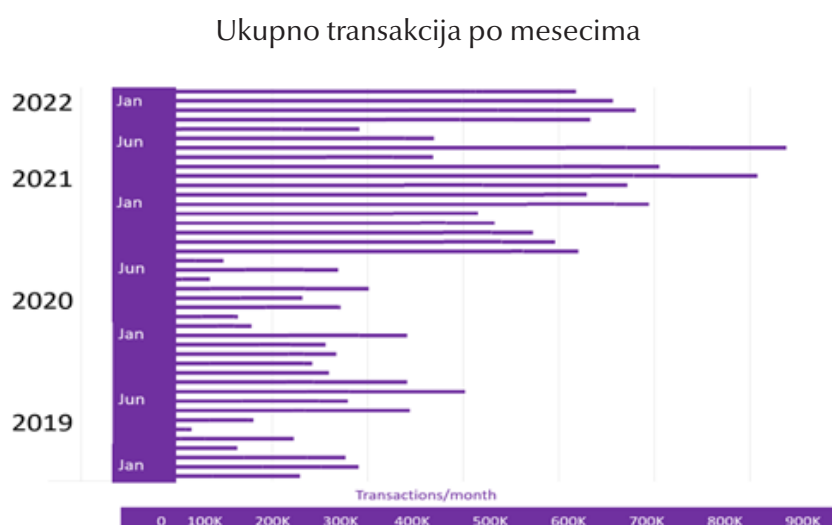


Tabela 2: Ukupno transakcija po mesecima u bankama

Zapažanja: Kako studija otkriva, i dalje postoji porast gotovine koja se distribuira u periodu od 2019. do 2022. Studija takođe primećuje da je za mnoge kartice, iako se obim gotovinskih transakcija poboljšao, isti ostao dosledan za druge ljude. Postoji nekoliko kartica koje su premašile ukupan iznos transakcija od ostalih metoda, tako da je njihova neto potrošnja bila mnogo veća od ukupne zarade za to vreme.

Ukupne debitne transakcije

Zapažanja: I dalje postoji postepeni porast ukupnog novca koji leže direktno na račune. Ovo je u skladu sa time kako se vrednost finansijske imovine povećava tokom vremena za skoro svaku finansijsku instituciju. Za račune vlasnika kartice, očigledno je povećanje gotovine koja se prima svakog meseca.

Zaključak: Ovaj vlasnik kartice može biti osoba koja ima normalnu platu, sa godišnjim porastom neto prihoda. Varijacije mogu biti posledica prilagodljive komponente prihoda, ali bi se osnovna plata u ovom slučaju poboljšala. Identifikacija „zdravih“ vlasnika kartica sa normalnom platom mogla bi dodatno da ide na ruku bankama, jer se ovim vlasnicima kartica može pristupiti sa boljim uslovima štednje, robom i sistemima odgovornosti. Ostatak slotova za kartice može biti ugovorno osoblje ili možda imaju neujednačene izvore prihoda. Identifikacija vlasnika kartica bez plata može pomoći bankama da razviju i obezbede proizvode kao što su mali štedni programi, kao i programi fiksnih depozita sa atraktivnim prinosima.

Zaključak: Ovaj vlasnik kartice može biti osoba koja ima normalnu platu, sa godišnjim porastom neto prihoda. Varijacije mogu biti posledica prilagodljive komponente prihoda, ali bi se osnovna plata u ovom slučaju poboljšala. Identifikacija „zdravih“ vlasnika kartica sa normalnom platom mogla bi dodatno da ide na ruku bankama, jer se ovim vlasnicima kartica može pristupiti sa boljim uslovima štednje, robom i sistemima odgovornosti. Ostatak slotova za kartice može biti ugovorno osoblje ili možda imaju neujednačene izvore prihoda. Identifikacija vlasnika kartica bez plata može pomoći bankama da razviju i obezbede proizvode kao što su mali štedni programi, kao i programi fiksnih depozita sa atraktivnim prinosima.

Ukupne kreditne transakcije

Zapažanja: Postoji slab porast ukupnog kreditiranja svakog računa svakog meseca svake godine.

Postoji verovatna sezonalnost u obrascima potrošnje. Mnogi faktori mogu uticati na to, kao što su makroekonomski uslovi, praznična sezona, prihodni izvori subjekata koji se posmatraju i prakse potrošnje subjekata koji se posmatraju.

Zaključak: Takvi potrošači bi mogli imati velike koristi od ponude kreditnih kartica, omogućavajući im da troše više da zadovolje svoje potrebe u različitim prilikama, a istovremeno omogućavajući više transakcija za banke. Klijent takođe ostaje lojalan banci ako su ispunjeni njegovi zahtevi.

Analiza ponašanja potrošača zasnovana na analizi korišćenja kanala

Dinamika transakcija se smatra važnim parametrom za poznavanje zahteva i navika klijenta. Sledeće vrste transakcija se posmatraju za slučaj kao što su kreditna transakcija i debitna transakcija.



Tabela 3: Korišćenje kanala

Zapažanja: Na osnovu upotrebe debitnih i kreditnih kartica, primećeno je da su debitne transakcije obično veće od kreditnih transakcija po korisniku. Kao što se vidi na gornjem grafikonu, učestalost debitnih transakcija je obično oko 20% veća. Međutim, uočavamo i zanimljiv fenomen gde su transakcije kreditnom karticom gotovo postale jednake transakcijama debitnih kartica, uglavnom zbog smanjenja učestalosti transakcija debitnim karticama. Zbog vremena, procenjujemo da je to posledica uticaja Covid-19 na smanjene zarade ljudi, što je dovelo do toga da ljudi češće koriste kreditne kartice. Trend se nastavio do kraja 2021. kada se zatvaranje vezano za Covid završilo i kada su se preduzeća počela otvarati, što je rezultiralo time da ljudi zarađuju više i stoga češće koriste debitne kartice.

Analiza ponašanja potrošača zavisi od obrazaca potrošnje za unakrsnu prodaju

Studija takođe može da koristi informacije o transakcijama da proceni kojim potrošačima se mogu prodati koje vrste finansijskih proizvoda. Takođe ga koriste banke za segmentiranje i ciljanje potencijalnih klijenata. Ispod je kompilacija informacija iz našeg skupa podataka, za naš skup podataka, u cilju analize ponašanja kupaca za svrhu unakrsne prodaje i prodaje finansijskih proizvoda klijentima.

Zapažanja: Gornji grafikon prikazuje optimalne obrasce zaduženja i najviše trendove kreditiranja za vlasnike kartica. Kao što je primećeno, sa promenom vremenske linije, upotreba ovih kartica se povećava, a to povećava moć ulaganja; a kako se kapacitet potrošnje povećava, produžena potrošnja debitnih kartica se dodatno poboljšava. Ne samo da im se povećava iznos potrošnje, već se povećava i njihova učestalost potrošnje. Na osnovu analize ponašanja kupaca, studija može zaključiti sledeće - Ova osoba ima kapacitet da investira, i iako povremeno, ulaže mnogo više od onoga što se vidi posmatrajući njihovu potrošnju tokom određenog vremenskog perioda. I tako, ova osoba je savršen kandidat za potencijalni kredit. Ova osoba dodatno pokazuje da, kako se njihov kapacitet za investiranje povećava, internet zaduženje dodatno raste. Dakle, ovaj pojedinac je dodatno savršen izbor za korišćenje kreditne kartice. Može im se ponuditi platna kartica, ili u zavisnosti od toga da li je već koriste, njihov kreditni limit se može povećati. Mogućnosti vezane za kreditnu karticu mogu se proširiti na ovu osobu, jer je mnogo verovatnije da će svoju karticu koristiti.

Analiza bezbednosti i prevara

Na osnovu istorijskih transakcija i potrošačkih kapaciteta klijenata, analiza ponašanja može nam pomoći da otkrijemo moguću pretnju i prevare koje su se mogle desiti u prošlosti. Ako je zapaženo da je klijent učestvovao u prekomernim transakcijama sa sumnjivim računima, može se označiti, a mogu se izvršiti dodatna ispitivanja kako bi se osiguralo pravilno korišćenje finansijskih sredstava. Ako je klijent u prošlosti vršio lažne aktivnosti, njegovi transferi mogu biti označeni dok se ne preduzmu odgovarajuće mere za rešavanje bilo kakve zabrinutosti. Na taj način banke mogu osigurati da su subjekti sa kojima klijenti posluju zaštićeni, kao i da su klijenti zaštićeni od lažnih subjekata.

Broj neto debitnih transakcija mesečno, svake godine

Kada se u studiji pogledaju debitne transakcije koje su se desile tokom istog perioda, dobijamo nekoliko intrigantnih rezultata. Ispod će biti prikazan prikaz svih ukupnih debitnih transakcija za odgovarajuće vlasnike kartice. Zapažanja: Broj neto transakcija raste s vremenom i suptilno.

Banke mogu da koriste podatke da bi razumele probleme kao što su iznenadni skokovi, koji se mogu koristiti za nezakonite transakcije i takođe mogu predložiti moguće kompromitovanje proizvoda. To jasno ukazuje na neovlašćeni pristup i malverzacije sa novcem od strane nepoštenih agenata.

Analiza trenda vremena transakcije za celu 2021

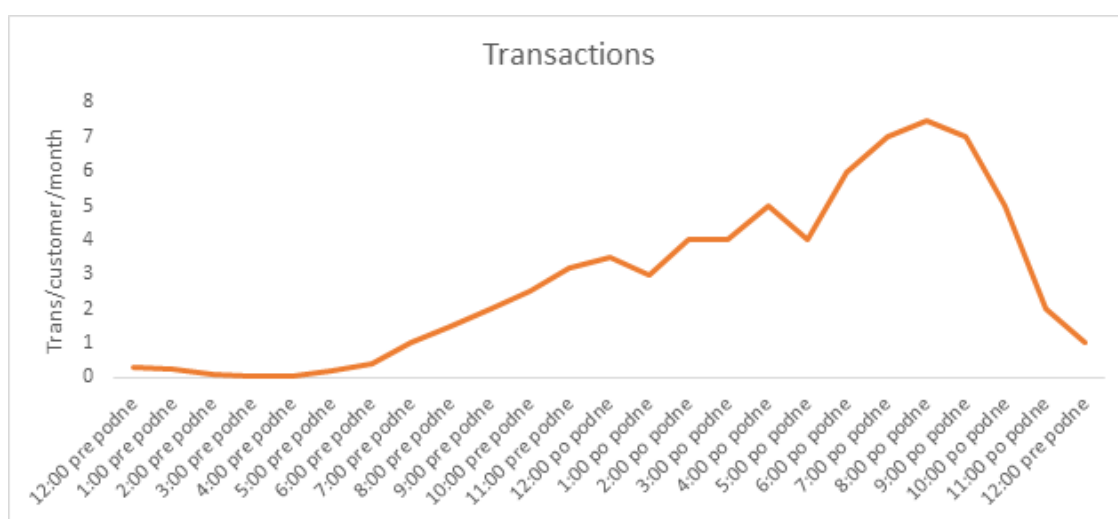


Tabela 4: Trend transakcija

Zapažanja: Uobičajeno se očekuje da se transakcije karticama odvijaju između 08:00 i 23:00 časova, pošto je to period u kome rade redovne kompanije.

Počevši od ponoći, pa do ranih jutarnjih sati, vidimo manje transakcija, što pokazuje da korisnici ne koriste toliko ovaj način plaćanja kasno u noć. Međutim, počevši od 06:00 ujutru, posmatramo rast transakcija prema očekivanjima, koji dostiže vrhunac oko 20:00, kada ljudi možda koriste svoje kartice u različite svrhe kao što su kupovina u prodavnicama ili restoranima.

Zapažanja: Uobičajeno se očekuje da se transakcije karticama odvijaju između 08:00 i 23:00 časova, pošto je to period u kome rade redovne kompanije. Počevši od ponoći, pa do ranih jutarnjih sati, vidimo manje transakcija, što pokazuje da korisnici ne koriste toliko ovaj način plaćanja kasno u noć. Međutim, počevši od 06:00 ujutru, posmatramo rast transakcija prema očekivanjima, koji dostiže vrhunac oko 20:00, kada ljudi možda koriste svoje kartice u različite svrhe kao što su kupovina u prodavnicama ili restoranima.

Korelacija između zapažanja

Jedna od banaka koju smo proučavali suočila se sa zastojem zbog tehničkih kvarova tokom perioda istraživanja i tog dana smo prikupili zadovoljstvo klijenata za tu konkretnu banku i uporedili ga sa normalnim danima.



Analiza zadovoljstva klijenata: U ranim jutarnjim satima banka je naišla na sajber napad, prilikom kojeg su za kupovinu korišćene kartice. Aktivnost hakovanja je pauzirana nakon 16. maja 2021, i samim tim prestala je da postoji oko 10. juna 2021. Skoro istog trenutka, lista za merenje zadovoljstva klijenata banke smanjila se za tri indeksna poena. To znači da se problem desio u širokom krugu delatnosti, a klijenti su bili pogođeni u velikom broju. Zaposleni u banci su poboljšali zaštitu svog internet sistema kako bi izbegli još više prevarnih transakcija. Ovo je očigledno, pošto nakon događaja nisu pronađene prevarne transakcije. Banka je takođe radila na smirivanju stresnih kupaca, a radila je i na kontroli oštećenja brenda. Ovo je dodatno vidljivo iz činjenice da lista za merenje zadovoljstva klijenata nastavlja da raste nakon incidenta i da je dostigla stepen pre maja 2021.

Budući obim istraživanja

Studija bi se mogla proširiti na testiranje i kvantifikaciju finansijskih i nefinansijskih prednosti koje su banke dobile nakon uvođenja BDA i predviđanja poboljšanja u finansijskim izveštajima banke. Rad se takođe može proširiti na različite metode prikupljanja podataka koje banke mogu koristiti za poboljšanje kvaliteta analize. Neki dodatni obim istraživanja mogao bi biti obrazac upotrebe specifičnog finansijskog instrumenta koji se uzima u obzir BDA, kao što su hartije od vrednosti obezbeđene hipotekom, stambeni krediti itd., koji imaju široke implikacije u finansijama i na koje korišćenje BDA u velikoj meri utiče.

Zaključak

Uspion tehnologije omogućio je finansijskim institucijama da prikupe značajnu količinu podataka o klijentima. Ova značajna količina podataka donela je unosnu priliku za banke da prilagode svoju ponudu na način da je učine unosnijom za svoje klijente. Korišćenje BD može značajno da pomogne u smanjenju vremena usluge, poboljšanju kvaliteta usluga i osiguranju bezbednosti zainteresovanih strana (Gupta, Gupta, Agraval, & Kansal, 2019).

BDA se koristi u različitim sferama finansijskog sektora. Podržava ih da isporuče mnogo bolje rešenje svojim potrošačima, kako eksternim tako i internim. Banke iz različitih zemalja, kao što je Amerika, sada sprovode BDA i veštačku inteligenciju kako bi poboljšale svoje usluge (Radmehr & Bazmara, 2017). Američke banke koriste rešenja zasnovana na analitici da unaprede svoje proizvode, operacije i usluge. Bez implementacije ovakvih alata, banke možda neće uspeti da zadovolje potražnju potrošača, kao što se vidi u studiji. Banke moraju da modernizuju svoje tehničko znanje i da se koncentrišu na onlajn bankarstvo kako bi iskoristile prednosti ovih tehnologija. Ishod usvajanja tehnologije zavisi od nekoliko faktora uključujući, ali ne ograničavajući se na usvajanje znanja, implementaciju BDA alata, stalno poboljšanje načina da se bolje razumeju potrebe korisnika, fokusiranje na dugoročni cilj, naglasak klijenta, organizacione karakteristike, vrednost brenda, regulatorne sposobnosti i alokacije kapitala itd. (Mungai & Baiat, 2018). Pre nego što krenu napred, banke moraju temeljno da istraže funkcije i tehnološke inovacije koje žele da pruže. Da bi rešila probleme i iskoristila priliku, svaka banka mora da traži korišćenje BDA.

Poznavanje BDA u bankarskom poslovanju poboljšava iskustvo potrošača na brojne načine. Ova analiza je procenila sentimentalnu i transakcionu procenu finansijskog sektora, a rezultati istih su istaknuti u nastavku: Studija je sagledala jedan od načina na koji se precizno zahvataju osećanja potrošača i koriste za procenu opšte ponude usluga, brzo rešavajući probleme kupaca, i obezbeđivanje zadovoljstva kupaca (Srivastava, Singh, Tanvar, & Tiagi, 2017). Sve u svemu, oduševljenje klijenta može rezultirati ne samo povećanom lojalnošću klijenata već i povećanjem prihoda za banke i finansijske institucije.

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HOW BIG DATA ANALYTICS IS TRANSFORMING THE FINANCE INDUSTRY

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Summary

The data revolution happening throughout the world has brought transformation in the financial services sector. This vast information has opened doors to understanding the needs of the customers, finding insights, and lowering risks. In addition, it helps the financial services industry to take actions to improve clients' satisfaction at a faster rate than it was previously possible. Financial firms can develop new insights using BD because they can now collect a large volume of data about their customers, their spending pattern, and provide services that are beneficial, convenient, and quick for the customers. They can expand the use of those insights not only for their consumers but also for their internal process optimization, benefiting everyone in the process. While the impact of BDA on financial service companies is ubiquitous, not so many studies have been published to understand which aspects of the financial services industry could greatly benefit from the rise of technology and BDA. Few published studies address the challenges faced by banks in this technology era if they do not have BD tools implemented. This research covers data from banks from January 2019 to January 2022 to address that gap of a several banks from America and Europe that faced declining customer satisfaction. It uncovers the best methods used by financial firms globally to implement BDA to improve the services. This paper will also look at how BDA has been successfully used in the banking industry, regarding the following elements: consumer behavior, channels use, consumer spending pattern and profile creation, product cross-selling based upon user-profiling, analysis of feedback and sentiment, management of secure transactions, and fraud etc. This study helps find out and makes contributions on how the financial services industry, such as banks, could leverage BDA and provide superior services. Further research could be conducted across other players in the finance industry to learn about how they are impacted by the BDA.

Keywords: Big data analytics, Finance, Application, Banks, Machine Learning**Abbreviations:** BDA - Big Data Analytics, BD - Big Data, CS - Customer Satisfaction**JEL classification:** C55, G20, G21

Introduction

The data revolution has observed huge growth with financial companies. Even though the collecting of this information was impromptu, given that the financial system usually collects a lot of data, the opportunities opened by BDA surpasses any expectation previously anticipated of this historical record set. This information has also helped unlock secrets of cash moves, avoided risks, and understood consumer behavior. BD provides banks with the opportunity to extract valuable information from their customers and their own data more efficiently and quickly. Banks already reap the benefits of this.

A report by Munar et al. has discovered that companies in the financial services sectors that have implemented BDA have achieved more successes than others that did not use it (Munar, Chiner, & Sales, 2014). The benefit is not limited to the financial services industry, but all industries. BDA will not only support financial institutions to benefit from large volumes of data, but also help them get competitive upper hand, reduce costs, and transform challenges to opportunities. Banks are using BDA to develop insights and enhance capital management, capital allocation, and controlling resources. Research (Munar, Chiner, & Sales, 2014) found that 59.3% of financial and non-financial firms in America and Europe use BDA, and information analytics, demonstrating a major edge over the competition, and 91.2% think that a prosperous BDA application will determine the winners in the long run (Gupta, Gupta, Agrawal, & Kansal, 2019). But merely 32.3% of financial firms has developed a solid comprehension of BDA, and the remainder regularly focus on pilots and experiments with that (Gupta, Gupta, Agrawal, & Kansal, 2019).

While the use of BDA brings significant benefit to the worlds of business across any industry, many banks are still falling behind in terms of implementation of latest BD tools. Thus, some of them are failing to meet expectation of their customers. This study considers some such banks and evaluate how they could improve. The study makes significant contribution to understanding the challenges of lack of having a BD analysis method. The study also shows the benefits of having BDA tools.

Literature Review

What is BDA?

BD is defined as the vast growth and availability of data, both organized and unorganized (Gupta, Gupta, Agrawal, & Kansal, 2019). The author adds that BD is the sheer mass of data produced daily within global networks at a pace exceeding the capacity of current databases. (Bedeley & Iyer, 2014) described BD not only by the amount of information, but also by its variety, complexity, and speed by which the data must be analyzed or delivered; 3V is namely:

- **Volume:** Volume refers to the quantity of data beyond the ability to analyze through conventional tools, such as statistical analytical tools or standard analytical tools. (Hassani, Huang, & Silva,, 2018) adds that the sheer volume of stored data is rising rapidly, and (Indriasari, Gaol, & Matsuo, 2019) predicts that by 2022, there will be 90 zettabytes of data stored every year.
- **Velocity:** This is the speed of collecting data. Conventional intelligence applications use previous data from days, months, or quarters back, while BD relies on real time data to deliver insight rapidly. (Sproviero, 2020) states that the velocity of BD depends on not only the speed of the data flow, but also the pace at which it is collected, analyzed, and retrieved.
- **Variety:** BD accesses all sorts of information beyond the traditional structured and non-structured data and those stored in the data warehouse. It can also assimilate stored both structured and unstructured data provided by external sources (Amakobe, 2015).

(Radmehr & Bazmara, 2017) mentions that the ability to apply sophisticated algorithms and powerful computers to large data sets, revealing correlations and insights previously inaccessible through conventional data warehousing or BI tools, makes BD different from just “more data”.

According to a new study by (Delgosha, Hajiheydari, & Fahimi, 2020), across different industries, including banking and financial services, have experienced the enormous potential offered by a combination of rise of technology and analytics. The report revealed that businesses need to adopt BDA to advance their offerings. A (Yu & Song, 2021) survey showed that 37% of organizations reported practicing advanced analytics, while 85% said they would be practicing within three years. (Gupta, Gupta, Agrawal, & Kansal, 2019) research adds that the rush to BDA is due to changes in the business environment and the need to seize more business opportunities. Advanced analytics has become the best way to discover new customer segments, identify suppliers, associate products of affinity and understand sales. (Sun, Morris, Xu, Zhu, & Xie, 2014) cited a survey of 550 decision-makers in businesses, who stated they adopted BD and analytics to improve customer acquisition, assist with new product development, and manage and gain a competitive advantage.

Firms such as Facebook have successfully gained a competitive upper hand, especially because analytics is the fundamental to the business environment, they operate in. According to (Srivastava, Singh, Tanwar, & Tyagi, 2017), Facebook has developed sophisticated profiles of consumers that help the organization target advertising with such precision that new rivals cannot even hope to catch up. Microsoft also, according to (Sproviero, 2020), has reinvented human resource management by using people analytics, forcing many organizations to realize that there is a new path to success.

BD allows financial firms to innovate on multiple fronts, bringing new products and services to market (Boumlik & Bahaj, 2017). Most of the products that financial firms offer allow them to collect data at great details about their customers, which in turn feeds the BDA tools used by them to improve the product further. Finance experts define BD as the tool which enables an organization to produce, manipulate and manage large information sets in a certain timeframe, as well as the storage required to support the amount of information characterized by variety, velocity, and volume (Munar, Chiner, & Sales, 2014). Our focus in this report is to examine the areas in which financial institutions use BD to improve their business risk management frameworks to improve executive, audit, and transparency oversight of risk (Mungai & Bayat, 2018). One of the most important aspects of using BDA in financial firms is to reduce risks (Hassani, Huang, & Silva, 2018). Here, the study will explore the methods in which data analysis is used to discover consumer behavior pattern by using BDA and detection of the correlation between monetary theft, and characteristics of the transaction and various transactions (Wong & Wong, 2020).

Problem Statement and Usage of BD

The study considers data from multiple banks across the USA and Europe. They were selected based on their declining customer satisfaction over a period of time. Most of these banks have been in operation for more than twenty years and have had difficulty reviving the profit margins after their post-2008 economic crisis. From 2012 onward, many of them began gathering as much data as possible from consumers to under different aspects of consumer spending. They also gathered consumer feedbacks to recognize and fix problems with all the issues of bank account holders. Some of them encountered a dip in their customer satisfaction measurement, together with dropping client retention. We collected data from banks to understand the following:

- Determining the real cause of reduction in client satisfaction across multiple banks
- Analyzing the spending patterns of the cardholders
- Channel use evaluation –Debit, and credit etc.
- Understand Consumer behavior

For our case, the following points are considered:

- Transactional details for cardholders (set of about 25,000 records), for time sequence January 2019 - Jan 2022.
- Accessed readily available to 25,000 files kept with a third-party management that banks use for gathering feedbacks.

Methodology

The study starts with analyzing the client satisfaction measurement. The data was collected from multiple banks across the world, from USA to Europe. The data is used to understand the consumer behavior, spending pattern and usage of banking services. The study also analyzes how the banks have used the BDA to address concerns of banking customers. Since a major portion of consumer facing role depends on services, the study will use a set of metrics to understand the quality of service provided by the banks and the speed at which the issues were resolved. This will help us understand whether the problems banks faced were due to poor services or maybe various other problems. Right after segmenting the problem with the feedback analysis, the study will try to find the explanation of why the matter occurred, as well as suggest improvements.

Findings and Analysis

Analysis of Responses

Feedback procedures are essential for every group to help you understand the likely areas of development. Of course, if done regularly, they help identify gaps in services rendered. Banks additionally started collecting responses from their customers; from people who visited bank limbs, and from people who utilized internet services.

Data Collection and Sample Size

The evaluation below is conducted utilizing the entire data collected, containing feedback from approximately 25,000 buyers. Following data was gathered and built up over two years. Customers accessing some banks have been asked to rate the bank anonymously on a scale of one-five on the following parameters:

- Is the buyer pleased with the quality of service?
- Is the buyer pleased with the speed of service?
- Are consumer queries addressed effectively?

Responses Analysis and Inference

The scores fell just before February 2019 are steady and slow. Program satisfaction, service quality, and handling velocity of queries have been almost all placed with the same weight. The clients ranked financial firms account products as normal, and also the financial firms account didn't occupy the remedial steps to enhance its customer ratings.

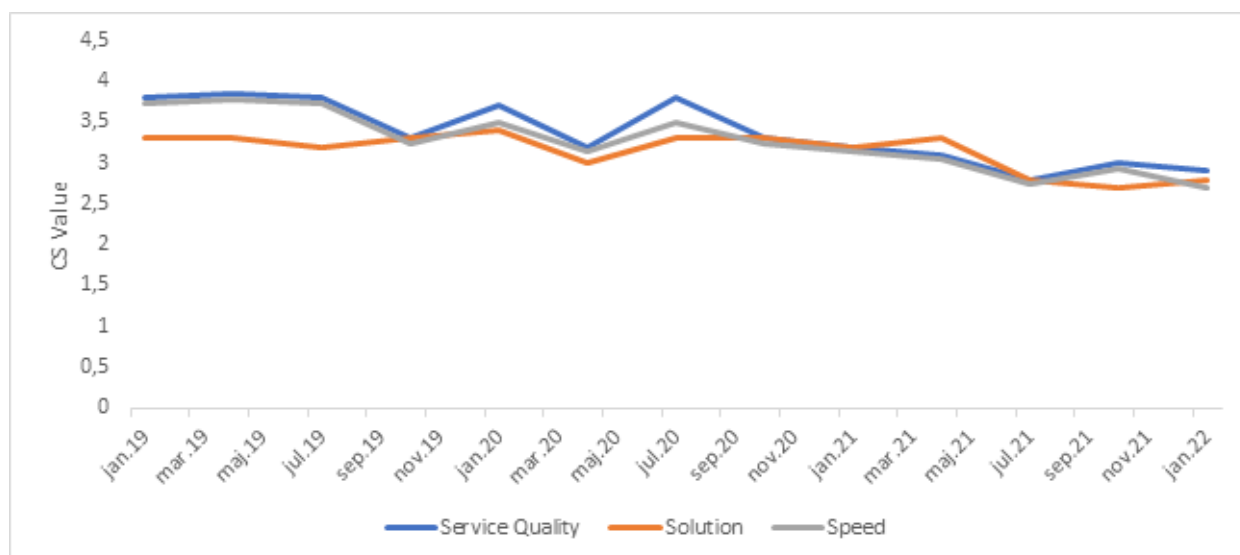


Figure 1: Feedback by different parameters

Nevertheless, between Jan 2018 and Mar 2019, “Service Quality” along with “efficient dealing with queries” have a low correlation = 0.401. That means the service quality was not correlated with the resolution of queries. During the same periods, “Quality of provided service” and “speed of providing service” have a great correlation = 0.692, showing that quality and speed of service were correlated, meanwhile the general score remained typical. It implies that the quality became an immediate manifestation of the velocity of quality service. If the pace of service has been enhanced, the clients perceived corresponding development within the quality of service. What this means is that people see pace as becoming a more important parameter. Speed and solution have low correlation of 0.365

Correlation	Quality	Solution	Speed
Quality	1,000	0,401	0,692
Solution	0,401	1,000	0,365
Speed	0,692	0,365	1,000

Table 1: Correlation

There are somewhat improvements within the method from January 2019 to April 2019. Infrequent surges make the finance firm require various steps to enhance the client satisfaction. If perhaps the study has a significantly simpler look into the three weeks Apr 2019 - June 2019, it is found that the regular buyer makes at least three transactions in some period of the day. The other section of the study will try and isolate the real cause of the drop in client satisfaction ratings for banks and evaluate and look at different strategies utilized in analytics. As stated before, the following will be the foundation of the part of the study: the banks’ dataset includes the transactional history of cardholders from January 2019 – Jan 2022 and shall also be examined as per the heads provided below.

Transaction Pattern

Let us have a glimpse at the common card use per month every season, with the time sequence from 2019 - 2022. The study will analyze the web transaction with cards and examine the fads in credit patterns and debit patterns of our cardholders.

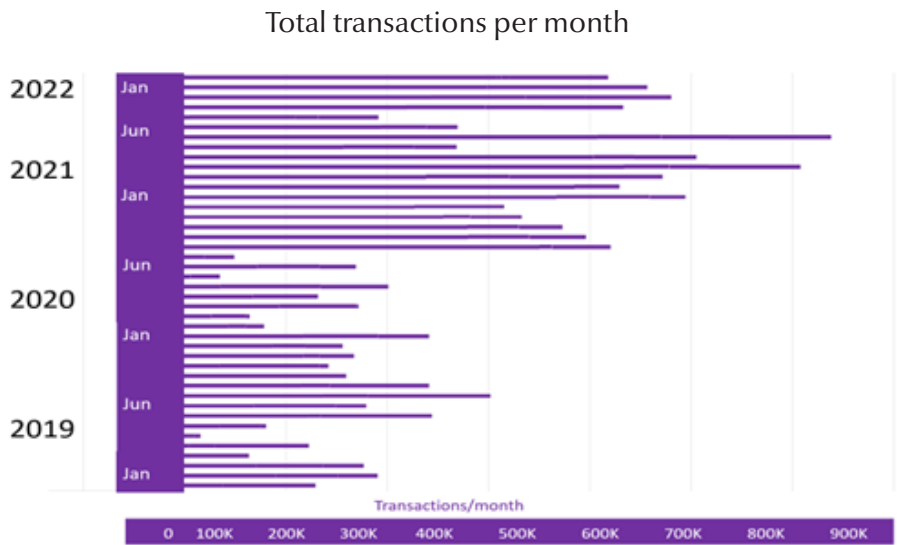


Table 2: Total transactions per month in the banks

Observations: As the study finds, there continues to be a rise in cash distributed through 2019 to 2022. The study also observes that for many cards, even though the cash transaction volume has improved, it is remained consistent for other people. There are several cards that exceeded total amount of transactions than the other methods, so that the net spending of theirs was much more than total earnings during that time.

Total Debit Transactions

Observations: There continues to be a gradual rise in total cash flowing directly into accounts. This goes in sync with how value of financial assets increases with time for almost any financial institution. For card holder accounts, there is an obvious increase of cash received each month.

Inference: This card holder might be a normal salaried individual, with an annual rise in their take-home income. The variations in the credit could be due to an adjustable component in the income, but the fundamental wage would have improved in this instance. Identification of healthy normal salaried card holders could additionally profit the banks, as these card holders may be approached with more desirable savings, liability goods and systems. Rest of the card slots might be contractual personnel, or maybe have staggered energy sources of income. Identification of non-salaried card holders can help banks develop and provide goods like small savings programs, as well as fixed deposit programs with attractive returns.

Total Credit Transactions

Observations: There is an easy rise in total credit every account every month every year. There is probable seasonality in the spending patterns. Many factors may influence this, like macro-economic conditions, festive seasons, income resources of the entities under observation and spending practices of the entities under observation.

Inference: Such consumers could greatly benefit from a credit card offering, allowing them to spend more to fulfill their needs during different occasions, while also allowing more transaction for the banks. The customer also remain loyal to the bank if the customer’s requirements are met.

Consumer Behavior Analysis Based on Channel Use Analysis

The dynamics of transactions are considered an important parameter for knowing the requirements and habits of a client. Following transaction sorts are looked at for the case like Credit Transaction, and Debit Transaction.

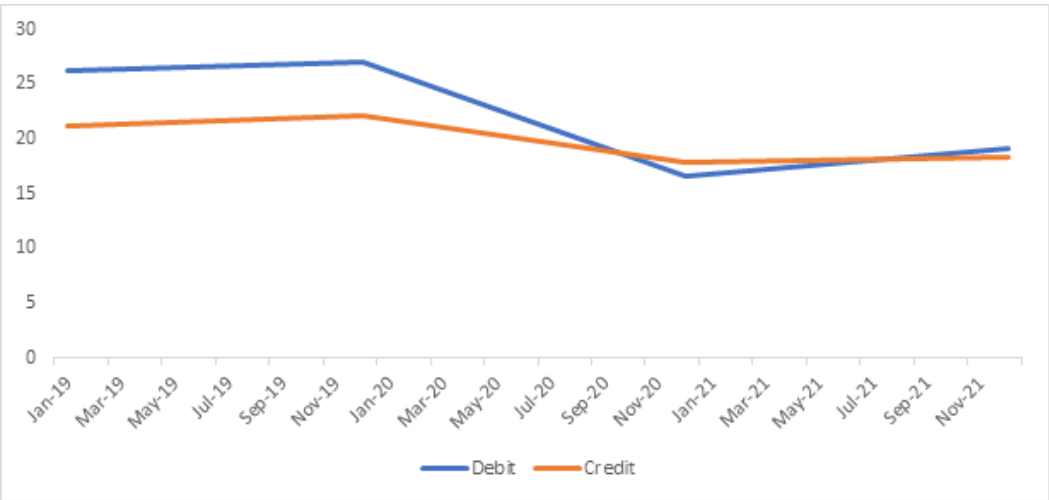


Table 3: Channel usage

Observations: Based on the usage of debit and credit cards, it’s observed that debit transactions are usually higher than that of credit transactions per user. As seen in the graph above, debit transactions frequency is usually around 20% higher. However, due we also observe an interesting phenomenon where the credit card transactions almost became equal to debit card transactions, mostly because debit card transaction frequency fell. Due to the timing, we estimate that it was due to Covid-19’s impact of people’s reduced earnings, resulting in people using credit cards more often. That continues till the end of 2021 when covid’s related closure’s reversed and businesses opened more, resulting in people earning more and thus using debit cards more often.

Consumer Behavior Analysis Dependent on Consumption Patterns for Cross Selling

The study can also use the transactional information to estimate which consumers can be sold what kinds of financial products. It is also used by banks to segment and target prospective clients. Below is the compilation of information from our dataset, for the dataset of ours, for the goal of knowledge customer behavior for cross selling and up-selling financial items to clients.

Observations: The graph above shows the optimum debit and highest credit patterns for the cardholders. As noticed, with change for timeline, usage of these cardholders increases, and that boosts their investing power; and, as their spending capacity increases, the extended debit card spending additionally improves. Not just the spending amount increases of theirs, but additionally the spending frequency increases of theirs. Based on customer behavior analysis, the study can infer the following - This individual has a capacity to invest, and though occasionally, they are invested much more than what is acknowledged, to the account of their spending throughout specific times. And so, this person is the perfect candidate for prospective loan applicants. This person additionally shows that as their capacity to invest increases, the online debit additionally increases. Thus, this individual is additionally a perfect choice for using a credit card. They can be offered a charge card, or depending on whether They is today using one, the credit limit of their may be increased. Credit card linked provides could be extended to this individual, since They is much more likely to use the card of theirs.

Security and Fraud Analysis

Based on historical transactions and consumption capacity of clients, the behavioral analysis can help us expose a possible threat and uncover frauds which may have occurred in the past. If a customer has been observed to have engaged in excessive transactions to questionable accounts, they can be flagged, and further inquiries can be made to ensure proper use of financial resources. If a customer has conducted fraudulent activities in the past, their transfers could be flagged until proper action is taken to address any concern. That way, banks can ensure that the entities the customers are dealing with are protected and so are the customers from fraudulent entities.

Net Debit Transaction Counts per Month Every Year

When the study looks at the debit transactions which occurred during the same period, it results in several intriguing results. Below will be the plot of all total debit transactions for respective card holders. Observations: Net transactions' count grows with time and subtly. Banks can use the data to understand issues such as sudden spikes like this can be used for illegal transactions and may also suggest the product could be compromised. It clearly suggests unauthorized access and misuse of money by dishonest agents.

Transaction Time Trend Analysis for 2021

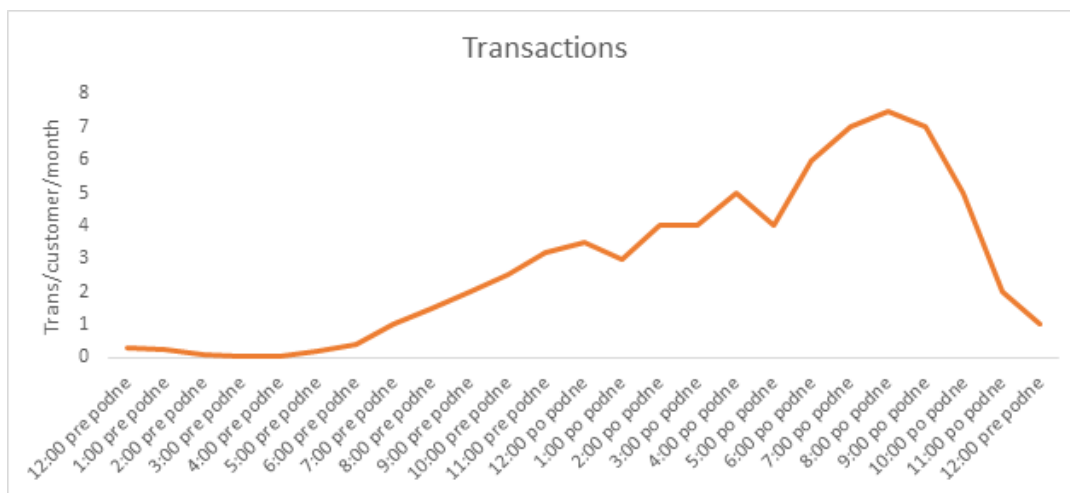


Table 4: Transaction trend

Observations: In common, card transactions are expected to take place between 08:00 and 23:00, since that is the period inside which regular companies work. Starting from midnight to early in the morning, we see fewer transactions, which shows that the users do not use the payment methods that much as it gets late at night. However, starting around 06:00, we observe a growing number of transactions, as expected, and it peaks around 20:00, where people might be using their cards for different purposes like buying at stores or at restaurant.

Correlation Between Observations

One of the banks we have studied faced downtime due to technical glitches during period of the study and we collected the client satisfaction for that specific bank on that day and compare it with normal days.



Client satisfaction analysis: In the early hours of the morning, the bank encountered a cyber-attack during which cards were used for making purchases. The hacking activity paused after 16th May 2021 and consequently ceased to exist around 10th June 2021. Almost instantly, the client satisfaction measurement list for the bank decreased by three indices. What this means is the problem happened at a widespread level, and customers were impacted in large numbers. Bank employed improved the protection of the internet system to avoid even more fraud transactions. This is apparent from the reality that no fraud transactions were found following the event. Bank also worked towards pacifying the stressed buyers, and also did activities regarding brand damage control. This is additionally apparent from the reality that the client satisfaction measurement list is rising steadfastly after the incident and has maxed out the degree pre-May 2021.

Future Research Scope

The study could be extended to test and quantify the financial and non-financial advantages that banks received after the introduction of BDA and forecast improvements in the bank's financial statements. The work may also be expanded to include the different data collection methods that banks can use to improve analysis quality. Some additional scope of research could be the usage pattern of specific financial instrument considering BDA, such as mortgage-backed securities, home loans etc., that have wide implications in finance and are greatly impacted by the use of BDA.

Conclusion

The rise of technology has enabled financial institutions to gather significant amount of data about customers. This significant volume of data has brought a lucrative opportunity for banks to customize their offerings in a way to make it more lucrative for their customers. Using BD can significantly help reduce service time, improve quality of services, and ensure safety of the stakeholders (Gupta, Gupta, Agrawal, & Kansal, 2019).

BDA is used throughout different spheres of the financial sectors. It supports them to deliver much better solution to their consumers, both external and internal. Banks from different countries, such as America, is now carrying out BDA and AI to improve their services (Radmehr & Bazmara, 2017). The American banks are using analytics-based solutions to enhance its products, operations, and services. Without implementation of such tools, banks might fail to meet the consumer demand as seen in the study. Banks must modernize their technical knowhow, and concentrate on online banking, to take advantages of these technologies. The outcome of technology adoption depends on several factors including but not limited to the adoption of the know-how, implementation of BDA tools, constantly improving ways to understand the customer needs better, being focused on the long-term objective, client emphasis, organizational features, brand value, regulatory abilities, and capital allocations etc. (Mungai & Bayat, 2018). Before moving forward, banks must thoroughly investigate the functions and technological innovation they wish to provide. To fix the troubles and to grab the opportunity, each bank must seek usage of BDA.

Knowledge of BDA in banking business improves consumers' experience in numerous ways. This analysis assessed sentimental and transactional evaluation on the financial sector, with the results of the same being pointed out below: The study viewed one of the ways precisely how consumer sentiments are seized and used to evaluate the general service offering, solving customers' issues rapidly and ensuring customer satisfaction (Srivastava, Singh, Tanwar, & Tyagi, 2017). Overall, delighting a customer can result in not only increased customer loyalty but also increased revenue for banks and financial institutions.

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KONVENCIJA EVROPSKE UNIJE O ZAJEDNIČKOM TRANZITNOM POSTUPKU

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Rezime

Republika Srbija je 01.02.2016. god. stekla status punopravne članice Konvencije Evropske unije o zajedničkom tranzitnom postupku, te se pridružila postojećim članicama: državama EU, državama EFTA-a, kao i individualnim članicama Turskoj i Republici Severnoj Makedoniji. Na taj način Srbija je svoj posebno značajan geopolitički položaj u Evropi, te otvorenost za podršku i prihvatanje stranih direktnih investicija, stavila u funkciju daljeg dinamičnog unapređenja u sferi ekonomije i ukupnog privrednog razvoja.

Ključne reči: Evropska unija, Konvencija EU, Zajednički tranzitni postupak, garancija, banka

JEL klasifikacija: F13, R48, O52

Usvajanjem Zakona o potvrđivanju Konvencije Evropske unije o zajedničkom tranzitnom postupku (u daljem tekstu: Konvencija EU), a koji je objavljen u "Službenom glasniku Republike Srbije - Međunarodni ugovori", br. 13/2015, Republika Srbija je stekla status punopravne članice Konvencije EU o zajedničkom tranzitnom postupku.

Konvencija EU je potpisana 20.05.1987. god. u Interlakenu, Švajcarska. Ista je shodno važećim procedurama potvrđena 15.06.1987. god. Odlukom Saveta Evropske zajednice (eng. Council Decision 87/415/EEC).

Zatim je u jednom dužem vremenskom periodu Konvencija EU predstavljala ugovor zaključen između svih država članica Evropske Unije i država članica Evropske asocijacije za slobodnu trgovinu (eng. European Free Trade Association – EFTA), a koju trenutno čine: Norveška, Island, Švajcarska i Lihtenštajn.

Novijeg datuma je praksa pristupanja Konvenciji EU od strane individualnih država. Ista je započeta prijemom Turske 01.12.2012. god., te nastavljena prijemom Republike Severne Makedonije 01.07.2015. god., odnosno prijemom Republike Srbije 01.02.2016. god. Shodno navedenom, zaključno sa današnjim danom, Konvenciju EU čine ukupno 34 države i to: 27 država članica EU, 4 države članice EFTA i 3 individualne države.

Pristupanje Konvenciji EU predstavlja jedan od formalnih preduslova za punopravno članstvo svake pojedinačne države u EU. Naime, država koja je zainteresovana za članstvo u EU mora u trenutku apliciranja za prijem, pored ostalih ispunjenih uslova, imati status potpisnika Konvencije EU u trajanju od najmanje 1 godine.

Primer Republike Hrvatske je direktna potvrda za napred navedeno, utoliko što je Republika Hrvatska pristupila Konvenciji EU 01.07.2012. god., te postala članica EU 30.06.2013. god.

Evropska unija danas predstavlja političku i ekonomsku uniju 27 država članica. Prema podacima iz 2021. godine EU ima oko 447 miliona stanovnika, što predstavlja 5,8% ukupne svetske populacije. Sa učešćem od približno 15% u ukupnom svetskom izvozu, kao i približno 15% u ukupnom svetskom uvozu, EU predstavlja najvećeg izvoznika, odn. uvoznika roba i usluga na svetu.

Carinska unija Evropske unije (eng. The European Union Customs Union – EUCU), koja je formalno poznata pod nazivom Carinska unija Zajednice, predstavlja carinsku uniju, koju čine države članice EU, kao i Monako i Britanska prekomorska teritorija Akrotiri i Dhekelia (eng. The Sovereign Base Areas of Akrotiri and Dhekelia - SBA) locirana na Kipru.

Pri tome neke odvojene teritorije država članica EU ne učestvuju u Carinskoj uniji, po pravilu po osnovu geografske odvojenosti od svojih matičnih država. Kao primer može se navesti Gibraltar, koji predstavlja jednu od Britanskih prekomorskih teritorija.

Pored Carinske unije Evropske unije, EU je takođe u carinskim unijama sa Andorom, San Marinom i Turskom (uz izuzeće tačno određenih roba). Navedene Unije su rezultat odvojenih bilateralnih sporazuma zaključenih između EU i svake od napred navedenih država.

Sledi prikaz jedne sasvim posebne institucionalne promene u strukturi EU, kao i u samoj Carinskoj uniji EU. Podsećanja radi, Ujedinjeno Kraljevstvo (eng. United Kingdom) čine četiri države: Engleska (eng. England), Škotska (eng. Scotland), Vels (eng. Wales) i Severna Irska (eng. Northern Ireland).

Shodno Brexit-u (pojam izveden od engleskog izraza „British exit“, a koji označava Britanski izlazak), Ujedinjeno Kraljevstvo se povuklo iz Evropske Unije dana 31. januara 2020. god. S tim u vezi napomena da Severna Irska, formalni deo Ujedinjenog Kraljevstva Velike Britanije i Severne Irske, a shodno odredbama Brexit-a, nastavlja da učestvuje na evropskom jedinstvenom tržištu robe. Samim tim Severna Irska je de facto članica Carinske unije EU. Radi ilustracije primarnih odrednica predmetne Konvencije u nastavku sledi prikaz uvodnog dela teksta iste. Naime, Predmetnom Konvencijom su utvrđene mere za prevoz robe u tranzitu između Zajednice i država EFTA-e, kao i između samih država članica EFTA-e.

Pojam prevoz robe uključuje i pretovar, ponovni izvoz ili skladištenje robe, kao i uvođenje zajedničkog tranzitnog postupka. Pri tome sve te radnje se mogu obavljati nezavisno od vrste i porekla robe. U nastavku se daje prikaz osnovnih elemenata koji se odnose na tranzitne procedure Unije, kao i na zajedničke tranzitne procedure.

Tranzitna procedura Unije se koristi za carinske tranzitne operacije između država članica EU (i Andore i San Marina) i generalno je primenljiva na kretanje roba koje nisu uz EU, kod kojih se radi o carinskim dažbinama i drugim troškovima po osnovu uvoza, i roba iz EU, koje na svom putu od mesta otpreme do krajnjeg odredišta u EU, treba da prođu preko teritorije treće države.

Zajednička tranzitna procedura se koristi za kretanje roba između država članica EU, država članica EFTA-e (Island, Norveška, Lihtenštajn i Švajcarska), Turske, Republike Severne Makedonije, Srbije, kao i Velike Britanije (od 01. januara 2021. god.). Procedura je zasnovana na Konvenciji od 20. maja 1987. god., pri čemu su ove procedure praktično identične tranzitnim procedurama Unije. Zakon o carinskim tranzitnim procedurama u Uniji propisan je Carinskim kodeksom Unije, Uredba (EU) br. 952/2013), u Delegiranoj uredbi Komisije (EU) br. 2015/2446, u Uredbi o implementaciji Komisije (EU) 2015/2447 i u Delegiranoj uredbi Komisije (EU) 2016/341, sa izmenama i dopunama.

Posebnu pažnju zaslužuje Tranzitni priručnik, koji predstavlja najsveobuhvatniji izvor informacija o Uniji i uobičajenoj tranzitnoj proceduri. Kao takav, Priručnik je alat za promovisanje boljeg razumevanja načina na koji funkcioniše tranzitna procedura, kao i uloga različitih učesnika.

Tranzitni priručnik ima ukupno 9 glavnih delova i to kako sledi:

- Deo I Opšti uvod
- Deo II Status robe
- Deo III Garancije
- Deo IV Standarda tranzitna procedura NCTS (Novi kompjuterizovani tranzitni sistem)
- Deo V Postupak kontinuiteta poslovanja
- Deo VI Pojednostavljenja
- Deo VII Sprovođenje tranzitnog postupka, istražni postupak
- Deo VIII Dug i povraćaj
- Deo IX Postupak TIR (Registrovano za međunarodni transport)

Primenom Konvencije EU se pojednostavljuje i u velikoj meri eliminiše papirologija, koja redovno prati postupke tranzita robe preko međunarodnih granica. Pri tome se svi zajednički transportni postupci odvijaju uz angažovanje otpremnih, graničnih i odredišnih carinarnica.

Otpremna carinarnica je mesto gde se prihvataju deklaracije, na osnovu kojih se roba pušta u tranzitni postupak. Istovremeno otpremna carinarnica je odgovorna za prihvatanje/kontrolu/verifikaciju garancije i puštanje pošiljke, kao i razduživanje postupka/završetak kretanja robe.

Odredišna carinarnica je odgovorna za potvrdu prijema i kontrolu pošiljke.

U sklopu primene Konvencije EU u toku 2000-te god. je pokrenut Novi kompjuterizovani tranzitni sistem (eng. New Computerised Transit System - NCTS).

Predmetni sistem služi kao alat za upravljanje i kontrolu tranzitnog sistema, što uključuje svaku pojedinačnu transakciju tranzita robe, uz maksimalno korišćenje prednosti elektronskog sistema unosa, praćenja, kontrole, kao i eventualno potrebnih intervencija. Konvencijom EU je predviđena kontrola robe isključivo prilikom utovara na početnoj lokaciji u državi izvoza robe, kao i prilikom istovara na krajnjoj destinaciji u državi uvoza robe.

Kretanje robe na putu od mesta utovara do mesta istovara, uključujući carinske teritorije države, odn. država kroz koje roba prolazi u tranzitu, obavezno je pokriveno garancijom izdatom od strane garanta sa sedištem u državi utovara robe za tranzit.

Zakonom o potvrđivanju predmetne Konvencije, Poglavlje IV Garancije, čl. 9 uređeno je da principal polaže garanciju radi osiguranja plaćanja duga koji može nastati u vezi sa tranzitom robe. Principal je ovlašćen da, u zavisnosti od potreba svojih klijenata, obezbedi garanciju za svaki pojedinačni tranzitni postupak ili pak zajedničku garanciju kojom će biti pokriven rizik većeg broja pojedinačnih tranzitnih postupaka. Garancija može biti položena u formi novčanog depozita kod polazne carinarnice ili pak od strane garanta kod garantne carinarnice. Kao garant odn. izdavalac garancije u skladu sa zahtevima Konvencije EU, može se, u zavisnosti od regulatornog modela svake pojedinačne države potpisnice Konvencije EU, angažovati jedna od sledećih institucija:

- Poslovna banka, kao što je to slučaj na primer u Republici Srbiji ili
- Osiguravajuća kompanija ili
- Neko treće pravno lice, koje je zakonima države čiji je ono rezident, ovlašćeno za izdavanje garancija, a u skladu sa zahtevima Konvencije EU. U sklopu priprema za aktivno angažovanje u vezi sa primenom Konvencije EU, neophodno je da potencijalni garant posveti posebnu pažnju sagledavanju sledećih elemenata:
- Izboru klijenta ili klijenata pravnih lica i/ili preduzetnika koji su shodno nacionalnim propisima matične države ovlašćeni za obavljanje spoljno-trgovinskih poslova, odnosno prekograničnog transporta robe, a za koje će garant biti spreman da izda garanciju shodno zahtevima Konvencije EU, uz prethodno zaključenje posebnog ugovora sa svakim pojedinačnim klijentom;
- Identifikaciji jednog potencijalnog agenta u svakoj državi potpisnici Konvencije EU, a koji će, uz prethodno pribavljenu pisanu saglasnost od garanta u svojstvu principala, biti imenovan za agenta izdavaoca garancije za tranzit u državi čiji je agent rezident;

- Proceni spremnosti svoje institucije da garantima u drugim državama potpisnicama Konvencije EU, ponudi pružanje usluga u funkciji agenta u državi, čiji je garant rezident;
- Proceni spremnosti razmatranja primljenog zvaničnog zahteva od strane garanta iz druge države za prihvatanje mandata agenta za državu čiji je rezident, te nekim drugim.

Jednom uspostavljeni odnos između banke garanta iz jedne države i banke agenta iz druge države, a po osnovu Konvencije EU, može biti praćen uspostavljanjem saradnje u smislu drugih bankarskih poslova i/ili finansijskih aranžmana, u koje na primer spadaju sledeće vrste transakcija: izdavanje garancija, otvaranje akreditiva, konfirmiranje akreditiva, te učešće u sindiciranim kreditima, Inicijalnim javnim ponudama (eng. Initial Public Offering – IPO), kao i brojnim drugim aranžmanima i to kako u zemlji garanta i/ili u zemlji agenta, uz mogućnost zajedničkog učešća garanta i agenta na trećim tržištima. Ovakav razvoj saradnje između banaka omogućava generisanje relevantnih prihoda, kao i unapređenje rejtinga.

Sledi predstavljanje hipotetičke situacije koja bi u praksi zajedničkog tranzitnog postupka mogla nastupiti. Naime, eventualni događaj koji bi predstavljao problem u vezi sa prevozom robe na teritoriji jedne od država potpisnica Konvencije EU, bio bi momentalno praćen reagovanjem lokalne carinske institucije dotične države. To praktično znači da bi nadležna carinska institucija o nastalom slučaju promptno obavestila lokalnog agenta, koji bi bez odlaganja izvestio svog principala, te postupio striktno po njegovim instrukcijama radi urgentnog otklanjanja problema, odn. eventualnih posledica istog.

U vezi sa očekivanim nastavkom procesa pristupanja Konvenciji EU od strane novih država ovo je takođe prilika da se istakne poseban značaj predmetne Konvencije EU za afirmaciju banaka iz Republike Srbije.

Pored napred navedenih država treba spomenuti i Albaniju, koja takođe ima razvijene trgovinske odnose kako sa državama Zapadnog Balkana, tako i sa Grčkom, Italijom i brojnim trećim državama.

U Republici Srbiji, kao i u navedenim državama u regionu, posluje veliki broj banaka koje pripadaju vodećim bankarskim grupacijama iz Slovenije, Italije, Mađarske, Austrije i nekih trećih država, što predstavlja značajan element daljeg unapređenja komercijalnih i finansijskih aranžmana u regionu. Upravo ova činjenica predstavlja dodatni stimulans za intenziviranje zajedničkih tranzitnih postupaka.

Konvencija Evropske unije o zajedničkom tranzitnom postupku svim direktnim i indirektnim učesnicima, kao što su proizvođači, izvoznici, uvoznici, korisnici odn. potrošači i neki drugi, pruža brojne prednosti. Reč je pre svega o znatno bržem protoku roba, ubrzanju prometa na granicama, te evidentnom smanjenju troškova.

Pored navedenih prednosti, svakako treba spomenuti da predmetni sistem prekograničnog transporta robe omogućava rano otkrivanje i efikasnije suzbijanje carinskih prekršaja, što doprinosi podizanju svesti o neophodnosti permanentnih aktivnosti protiv sive ekonomije, u cilju osnaživanja integriteta privrede svake države članice Konvencije.

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EUROPEAN UNION CONVENTION ON COMMON TRANSIT PROCEDURE

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Summary

On February 1st 2016, the Republic of Serbia acquired the status of a full member of the European Union Convention on Common Transit Procedure, and joined the existing members: EU countries, EFTA countries, as well as individual members Turkey and the Republic of North Macedonia. In this way, Serbia put its particularly important geopolitical position in Europe, and its openness to support and acceptance of foreign direct investments, into the function of further dynamic improvement in the sphere of economy and overall economic development.

Keywords: European Union; EU Convention; Common transit procedure; Guarantee; Bank Guarantee; Bank

JEL classification: F13, R48, O52

With the adoption of the Law on Confirmation of the Convention of the European Union on the Common Transit Procedure (hereinafter: the EU Convention), which was published in the "Official Gazette of the Republic of Serbia - International Treaties", no. 13/2015, the Republic of Serbia acquired the status of a full member of the EU Convention on Common Transit Procedure.

The EU Convention was signed on May 20th, 1987, in Interlaken, Switzerland. It was confirmed in accordance with valid procedures on June 15th, 1987, by the Decision of the Council of the European Community (Eng. Council Decision 87/415/EEC).

Then, for a longer period of time, the EU Convention was a contract concluded between all the member states of the European Union and the member states of the European Free Trade Association (EFTA), which currently consists of: Norway, Iceland, Switzerland and Liechtenstein. The practice of accession to the EU Convention by individual states is more recent. It started with the admission of Turkey on December 1st, 2012 and continued with the admission of the Republic of North Macedonia on July 1st, 2015, that is, with the admission of the Republic of Serbia on February 1st, 2016. According to the above, as of today, the EU Convention consists of a total of 34 states, namely: 27 EU member states, 4 EFTA member states and 3 individual states.

Accession to the EU Convention is one of the formal prerequisites for full membership of each individual state in the EU. Namely, a country that is interested in EU membership must, at the time of applying for admission, in addition to other fulfilled conditions, have the status of a signatory to the EU Convention for a period of at least 1 year.

The example of the Republic of Croatia is a direct confirmation of the above, insofar as the Republic of Croatia acceded to the EU Convention on July 1st, 2012 and became a member of the EU on June 30th 2013.

Today, the European Union is a political and economic union of 27 member states. According to data from 2021, the EU has about 447 million inhabitants, which is 5.8% of the total world population. With a share of approximately 15% in total world exports, as well as approximately 15% in total world imports, the EU is the largest exporter and importer of goods and services in the world.

The European Union Customs Union (EUCU), which is formally known as the Community Customs Union, is a customs union made up of EU member states, as well as Monaco and the British Overseas Territories of Akrotiri and Dhekelia (The Sovereign Base Areas of Akrotiri and Dhekelia - SBA) located in Cyprus.

At the same time, some separate territories of EU member states do not participate in the Customs Union, as a rule, due to geographical separation from their home states. As an example, we can cite Gibraltar, which represents one of the British Overseas Territories.

In addition to the European Union Customs Union, the EU is also in customs unions with Andorra, San Marino, and Turkey (with the exception of certain goods). The aforementioned Unions are the result of separate bilateral agreements concluded between the EU and each of the aforementioned states.

The following is a presentation of a very special institutional change in the structure of the EU, as well as in the EU Customs Union itself. As a reminder, the United Kingdom consists of four states: England, Scotland, Wales, and Northern Ireland.

According to Brexit (a term derived from “British exit”), the United Kingdom withdrew from the European Union on January 31st 2020. In this connection, note that Northern Ireland, formally part of the United Kingdom of Great Britain and Northern Ireland, and in accordance with the provisions of Brexit, continues to participate in the European single market of goods. Therefore, Northern Ireland is a de facto member of the EU Customs Union. To illustrate the primary benchmarks of the subject convention, below is a view of the introductory part of the text. Namely, the Subject Convention sets out measures for the transportation of goods in transit between the Community and EFTA states, as well as between EFTA member states themselves.

The notion of transporting goods includes loading, re-exporting or storing of goods, as well as introducing a joint transit procedure. In this way, all these actions can be performed independently of the type and origin of the goods. Below is an overview of the basic elements related to the transit procedures of the Union, as well as to the common transit procedures.

The Union transit procedure is used for customs transit operations between EU Member States (and Andorra and San Marino) and is generally applicable to the movement of non-EU goods subject to customs duties and other import charges and EU goods, which on their way from the place of dispatch to the final destination in the EU, should pass through the territory of a third country. The common transit procedure is used for the movement of goods between EU member states, EFTA member states (Iceland, Norway, Liechtenstein and Switzerland), Turkey, the Republic of North Macedonia, Republic of Serbia, as well as Great Britain (from January 1, 2021). The procedure is based on the Convention of May 20th, 1987, whereby these procedures are practically identical to the transit procedures of the Union.

The law on customs transit procedures in the Union is prescribed by the Customs Code of the Union, Regulation (EU) no. 952/2013), in Delegated Regulation of the Commission (EU) no. 2015/2446, in Commission Implementing Regulation (EU) 2015/2447 and Commission Delegated Regulation (EU) 2016/341, as amended. The Transit Handbook deserves special attention, as it is the most comprehensive source of information about the Union and the usual transit procedure. As such, the Handbook is a tool to promote a better understanding of how the transit procedure works, as well as the roles of the various actors.

The transit manual has a total of 9 main parts as follows:

Part I. General Introduction

Part II. Status of Goods

Part III. Guarantees

Part IV: Standard Transit Procedure NCTS (New Computerised Transit System)

Part V: Business Continuity Procedure

Part VI: Simplifications

Part VII: Discharge of the Transit Operation, the Enquiry Procedure

Part VIII: Debt and Recovery

Part IX. The TIR Procedure

The implementation of the EU Convention simplifies and largely eliminates paperwork, which regularly accompanies the transit of goods across international borders. In doing so, all joint transport procedures take place with the involvement of customs offices of departure, border, and destination.

The customs office of departure is the place where declarations are accepted, on the basis of which the goods are released for the transit procedure. At the same time, the customs office of departure is responsible for the acceptance/control/verification of the guarantee and release of the shipment, as well as discharge of the procedure/completion of the movement of goods.

The customs office of destination is responsible for confirmation of receipt and control of the shipment.

As part of the implementation of the EU Convention, the New Computerized Transit System (NCTS) was launched in 2000. The subject system serves as a tool for the management and control of the transit system, which includes each individual transaction of goods transit, with maximum use of the advantages of the electronic system of input, monitoring, control, as well as any necessary interventions.

The EU Convention stipulates the control of goods exclusively during loading at the initial location in the country of export of goods, as well as during unloading at the final destination in the country of import of goods. The movement of goods on the way from the place of loading to the place of unloading, including the customs territories of the country or the country through which the goods pass in transit, is necessarily covered by a guarantee issued by a guarantor based in the country where the goods are loaded for transit.

Law on Confirmation of the Subject Convention, Chapter IV Guarantees, Art. 9 regulates that the principal shall place a guarantee to ensure that the debt that may arise in connection with the transit of goods. The principal is authorized, depending on the needs of his clients, to provide a guarantee for each individual transit procedure or a common guarantee that will cover the risk of multiple individual transit procedures.

The guarantee can be deposited in the form of a cash deposit at the starting customs office or by a guarantor at the customs office.

As a guarantor or the issuer of the guarantee in accordance with the requirements of the EU Convention, depending on the regulatory model of each individual state party to the EU Convention, one of the following institutions may be engaged:

- a commercial bank, as is the case for example in the Republic of Serbia or
- insurance company or
- some third party legal entity, which is authorised by the laws of the country of which it is a resident, to issue guarantees, and in accordance with the requirements of the EU Convention.

As part of preparations for active engagement in connection with the implementation of the EU Convention, it is necessary for a potential guarantor to pay special attention to the following elements:

- to the choice of a client or clients of legal entities and/or entrepreneurs who, according to the national regulations of the home country, are authorised to perform foreign trade operations, i.e., cross-border transport of goods, and for which the guarantor will be ready to issue a guarantee in accordance with the requirements of the EU Convention, with the prior conclusion of a special contracts with each individual client;
- identification of one potential agent in each state party to the EU Convention, who, with previously obtained written consent from the guarantor in the capacity of principal, will be appointed as the agent of the issuer of the transit guarantee in the state of which the agent is a resident;
- assess the readiness of your institution to offer guarantors in other EU Convention signatory states the provision of services as an agent in the state where the guarantor is a resident;
- evaluate the readiness to consider the received official request by the guarantor from another country to accept the mandate of the agent for the country of which they are a resident, and some others.

Once established, the relationship between the guarantor bank from one country and the agent bank from another country, based on the EU Convention, may be followed by the establishment of cooperation in terms of other banking operations and/or financial arrangements, which include, for example, the following types of transactions: issuance of guarantees, opening of letters of credit, confirmation of letters of credit, and participation in syndicated loans, Initial Public Offerings (eng. Initial Public Offering - IPO), as well as numerous other arrangements both in the country of the guarantor and/or in the country of the agent, with the possibility of joint participation of the guarantor and the agent in third markets. This development of cooperation between banks enables the generation of relevant income, as well as the improvement of the rating.

The following is a presentation of a hypothetical situation that could occur in the practice of the joint transit procedure. Namely, a possible event that would represent a problem in connection with the transportation of goods on the territory of one of the signatory states of the EU Convention, would be immediately followed by the reaction of the local customs institution of the respective state. This practically means that the competent customs institution would promptly inform the local agent about the incident, who would report their principal without delay, and act strictly according to their instructions in order to urgently eliminate the problem, or the possible consequences thereof.

In connection with the expected continuation of the process of accession to the EU Convention by new countries, this is also an opportunity to emphasise the special importance of the relevant EU Convention for the affirmation of banks from the Republic of Serbia.

Of course, we are primarily talking about the countries that directly border the Republic of Serbia, namely the Republic of Bosnia and Herzegovina, as well as the Republic of Montenegro. Between Serbia and the mentioned countries, there is a traditionally intensive exchange of goods in terms of foreign trade. Already realised foreign direct investments in the mentioned countries have significantly contributed to the increase in the volume of trade, and such a trend is expected in the future as well.

In addition to the above-mentioned countries, Albania should also be mentioned, which also has developed trade relations with the countries of the Western Balkans, as well as with Greece, Italy and numerous third countries.

In the Republic of Serbia, as well as in the mentioned countries in the region, a large number of banks belonging to leading banking groups from Slovenia, Italy, Hungary, Austria and some third countries operate, which represents a significant element of further improvement of commercial and financial arrangements in the region. This fact is an additional stimulus for the intensification of joint transit procedures.

European Union Convention on Common Transit Procedure provides numerous advantages to all direct and indirect participants, such as producers, exporters, importers, users or consumers and some others. First of all, we are talking about a much faster flow of goods, speeding up traffic at the borders, and an obvious reduction in costs.

In addition to the mentioned advantages, it should certainly be mentioned that the system of cross-border transport of goods enables early detection and more effective suppression of customs violations, which contributes to raising awareness of the necessity of permanent activities against the grey economy, in order to strengthen the integrity of the economy of each member state of the Convention.

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PRIKAZ KNJIGE I POGLED NA PROBLEMATIKU FORENZIČKOG RAČUNOVODSTVA: ŠIRI KONTEKST ZA RISK MENADŽERE

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U knjizi pod naslovom *Forenzičko računovodstvo, istražne radnje, ljudski faktor i primenjeni alati*, na jasan i sistematičan način analiziran je širok spektar tema, strukturisano kroz četiri sekcije, od kojih svaka predstavlja zaokruženu celinu, s teorijskog i praktičnog aspekta. Knjigu odlikuje jedinstven pristup problematici forenzičkog računovodstva i povezanih istražnih radnji, ljudskog faktora i primenjenih alata, koji su predstavljeni kroz 44 tematske jedinice. Date tematske jedinice i problematika knjige rezultat su rada 75 autora, iz različitih institucija iz zemlje i inostranstva. Među njima su univerzitetski profesori, docenti i asistenti sa Fakulteta organizacionih nauka u Beogradu, Fakulteta za hotelijerstvo i turizam u Vrnjačkoj Banji, Ekonomskog fakulteta u Beogradu, Pravnog fakulteta u Novom Sadu, Kriminalističko-policijskog univerziteta, Fakulteta bezbednosti, Fakulteta za specijalnu edukaciju i rehabilitaciju, Ekonomskog fakulteta u Kragujevcu. Značajan doprinos teorijskim i praktičnim implikacijama problematike knjige dali su i profesori i docenti iz inostranstva, i to sa Ekonomskog fakulteta u Banjoj Luci, Pravnog fakulteta „Iustinianus Primus“, Univerziteta „Ćirilo i Metodije“, Univerziteta „Goce Delčev“, Štip. Profesori i predavači sa Beogradske akademije poslovnih i umetničkih strukovnih studija, Visoke poslovne škole strukovnih studija u Novom sadu, Akademije strukovnih studija Južna Srbija, Odseka za poslovne studije Blace, takođe su učesnici ove knjige kroz doprinose njenom sadržaju i kvalitetu. Recenzenti knjige, pored autora ovog prikaza prof. dr Radojka Lukića, jesu prof. dr Marijana Despotović Zrakić, prof. dr Zorica Bogdanović, dr Cvjetana Cvetković, docent i Vladimir Jović, klinički psiholog i specijalista medicinske psihologije.

U predgovoru, autori ističu da materijal u knjizi duguju velikoj i produktivnoj akademiji istraživača i praktičara iz različitih naučnih oblasti, ali mora se istaći ogromna i nadasve velika želja autora da multidisciplinarno, udruženim snagama ova knjiga ugleda svetlost dana. Najveća zahvalnost svakako pripada urednici, prof. dr Snežani Knežević, vanrednoj profesorki sa Fakulteta organizacionih nauka u Beogradu, za „čaroban štapić“ kojim je okupila najbolje stručnjake iz različitih oblasti, i spojila ih u neraskidivo i večno tkivo ove knjige. Motivacija za stvaranjem ove knjige leži duboko ukorenjena u naučnim i praktičnim znanjima urednice i autorâ, što će čitaoci svakako prepoznati.

Cilj okupljanja velikog broja autora, ali i povezanih oblasti, nije samo u istraživačkom tonu, već i teorijskom, i praktičnom značaju koji knjiga ima. S obzirom na značaj prevencije u svim oblastima, prevencija prevare u kontekstu tematike knjige je od velikog značaja. Privredni kriminal je posebno interesantno i aktuelno polje, te se simbioza finansijske, pravne i druge pismenosti nameće kao cilj efikasnog upravljanja privrednim kriminalom u Republici Srbiji.

Knjiga je namenjena upravo zainteresovanim čitaocima iz mnogobrojnih oblasti. To mogu biti studenti svih nivoa studija, poslovnih, računovodstvenih, pravnih usmerenja, ali i oni koji žele da u svoja saznanja integrišu i teme vezane za forenzičko računovodstvo, kao i povezane teme. Pored toga, knjiga je namenjena svim poslenicima na svim nivoima u preduzećima, vlasnicima, menadžerima, računovođama, revizorima itd. Spisak korisnika nije konačan i ne može biti, s obzirom na to da knjigu može čitati svako ko želi da sazna više o prevarama, prevenciji, njihovom otkrivanju i istrazi.

Značaj ove knjige je još veći ako se zna da cilj njenog štampanja nije komercijalni, već distribucija bibliotekama i zainteresovanim korisnicima i institucijama radi obrazovanja u ovoj oblasti, ali i profesionalnom osposobljavanju kadrova u privredi. S tog aspekta, može se reći da ima široko edukativan karakter, budući da motiv izdavanja nije finansijske prirode. Jedna stara narodna poslovice glasi: Trud i rad se uvek isplate.

O značaju ove knjige sudiće čitaoci i kritičari. Njena težina, za čitaoce koji je budu držali u rukama iznosi 1.781 grama, što znači da će morati da naprave pauzu u čitanju, barem između sekcija.

Prvu sekciju, pod nazivom: „Forenzičko računovodstvo, Revizija, Interna kontrola, Finansijska analiza, Upravljačko računovodstvo i etika, Forenzika javnih nabavki, Statistika“, sačinjava 16 radova. Ova sekcija počinje razmatranjem osnova forenzičkog računovodstva (Dragan Cvetković, Đurđica Trivunović Sajić, Stefan Milojević, Veljko Dmitrović, Bojan Cvetković, Aleksandar Grgur). Kako autori ističu, a prema Bošković (1999)¹, reč „forenzički“ potiče od latinske reči forensic, što znači forum ili onaj koji je na trgu. „Forenzika predstavlja interdisciplinarno područje korišćenja različitih naučnih dostignuća i saznanja, kako bi se donele objektivne i argumentovane sudske presude“ (str. 24). Forenzičko računovodstvo, prema autorima, predstavlja jednu od najstarijih profesija koja potiče još iz vremena starih Egipćana. U ovoj sekciji se prikazuju i forenzička, interna i eksterna revizija (Duško Šnjegota). Forenzička revizija predstavlja vrstu revizijske usluge, koja je zasnovana na primeni računovodstvenih i revizorskih veština u svrhu sprovođenja revizorskih procedura sa ciljem otkrivanja kriminalnih radnji u finansijskim izveštajima i njihovim predstavljanjem za sudski postupak (Petković, 2010: 188).² Sledi prikaz interne revizije u funkciji upravljanja rizikom od nastanka prevarnih radnji (Miloš Milošević). Kako autor naglašava, „...sistemi interne kontrole, interne revizije i eksterne revizije poslovanja imaju vodeću ulogu u odbrani od finansijskih prevara. Interna revizija ocenjuje interne kontrolne mehanizme preduzeća, upravljanje, računovodstvene procese, usaglašavanje sa zakonskim i internim regulativama i pouzdano finansijsko izveštavanje, sa ciljem povećanja efikasnosti preduzeća“ (str. 82). U ovoj sekciji dalje se ukazuje na računovodstvene informacione sisteme i prevarne radnje (Aleksandra Mitrović, Marko Milašinović). Autori naglašavaju da računovodstveni informacioni sistemi, svojim razvojem, nude više mogućnosti manipulacije i nastanka prevare. Iako su se organizacijska sredstva menjala, suština računovodstva je i dan-danas ostala ista. Kako autori ističu, a prema McHard (2019)³, „...moje iskustvo je da preduzeće uglavnom ne veruje da će postati žrtva prevare, vlasnici misle da se prevare dešavaju samo drugom preduzeću“. U nastavku je istražena uloga forenzičkog računovodstva u otkrivanju profesionalnih prevara i trendovi njihovog razvoja (Olivera Đurić).

¹Bošković, M. (1999), *Kriminološki rečnik*, Novi Sad: Matica srpska.

²Petković, A. (2010), *Forenzička revizija*, Proleter a.d. Bečej, Novi Sad.

³McHard, J. (CFA, CPA, CFF) (2019), *Don't miss opportunities to help organizations*, *Fraud Magazine*, Septembar/October 2019, 46–47.

Prema Gordon Brown, a kako ističe autor: „Ono što je upotreba otisaka prstiju bila u 19. veku, a DNK analiza u 20. veku, to će forenzičko računovodstvo biti u 21. veku.“ Sagledan je i uticaj prevarnih radnji na mala porodična preduzeća i internu kontrolu (Dragoljub Simonović). Prema autoru: „Prevara u malom porodičnom preduzeću se nikada ne očekuje, ali je još neočekivanija kada je izvrši neko iz vašeg preduzeća“ (str. 161). I mala porodična preduzeća su sklona prevarama, te je potrebno upravljati rizikom od prevare i razviti programe u borbi protiv prevara. Autor ističe da su interna kontrola i interna revizija važne funkcije u zaštiti preduzeća od prevara. U knjizi je takođe sagledano upravljanje zaradom kao oblikom kreativnog računovodstva, a dat je i osvrt na specifičnosti upravljanja rizikom od pranja novca i finansiranja terorizma u poslovnim bankama (Marija Milojević, Aleksandar Živković). Upravljanje zaradom može biti manipulativni oblik finansijskog izveštavanja, a u ovom radu ukazano je i na specifičnosti upravljanja rizikom od pranja novca i finansiranja terorizma, na primeru poslovnih banaka. Ova sekcija govori i o prevarnim radnjama u zdravstvu i specifičnostima njihovog identifikovanja (Stefan Nikolovski, Stefan Milojević, Jana Cvijić).

Prema autorima, „prevara u zdravstvu predstavlja namernu obmanu ili lažno predstavljanje činjenica, odnosno akcija koje učesnik u sistemu zdravstvene zaštite čini i za koje zna da su lažne, a pomoću kojih može imati neku neovlašćenu korist“ (str. 200). Autori ističu, a prema Gruen i Howarth (2005)⁴, da svaki član osoblja treba da bude odgovoran za zaštitu resursa u svojoj zoni odgovornosti i da se oseća ohrabrenim da prijavi bilo kakve nepravilnosti nadređenim osobama.

Kao logičan nastavak ove sekcije, dat je prikaz prevara u finansijskim izveštajima (Dragomir Dimitrijević). Ovaj rad na početku govori o motivima za ostvarivanje prevara, a zatim konkretno o prevarama u finansijskim izveštajima. Pored toga, ukazano je i na znake upozorenja za otkrivanje prevara u finansijskim izveštajima. Autor ističe „da je praksa mnogobrojnih finansijskih prevara u prošlosti pokazala da od svih znakova upozorenja, najčešće do otkrivanja prevara dovode promene u ponašanju i u načinu života počinioca prevara, kao i računovodstvene anomalije, koje se teško otkrivaju, ali skoro uvek dovode do otkrivanja prevara i počinioca“ (str. 236). Ovaj deo sadrži i osnove statistike za forenzičare (Aleksandar Đoković, Nikola Cvetković), kao izuzetno značajnoj temi. Statistika je značajan alat koji se koristi u analizi finansijskih podataka, prema autorima, „da bi se pronašle i otkrile zakonitosti koje vladaju i doneli odgovarajući zaključci uz primenu adekvanih tehnika“ (str. 242). Prikazan je i uticaj nematerijalne imovine na vrednost kompanija u uslovima globalne digitalizacije (Milenko Radonić), imajući u vidu značaj razumevanja nematerijalne imovine kroz forenzičko računovodstvo. Autor postavlja pitanje, „ko je vlasnik informacija, ako se ima u vidu da su digitalizacija i globalizacija pružile mogućnost brzog pristupa velikoj količini podataka“. Takođe se naglašava da su vlasnici najvećeg broja informacija danas pripadnici GAFA grupe, koju čine najveće svetske kompanije, kao što su Google, Amazon, Facebook i Apple (str. 284).

Zbog značaja u poslovanju, u ovom delu su javne nabavke sagledane kroz finansijsku forenziku javnih nabavki (Marko Špiler). Početak rada i razmatranja predstavlja isticanje da je u našoj zemlji sistem javnih nabavki regulisan 2002. godine donošenjem Zakona o javnim nabavkama⁵.

⁴ Gruen, R. & Howarth, A. (2005), *Financial Management in Health Services*. New York, NY: Open University Press. Zakon o javnim nabavkama, Službeni glasnik RS, broj 39/02.

⁵ Law, P. (2011), *Corporate governance and no fraud occurrence in organizations: Hong Kong evidence, Managerial Auditing*

Forenzika javnih nabavki, prema autoru, „treba da inkorporira saznanja različitih naučnih oblasti i koristi različita tehnička sredstva i metode kako bi utvrdila postojanje nepravilnosti ili izvršenje krivičnog dela, procenila posledice i pomogla da se otkrije počinitelj“ (str. 300). U nastavku su objašnjene i forenzičke računovođe i prevarne radnje u procesu nabavke (Dušan Purić, Marko Milašinić, Bosiljka Srebro, Zdravka Petković). Prema Law (2011)⁶, a kako autori ističu, „prevara je možda jedan od najozbiljnijih problema i izazova u trenutnom poslovnom okruženju“, a prevare kod nabavki su takoreći najrasprostranjenije prevare. Veliki značaj za prevarne radnje je u tzv. red flags, te su sagledani i indikatori prevarnog finansijskog izveštavanja, konkretno kako prepoznati prevarne radnje (Snežana Knežević, Jelena Stojanović Alcaraz, Stefan Milojević). Kako ističu autori, jednu od najsveobuhvatnijih podela prevara prema sektoru u kome nastaju, na privatni i javni sektor dao je Doig (2016)⁷. Ovaj rad počinje definisanjem i vrstama prevarnih radnji, zatim prikazuje crvene zastavice kao indikatore prevarnih radnji. U nastavku, rad govori o identifikovanju prevarnih radnji i predviđanju finansijskih manipulacija, ali i pogledu na odgovornosti revizora u otkrivanju prevara u finansijskim izveštajima. Ova sekcija uključuje i prikaz evaluacije finansijskih performansi malog ugostiteljskog preduzeća i nefinansijske mere, uz pomoć studije slučaja (Jovan Travica, Milan Vujić, Javorka Travica, Stefan Milojević, Tamara Vujić). Analiza je sprovedena na osnovu racio pokazatelja za trogodišnji period, a na osnovu podataka u finansijskim izveštajima, i tako su identifikovane ključne tačke koje su važne za donosiocje odluka. Poglavlje završava elaboriranjem etičkih načela kao temelja upravljačkog računovodstva (Tijana Obradović). Pored ukaza na značaj etike u upravljačkom računovodstvu, dat je i pregled postojećih standarda u upravljačkom računovodstvu, ali i faktora uticaja na etičko ponašanje. Nakon toga, sagledana je uloga upravljačkog računovodstva u prevenciji prevarnih radnji u organizacijama, ali i na izvore neetičkog ponašanja upravljačkih računovođa i načinima borbe protiv njih.

Druga sekcija, pod nazivom: „Istražne radnje, Poreska evazija, Veštačenje, Pranje novca i finansiranje terorizma“ sastavljena je iz 13 radova. Počinje prikazom destrukcije finansijskih transakcija u funkciji legalizacije kriminalnog prihoda u savremenom okruženju (Aleksandar Čudan, Stefan Tomašević).

Ovaj istraživački rad definiše hipotezu koja glasi: „Rizike pranja novca i nove tehnike njegovog integrisanja nije moguće eliminisati, ali je nužno učiniti napore i preduzeti adekvatne mere na njihovom minimiziranju“ (str. 400). Pored ostalih vidova, autori ističu da „u skorije vreme dovoljno poznat metod pranja novčanih sredstava, predstavlja fiktivno trgovanje umetninama i antikvitetima – najskuplje prodane slike u istoriji umetnosti Salvador mundi, Leonardno da Vinči, 453,3 miliona dolara (2017) i Kada ćeš se udati?, Pol Gogen, 300 miliona dolara (2015)“. (str. 413). Radom je istaknuta i legalizacija kriminalnog prinosa u procesu privatizacije. Ovim poglavljem, sagledane su i specifičnosti prevarnog kriminaliteta i subjekti njegovog suzbijanja (Dragan Cvetković, Zoran Morić, Božidar Banović). Naglašeno je da privredni kriminalitet predstavlja opasnu, dinamičnu pojavu i da posledice po društvo mogu biti višestruke: narušeno funkcionisanje privrede, stvaranje nelojalne konkurencije na tržištu, smanjenje kvaliteta javnih usluga usled smanjenja budžetskih prihoda i drugo (str. 418). Prema Walklate (2007)⁸, a kako ističu autori, privredni kriminalitet je složen kriminološki i pravni fenomen koji je nastao u savremenom društvu sa razvojem tržišta i privrede.

⁶ Journal, 26(6), 501–518.

⁷ Doig, A. (2016), *Fraud: The Counter Fraud Practitioner's Handbook*. Routledge.

⁸ Walklate, S. (2007), *Criminology: the basics*. London: Routledge.

Ovim radom su, pored pojmovnog određenja privrednog kriminaliteta i pojava oblika, prikazani i subjekti preventivno-represivnog postupanja u suzbijanju privrednog kriminaliteta, kao i stanje i tendencije kretanja privrednog kriminaliteta u Srbiji. Dalje su elaborirane teme veštačenja rukopisa, potpisa i dokumenata (Dunja Mekterović). Izuzetan značaj predstavlja i činjenica, a kako ističe autor, „da su pisana dokumenta bila rasprostranjena još u staroj Grčkoj i starom Rimu i da su se već tada javljali falsifikati dokumenta, te se ističe značaj veštačenja. Isto tako, grafologija je oblast koja se bavi ispitivanjem karaktera lica čiji rukopis se proučava i kao takva nije priznata kao dokaz na sudu, dok je veštačenje rukopisa i potpisa komparativna forenzička metoda koja se bavi identifikacijom skriptera, spornog rukopisa ili potpisa, i kao takva je priznata kao relevantan dokaz na sudu“ (str. 451).

U radu je detaljno sagledano veštačenje dokumenata pisanih rukom. Ova sekcija govori i o pojmu i pojavnim oblicima poreske evazije (Goran Milošević, Mirko Kulić). Autori naglašavaju da „prisustvo poreske evazije duži niz godina u okvirima srpske privrede ukazuje na to da se veliki iznosi novčanih sredstava i robe kreću izvan sistema oporezivanja, što narušava privredni sistem i sve aspekte ekonomske, socijalne i političke stabilnosti zemlje“ (str. 463). U ovoj sekciji, zbog svog značaja, obrađeno je i pranje novca kroz pravne aspekte (Jasmina Paunović). Autor ističe da je „pranje novca pretvaranje 'prljavog' novca u 'čist', odnosno proces koji traje, a zbog prikrivanja nelegalnih izvora prihoda, kako bi se na kraju uveo u legalne tokove“ (str. 478). Autor takođe ističe, zašto novac, kada se kriminalnim aktivnostima stiču i drugi oblici imovine, i da je to sigurno jer novac predstavlja najkvalitetniju robu, koja je zamenjiva za svaki drugi vid imovine (str. 478). Ovaj rad daje poseban doprinos literaturi kroz teorijske i praktične implikacije, a naročito prikazom studije slučaja kroz analizu predmeta. Forenzički intervjui, kao ključni korak o otkrivanju kriminalnih radnji, dati su u nastavku (Dragan Cvetković, Dragan Kecman, Želimir Kešetović). Prema Breakwell (2007)⁹, a kako autori ističu, biti dobar ispitivač znači mnogo više nego postavljati pitanja na koja želimo da dobijemo odgovor, a biti uspešan ispitivanik znači mnogo više nego odgovarati na postavljena pitanja. Kako ističu Golden i sar. (2006)¹⁰, a autori navode, intervju je razgovor sa svrhom, a svrha vođenja intervjua je prikupljanje informacija, ponekad i priznanje. U ovom delu, takođe je sagledana i finansijsko-računovodstvena forenzika za sudsko veštačenje, kroz suštinske pojmove, regulative i praktičan primer (Željko Babić).

U radu je ukazano na ključnu zakonsku regulativu vezanu za tretiranu problematiku, dat je pregled stručnih lica u kaznenim postupcima (finansijski forenzičar, sudski veštak, stručni savetnik, zaposleni u jedinicama MUP-a za finansijske istrage i stručna lica angažovana od strane jedinice – finansijski istražitelji (str. 550). U nastavku je detaljno prikazan postupak utvrđivanja posebnog poreza (Luka Baturan), regulisanog u Zakonu o utvrđivanju porekla imovine i posebnom porezu. Odredbe ovog zakona su posmatrane u kontekstu drugih zakona koji već uređuju materiju poreskog postupka kao vrste upravnog postupka, odnosno poreskog nadzora kao inspekcijskog nadzora (str. 566). Ovim radom, između ostalog, opisan je tok prvostepenog postupka utvrđivanja posebnog poreza, žalba protiv rešenja o utvrđivanju posebnog poreza, kao i organ nadležan za vođenje postupka utvrđivanja posebnog poreza. U ovoj sekciji dat je i teorijski osvrt na finansiranje terorizma i povećanje kapaciteta finansijsko-obaveštajnih službi (Dragan Živković, Žarko Radojičić). Rad počinje pojmovnim određenjem finansiranja terorizma, kroz modalitete finansiranja terorizma i upotrebu legalnih i nelegalnih sredstava i imovine.

⁹ Breakwell, G. (2007), *Vještine vođenja intervjua*, Naklada Slap, Zagreb.

¹⁰ Golden, T., Skalak, S. & Clayton, M. (2006), *A guide to forensic accounting investigation*: Hoboken, New Jersey, John Wiley & Sons, Inc.

Razmatraju se i vrste zahteva za finansiranje terorizma, kao i uloga i značaj finansijsko-obaveštajnih službi u funkciji povećanja kapaciteta u borbi protiv pranja novca i finansiranja terorizma i njihovo funkcionisanje. U nastavku poglavlja, sagledana je i Poreska policija (Boban Ničić). Organizacioni aspekti Poreske policije i pojam krivičnih dela iz nadležnosti Poreske policije su deo ovog rada. Takođe su obrađeni i ključni oblici poreske evazije. Autor navodi da finansijski kriminal i kriminal belog okovratnika postaju iz godine u godinu sve sofisticiraniji. Zato se i ističe Poreska policija kao organ koji se bavi suzbijanjem poreskih krivičnih dela pred stalnim novim izazovima u pronalaženju načina da se stane na put takvoj pojavi (str. 648). U nastavku je objašnjena detekcija i prevencija pranja novca, kroz pravni i finansijski aspekt (Uglješa Mrdić). Kao što autor ističe, a prema Zali i Maulidi (2018)¹¹, suštinski element u procesu pranja novca je pretvaranje širokog spektra ilegalnih sredstava, uključujući i prihod od korupcije zvaničnika, od uličnog kriminala, korporativnih prevara, mita, pa čak i od finansiranja terorizma, u očigledno legitiman prihod. Pored pranja novca, ovaj rad definiše i proces pranja novca, posledice od pranja novca, merenje obima pranja novca i procene obima pranja novca. Sagledana je i zastupljenost problema pranja novca i uobičajene tehnike i alati koji se koriste u procesu pranja novca, kao i naponi u sprečavanju pranja novca. U nastavku je sagledana uloga poreskih inspektora i forenzičkih revizora, izazov za računovođe, kao i koje su to globalne mere protiv pranja novca, tipologije pranja novca i specifične metode prevencije. Ukazano je i na izgled za prevenciju i opstanak pranja novca u budućnosti.

U ovom poglavlju, prikazana je i studija slučaja koja govori o simulaciji realnog primera iz prakse o mogućnostima nastanka prevarne radnje u postupku obezvređivanja imovine u privatizaciji (Dragan Vasilev). Ovim radom se prikazuje procena u funkciji umanjenja vrednosti imovine preduzeća. Izuzetno je značajan sa aspekta korisnika koji žele da sagledaju način na koji se obezvređuje imovina privatizovanog preduzeća. Na kraju ove sekcije, prikazane su prevarne radnje, kroz quo vadis (Miloš Lukić, Đorđe Mihailović, Slavica Đurić Dakić, Jelena Runjić). Kako autori naglašavaju, a prema Button, Lewis i Tapley (2009)¹², većina žrtava prevara želi da vrati svoj novac i vidi prestupnika izvedenog pred lice pravde. Ovim radom su sagledani tipovi i izvori podataka koje organi reda koriste u sprečavanju i procesuiranju prevarnih radnji, kao i specifičnost prevara izvršenih putem interneta i njihova istraga.

Treća sekcija, pod nazivom: „Ljudski faktor, Forenzička fonetika, Bezbednost“ prikazana je kroz šest radova. Počinje prikazom selekcije ljudskih resursa i prevarnim radnjama (Tatjana Ivanović). Kontraproduktivno ponašanje na radnom mestu podrazumeva, prema Fine i sar. (2010)¹³, a kako navodi autor, postupke zaposlenih koji su u suprotnosti sa ciljevima i svrhom organizacije. Radom je opisano otkrivanje kandidata za posao sklonih prevarnim radnjama, kao i tehnike procene integriteta kandidata za posao. Nakon toga, u ovoj sekciji se govori i o prevarama u finansijama, konkretno o ljudskom faktoru kroz korene i prevenciju (Ivan Marković, Nikola Vasiljević). Norme i principi ljudskog ponašanja prikazani su nakon uvodnih razmatranja u radu. Opisujući delinkventno ponašanje, autori razmatranja počinju citatom Petra Petrovića Njegoša, iz Gorskog vijenca: „Kome zakon leži u topuzu tragovi mu smrde nečovještvom“ (str. 756). Ličnost i prevaru kao deo ovog rada počinju citatom Kluckhohn i Murray, (1953)¹⁴: „Svaki čovek je kao svi drugi ljudi, kao neki drugi ljudi i kao nijedan drugi čovek“ (str. 762). U radu se govori i o profilisanju.

¹¹Zali, M. & Maulidi, A. (2018), *Fighting Against Money Laundering*, *Brics Law Journal*, 5(3), 40–63.

¹²Button, M., Lewis, C., Tapley, J. (2009). *A better deal for fraud victims: Research into victims needs and experiences*, London: NFA.

¹³Fine, S. Horowitz, I., Weigler, H., Basis, L. (2010). *Is character good enough? The effects of situational variables on the relationship between integrity and counterproductive work behaviors*, *Human Resource Management Review*, 20, 73–84.

¹⁴Kluckhohn, C., Murray, A.H. (1953). *Personality in Nature, Society and Culture*, New York.

Psihološki aspekti u identifikovanju prevarnih radnji u finansijskim izveštajima prikazani su u nastavku (Stefan Milojević). Autor ukazuje da „interesovanje za ispitivanje psiholoških profila osoba koje čine prevarne radnje raste poslednjih decenija i sve je više istraživanja koja definišu nove tipologije ličnosti sklonih činjenju prevarnih radnji“ (str. 786). Ovim radom je sagledana tipologija prevaranata i profil ozbiljnih počinioca prevare.

Takođe je ukazano na mikroekspresije i obmanu, njihovu pouzdanost kao pokazatelja prevare, kao i uočljivost i ulogu u razlikovanju istine od obmane. Ukazuje se i na prevare kao uzrok nedoslednog i nekontrolisanog emocionalnog izraza, mikroekspresije kao validni i pouzdani pokazatelji prevare, povezanost sposobnosti prepoznavanja mikroekspresija i otkrivanja prevara i, na kraju, uloge informacionih tehnologija u otkrivanju počinilaca prevarnih radnji. Sledi prikaz prevarnih radnji i ljudskog faktora (Srđan Nikolovski, Stefan Milojević, Jasminka Marjanović), takođe u okviru ove sekcije. Ovim radom prikazana su tri elementa prevarnih radnji.

Nakon toga, misaproprijacija i uticaj ličnosti na radno ponašanje, dimenzije i kategorije prevara. Što se tiče psiholoških faktora prevara, isuviše bi pojednostavljeno bilo objašnjenje iste - pohlepa i nepoštovanje. Do danas, naučnici o ponašanju, a prema prikazu autora, nisu bili u stanju da identifikuju psihološku karakteristiku koja služi kao validan i pouzdan pokazatelj sklonosti pojedinca da izvrši prevaru (str. 813).

Po pitanju budućnosti ispitivanja faktora ličnosti u prevenciji prevarnih radnji, Weber i Dwoskin (2014)¹⁵ ističu, a prema navodu autora, da upotreba testova ličnosti od strane poslodavaca u procesu procene osobina pojedinaca, kao i veština, kognitivnih sposobnosti i drugih osobina, u poslednjoj deceniji raste. Ova sekcija govori i o forenzičkoj fonetici, identifikaciji govornika (Mia Šešum). Prema autoru, „finansijska fonetika podrazumeva primenu metoda i tehnika analize glasa i govora u cilju rasvetljavanja kriminalnih dela, a identifikacija govornika je najkompleksnija oblast forenzičke fonetike i smatra se najsloženijom forenzičkom disciplinom“ (str. 828). Bezbednosni aspekti zaštite kritične infrastrukture u antropogenim katastrofama, uz pomoć studije slučaja Beograda, takođe su deo ove sekcije (Vladimir Cvetković, Andrija Kezunović). U ovom radu je ukazano i na fenomenologiju antropogenih katastrofa i zaštitu kritične infrastrukture. Pored toga, izvršena je analiza rezultata istraživanja, te je zaključeno da, „ukupno posmatrano, rezultati anketnog istraživanja ukazuju da su ispitanici uglavnom informisani o tome šta je kritična infrastruktura, a šta su tehničko-tehnološke katastrofe i katastrofe uopšte“ (str. 875). Isto tako, ističe se da je prevencija ključna za ublažavanje njihovih posledica.

Četvrta sekcija, pod nazivom: „Primenjeni alati, Poslovni modeli, Statistika, Digitalizacija, Korporativna društvena odgovornost“ sastoji se od devet radova. Ova sekcija počinje elaboriranjem pajžajber bezbednosti i digitalne forenzike, kroz makedonsku perspektivu (Hristina Runcheva Tasev, Aneta Stojanovska-Stefanova, Milena Apostolovska Stepanoska).

Prema Sammons (2015)¹⁶, a ukazom autora, najbolji naučni dokazi na svetu su bezvredni ako su neprihvatljivi na sudu. U radu je prikazan makedonski zakonodavni okvir za pajžber bezbednost i institucionalni kapaciteti, kao i ciljevi i očekivanja nacionalne strategije pajžber bezbednosti. Ovaj rad je u velikoj meri značajan, s obzirom na to da je dosadašnji prikaz problema istraživanja Republike Srbije dopunjen ovim radom kroz prizmu Severne Makedonije. Studija slučaja o biznis modelu Airbnb kompanije prikazana je u nastavku (Dušan Marković). To je učinjeno uz pomoć prikaza istorijata kompanije, biznis modela i situacione analize.

¹⁵Weber, L. & Dwoskin, E. (2014), *Are workplace personality tests fair?*, Wall Street Journal, September 9.

¹⁶Sammons, J. (2015), *Osnove digitalne forenzike – Priručnik za početak rada u digitalnoj forenzici*, Elsevier.

Jedno od glavnih pitanja koje se postavlja, prema gledištu autora, jeste „da li vlasnik kompanije namerno povećava troškove marketinga kako bi 'naštelovao' poslovni rezultat na kraju godine i izbegao plaćanje poreza“ (str. 921).

Pokušaj da se odgovori na ovo pitanje dat je prikazanom studijom slučaja. Sledi primena spreadit alata u finansijsko-forenzičkoj analizi finansijskih izveštaja i sprečavanju finansiranja terorizma i pranja novca (Slobodan Antić, Lena Đorđević Milutinović, Nikola Vuksanović¹⁷). Različite su definicije spreaditova, prema autorima.

Čini se prigodnim navesti da, prema Antić i Đorđević (2018), a kako navode autori: Spreadit programi nalaze primenu u širokom opsegu organizacionih funkcija, u različitim oblastima industrije, prilikom ostvarenja različitih poslovnih ciljeva. Rad govori o pojmovnom određenju spreadit inženjerstva, pojmu spreadit modela i simulacionim spreadit modelima. Isto tako, ukazuje na utvrđivanje nivoa rizika od pranja novca i finansiranja terorizma u radu finansijskih institucija. U nastavku je dat razvoj spreadit modela i aplikacije za utvrđivanje nivoa rizika od pranja novca i finansiranja terorizma u radu finansijskih institucija. Prikazano je i forenzičko računovodstvo i razvoj spreadit modela i aplikacije za finansijsko-forenzičku analizu finansijskih izveštaja. Identifikovanje prevarnih radnji primenom Benfordovog zakona na uzorku preduzeća, čije akcije se nalaze u okviru sektora A-poljoprivreda, šumarstvo i ribarstvo na Beogradskoj berzi¹⁸, prikazano je takođe u ovoj sekciji (Bojan Mavrenski, Vesna Bogojević Arsić, Snežana Knežević). Ovaj rad počinje elaboriranjem Benfordovog zakona anomalijских brojeva kroz detalje. Benford (1938) je primetio da su mnogo više istrošene prve stranice logaritamskih tablica, što ukazuje na činjenicu da više traženih brojeva počinje cifrom 1, nego cifrom 9. Ovaj rad je i više nego značajan, jer prikazuje primenu Benfordovog zakona na uzorku preduzeća čije akcije se nalaze u okviru sektora A-poljoprivreda, šumarstvo i ribarstvo na Beogradskoj berzi, pojedinačno za svako preduzeće. Pored toga, u ovoj sekciji je izvršena i analiza problema da li su ESG prevare od značaja za investitore (Milica Latinović). Kako autor naglašava, „strategija integracije zaštite životne sredine, društvene odgovornosti i korporativnog upravljanja (ESG) jedna je od najpopularnijih investicionih strategija u svetu“ (str. 1036). Arens i sar. (2017), a prema citatu autora, prevaru definišu kao svaku namernu obmanu kojom se želi lišiti druga osoba ili strana njihove imovine ili prava. Rad govori i o ESG i prevarnim radnjama i ekomaniplacijama u automobilskoj industriji. Blok-lanac i sektor finansijskih usluga su takođe deo ove sekcije (Vesna Tornjanski). Na početku je definisan blok-lanac, kao decentralizovana digitalna knjiga, kao i razvoj i buduća perspektiva. Dat je prikaz i blok-lanca i sektora²⁰ finansijskih usluga. U nastavku sledi prikaz Excel alata za forenziku, kroz identifikovanje nepravilnosti u podacima (Aleksandar Marković, Nikola Zornić). Kao što ističu autori, a prema Knežević (2019), nepravilnosti mogu biti i nenamerne, ali ih u svakom slučaju treba otkriti i korigovati na odgovarajući način. Ovaj rad prikazuje tehnike za otkrivanje nepravilnosti u podacima. Data je revizija formula, identifikovanje dupliranih transakcija, analiza transakcija sa zaokruženim brojevima, identifikovanje transakcija koje odstupaju od uobičajenih.

¹⁷Antić, S. i Đorđević, I. (2018), „Upravljački modeli i aplikacije u spreaditovima“, u: Benković, S. (eds.): *Finansijski menadžment, kontrola i menadžersko računovodstvo*, 245–277. Beograd: Fakultet organizacionih nauka.

¹⁸Benford, F. (1938), *The Law of Anomalous Numbers, Proceedings of the American Philosophical Society*, 551–572.

¹⁹Arens, A., Elder, R., Beasley, M. & Hogns, C. (2017), *Auditing and Assurance Services: An Integrated Approach*, USA: Pearson Education, Inc.

²⁰Knežević, S. (2019), *Finansijsko izveštavanje (samostalno izdanje autora)*, Valjevo.

Nakon toga, prikazano je pronalaženje nedostajućih brojeva dokumenata, modeli za određivanje vrednosti kompanije, određivanje vrednosti akcija, korišćenjem diskontovanih novčanih tokova i modela diskontovanih dividendi. Lingvopsihološki prediktori upravljanja dobitkom, prikazani kroz empirijsko istraživanje, takođe su deo ove sekcije (Mina Bulatović, Miloš Milosavljević). Cilj istraživanja je ispitivanje složenosti narativa finansijskih izveštaja, posebno uticaj složenih jezičkih formi kao jednog od osnovnih činilaca koji mogu uticati na upravljanje zaradom. Sprovedenim istraživanjem utvrđeno je da kompleksnost narativa, merena brojem reči i brojem sastavnih priloga u engleskom jeziku, bitno utiče na upravljanje dobitkom. Autori u vezi s kreativnim računovodstvom ističu „da se odnosi na računovodstvenu manipulaciju, ujednačavanje dobitka, agresivno računovodstvo ili lažno finansijsko izveštavanje“ (str. 1101). Poglavlje i knjiga završavaju kroz prikaz praktičnog pogleda na digitalnu imovinu u savremenom okruženju (Stefan Stojanović). Digitalne valute i regulative su deo ovog rada, a nakon njihovog elaboriranja sledi uvod u kriptovalute.

Nakon toga je sagledano investiranje i prevarne radnje, i dat primer trgovanja kriptovalutama.

Na osnovu prethodnog prikaza poglavlja, može se zaključiti da su u prikazanoj knjizi pod nazivom: Forenzičko računovodstvo, istražne radnje, ljudski faktor i primenjeni alati, na argumentovan način analizirane relevantne teme iz forenzičkog računovodstva i povezanih oblasti, te je s tim u vezi i značaj knjige višestruk. Knjiga je upotrebljiva za unapređenje kako teorijskih, tako i praktičnih osnova.

Sa aspekta jednog od recenzenata ove knjige, naglašavam njenu originalnost i značaj koji sublimiranje prikazanih tema ima po teoretičare i praktičare, tj. njene korisnike. Slobodno se možemo uveriti da knjiga predstavlja jedno od najobimnijih dela iz ove oblasti, iskazana na **1132 strane**, modernog dizajna i, pre svega, zanimljive, aktuelne i korisne sadržine. Na zdravlje i korist mnogih generacija, budimo odgovorni i obrazujmo se. Obrazovanje je ključ razvoja, a razvoj pretpostavlja stalno napredovanje. U svetlu napretka, javljaju se i izazovi, a izazova i prevara će biti sve dok je čoveka. **Zato, neka ova knjiga služi razvoju čovečnosti među ljudima.**

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BOOK REVIEW AND AN OVERVIEW OF THE ISSUES OF FORENSIC ACCOUNTING: A BROADER CONTEXT FOR RISK MANAGERS

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In the book entitled *Forensic Accounting, Investigative Actions, Human Factor and Applied Tools*, a wide range of topics is analysed in a clear and systematic way, structured through four sections, each of which is a rounded whole, from a theoretical and practical point of view. The book is characterised by a unique approach to the issue of forensic accounting and related investigative actions, human factor and applied tools, which are presented through 44 thematic units. The given thematic units and issues presented in the book are the result of the work of 75 authors, from various institutions from Serbia and abroad. Among them are university professors, assistant professors and assistants from the Faculty of Organisational Sciences in Belgrade, the Faculty of Hotel Management and Tourism in Vrnjačka Banja, the Faculty of Economics in Belgrade, the Faculty of Law in Novi Sad, the Criminalistics and Police University, the Faculty of Security, the Faculty of Special Education and Rehabilitation, and the Faculty of Economics in Kragujevac. Professors and assistant professors from abroad, from the Faculty of Economics in Banja Luka, Faculty of Law „Iustinianus Primus“, „Cirilo i Metodije“ University, „Goce Delčev“ University in Štip, made a significant contribution to the theoretical and practical implications of the book's themes. Professors and lecturers from the Belgrade Academy of Business and Art Vocational Studies, the Business School of Vocational Studies in Novi Sad, the South Serbia Academy of Vocational Studies, the Blace Department of Business Studies, also participated in this book through their contributions to its content and quality. The reviewers of the book, in addition to the author of this review, prof. Radojko Lukić, PhD, are prof. Marijana Despotović Zrakić, PhD, prof. Zorica Bogdanović, PhD, Cvjetana Cvetković, PhD, docent, and Vladimir Jović, clinical psychologist and specialist in medical psychology.

In the preface, the authors point out that they owe the material in the book to a large and productive academy of researchers and practitioners from various scientific fields, but it must be emphasised that the authors expressed great desire for this book to see the light of day through their multidisciplinary, combined forces. The greatest gratitude certainly goes to the editor, prof. Snežana Knežević, PhD, associate professor from the Faculty of Organisational Sciences in Belgrade, for the „magic wand“ with which she brought together the best experts from different fields and joined them in the inseparable and eternal fabric of this book. The motivation behind the creation of this book lies deeply rooted in the scientific and practical knowledge of the editor and the author, which readers will certainly recognise.

The goal of bringing together a large number of authors, but also related fields, is not only reflected in the research tone, but also in the theoretical and practical importance that the book has. Given the importance of prevention in all areas, fraud prevention in the context of the book's subject matter is of great prominence. Economic crime is a particularly interesting and relevant field, and the symbiosis of financial, legal, and other literacy is imposed as the goal of effective management of economic crime in the Republic of Serbia. The book is intended for interested readers from many fields. These can be students of all levels of studies, business, accounting, legal fields, but also those who want to learn about issues related to forensic accounting, as well as related topics. In addition, the book is intended for all employees at all levels in companies, for owners, managers, accountants, auditors, etc. This list of intended audiences is not exhaustive and cannot be so, given that the book can be read by anyone who wants to learn more about fraud, prevention, detection, and investigation.

The importance of this book is even greater bearing in mind that the goal of its printing is not commercial, but distribution to libraries and interested users and institutions for the purpose of education in this area, but also professional training of personnel in the economy. From that aspect, it can be said that it has a broadly educational character, since the motive behind its publication is not of a financial nature. An old proverb says: Hard work always pays off.

The importance of this book will be judged by readers and critics. Its weight, for readers who will hold it in their hands, is 1,781 grams, which means that they will have to take a break in reading, at least between sections.

The first section, entitled: "Forensic Accounting, Audit, Internal Control, Financial Analysis, Management Accounting and Ethics, Public Procurement Forensics, Statistics", consists of 16 papers. This section begins with a review of the basics of forensic accounting (Dragan Cvetković, Đurdica Trivunović Sajić, Stefan Milojević, Veljko Dmitrović, Bojan Cvetković, Aleksandar Grgur). As the authors point out, and according to Bošković (1999), the word "forensic" comes from the Latin word *forensis*, which means "forum", or "one that is in the square". "Forensics is an interdisciplinary field of using various scientific achievements and knowledge, in order to make objective and reasoned court judgments" (p. 24). Forensic accounting, according to the authors, is one of the oldest professions that dates back to the time of the ancient Egyptians. In this section, forensic, internal and external audits are presented (Duško Šnjegota). Forensic audit is a type of audit service, which is based on the application of accounting and auditing skills for the purpose of conducting audit procedures with the aim of detecting criminal acts in financial statements and presenting them for court proceedings. (Petković, 2010: 188)¹. The following is a presentation of internal audit in the function of managing the risk of fraud (Miloš Milošević). As the author emphasizes, "...internal control systems, internal audits and external business audits play a leading role in the defence against financial fraud. Internal audit evaluates the company's internal control mechanisms, management, accounting processes, compliance with legal and internal regulations and reliable financial reporting, with the aim of increasing the company's efficiency" (p. 82). In this section, accounting information systems and fraudulent actions are further pointed out (Aleksandra Mitrović, Marko Milašinović). The authors emphasise that accounting information systems, with

¹Petković, A. (2010), *Forenzička revizija*, Proleter a.d. Bečej, Novi Sad.

with their development, offer more opportunities for manipulation and fraud. Although the organisational means have changed, the essence of accounting has remained the same to this day. As the authors point out, and according to McHard (2019)² "...my experience is that the company generally does not believe that it will become a victim of fraud, the owners think that frauds only happen to other companies". In the following, the role of forensic accounting in the detection of professional frauds and the trends of their development are investigated (Olivera Đurić).

According to Gordon Brown, and as the author points out: "What the use of fingerprints was in the 19th century, and DNA analysis in the 20th century, forensic accounting will be in the 21st century." The impact of fraud on small, family-owned companies and internal control was also analysed (Dragoljub Simonović). According to the author: "Fraud in a small family business is never expected, but it is even more unexpected when it is committed by someone from your business" (p. 161). Even small family businesses are prone to fraud, so it is necessary to manage the risk of fraud and develop anti-fraud programs. The author points out that internal control and internal audit are important functions in protecting companies from fraud. The book also looks at earnings management as a form of creative accounting, and gives an overview of the specifics of money laundering and terrorist financing risk management in commercial banks (Marija Miložić, Aleksandar Živković). Earnings management can be a manipulative form of financial reporting, and this paper also points out the specifics of money laundering and terrorist financing risk management, using the example of commercial banks. This section also talks about fraudulent activities in healthcare and the specifics of their identification (Stefan Nikolovski, Stefan Milojević, Jana Cvijić). According to the authors, "fraud in health care is a deliberate deception or misrepresentation of facts, that is, actions that a participant in the health care system makes and knows to be false, and through which they can gain some unauthorised benefit" (p. 200). The authors point out, and according to Gruen and Howarth (2005)³, each staff member should be responsible for protecting the resources in their area of responsibility and should feel encouraged to report any irregularities to superiors.

As a logical continuation of this section, an account of fraud in financial statements is given (Dragomir Dimitrijević). This paper first talks about the motives for committing fraud, and then specifically about fraud in financial statements. In addition, warning signs for detecting fraud in financial statements were also pointed out. The author points out "that the practice of numerous financial frauds in the past has shown that of all the warning signs, fraud detection is most often caused by changes in the behaviour and lifestyle of the perpetrator of the fraud, as well as accounting anomalies, which are difficult to detect, but almost always lead to the detection of fraud and the perpetrator" (p. 236). This part also contains the basics of statistics for forensic scientists (Aleksandar Đoković, Nikola Cvetković), as an extremely important topic. Statistics is an important tool used in the analysis of financial data, according to the authors, "to find and discover the patterns that govern and draw appropriate conclusions with the application of adequate techniques" (p. 242). The impact of intangible assets on the value of companies in the conditions of global digitalisation is also presented (Milenko Radonić), bearing in mind the importance of understanding intangible assets through forensic accounting.

²McHard, J. (CFA, CPA, CFF) (2019), *Don't miss opportunities to help organizations*, *Fraud Magazine*, Septembar/October 2019, 46–47.

³Gruen, R. & Howarth, A. (2005), *Financial Management in Health Services*. New York, NY: Open University Press.

The author asks the question, “who is the owner of the information, given that digitalisation and globalisation have provided the possibility of quick access to a large amount of data”. It is also emphasised that the owners of the largest amount of information today are members of the GAFA group, which consists of the world’s largest companies, such as Google, Amazon, Facebook, and Apple (p. 284).

Due to its importance in business, in this part, public procurements are reviewed through the financial forensics of public procurements (Marko Špiler). The beginning of the paper and the hypothesising starts with the emphasis that in Serbia the system of public procurement was regulated in 2002 with the adoption of the Law on Public Procurement⁴. Public procurement forensics, according to the author, “should incorporate the knowledge of different scientific fields and use different technical means and methods in order to determine the existence of irregularities or the commission of a criminal act, assess the consequences and help to discover the perpetrator” (p. 300). In the following, forensic accountants and fraudulent activities in the procurement process are explained (Dušan Purić, Marko Milašinović, Bosiljka Srebro, Zdravka Petković). According to the Law (2011)⁵, and as the authors point out, “fraud is perhaps one of the most serious problems and challenges in the current business environment”, and procurement fraud is, so to speak, the most widespread type of fraud. The so-called red flags are of great importance for fraudulent activities, and the indicators of fraudulent financial reporting were examined, specifically how to recognise fraudulent activities (Snežana Knežević, Jelena Stojanović Alcaraz, Stefan Milojević). As the authors point out, one of the most comprehensive divisions of fraud according to the sector in which they occur, into the private and public sectors, was given by Doig (2016)⁶. This paper begins by defining the types of fraudulent activities, then presenting red flags as indicators of fraudulent activities. In the following, the paper talks about identifying fraudulent actions and predicting financial manipulations, as well as looking at auditors’ responsibilities in detecting fraud in financial statements. This section also includes an evaluation of the financial performance of a small catering company and non-financial measures, with the help of a case study (Jovan Travica, Milan Vujić, Javorka Travica, Stefan Milojević, Tamara Vujić). The analysis was carried out on the basis of ratio indicators for a three-year period, and on the basis of data in financial reports, and thus key points that are important for decision makers were identified. The chapter ends with an elaboration of ethical principles as the foundation of management accounting (Tijana Obradović). In addition to pointing out the importance of ethics in management accounting, an overview of existing standards in management accounting, as well as factors influencing ethical behaviour, was given. After that, the role of management accounting in the prevention of fraudulent actions in organisations, as well as the sources of unethical behaviour of management accountants and the ways to fight against them, were reviewed.

The second section, entitled: “Investigative Activities, Tax Evasion, Expertise, Money Laundering and Financing of Terrorism” is composed of 13 papers. It begins with a description of the destruction of financial transactions in the function of legalisation of criminal income in the modern environment (Aleksandar Čudan, Stefan Tomašević). This research paper defines the hypothesis that reads: “The risks of money laundering and new techniques of its integration cannot be eliminated, but it is necessary to make efforts and take adequate measures to minimize them” (p. 400).

⁴Zakon o javnim nabavkama, Službeni glasnik RS, broj 39/02.

⁵Law, P. (2011), *Corporate governance and no fraud occurrence in organizations: Hong Kong evidence*, *Managerial Auditing Journal*, 26(6), 501–518.

⁶Doig, A. (2016), *Fraud: The Counter Fraud Practitioner's Handbook*. Routledge.

Among other aspects, the authors point out that “recently, a fairly well-known method of money laundering is fictitious trading of art and antiques - the most expensive sold paintings in the history of art are Salvador Mundi, Leonardo da Vinci, \$453.3 million (2017) and When Will You Marry?, Paul Gauguin, \$300 million (2015)”. (p. 413). The paper also highlights the legalisation of criminal proceeds in the process of privatisation. This chapter examines the specifics of fraudulent crime and the subjects of its suppression (Dragan Cvetković, Zoran Morić, Božidar Banović). It was emphasised that economic crime is a dangerous, dynamic phenomenon and that the consequences for society can be multiple: impaired functioning of the economy, creation of unfair competition on the market, reduction of the quality of public services due to the reduction of budget revenues and others (p. 418). According to Walklate (2007)⁷, and as the authors point out, economic crime is a complex criminological and legal phenomenon that arose in modern society with the development of the market and economy. This paper, in addition to the conceptual definition of economic crime and its forms, also shows the subjects of preventive and repressive actions in the suppression of economic crime, as well as the state and trends of economic crime in Serbia. The topics of expert examination of manuscripts, signatures and documents were further elaborated (Dunja Mekterović). The fact, as the author points out, “that written documents were widespread in ancient Greece and Rome and that forgeries of documents were already appearing then, is of great importance, and the importance of expert testimony is highlighted.” Likewise, graphology is a field that deals with examining the character of the person whose handwriting is being studied and as such is not recognised as evidence in court, while handwriting and signature expertise is a comparative forensic method that deals with the identification of the scribe, disputed handwriting or signature, and as such is recognised as relevant evidence in court” (p. 451). The paper examines the expertise of handwritten documents in detail.

This section also talks about the concept and forms of tax evasion (Goran Milošević, Mirko Kulić). The authors emphasise that “the presence of tax evasion for many years within the framework of the Serbian economy indicates that large amounts of money and goods move outside the taxation system, which disrupts the economic system and all aspects of the economic, social and political stability of the country” (p. 463). In this section, due to its importance, money laundering through legal aspects is also dealt with (Jasmina Paunović). The author points out that “money laundering is the transformation of ‘dirty’ money into ‘clean’, i.e., a time-consuming process, due to the concealment of illegal sources of income, in order to eventually introduce it into legal flows” (p. 478). The author also points out, why money, when other forms of property are acquired through criminal activities, and that this is certainly because money represents the highest quality commodity, which is replaceable for every other type of property (p. 478). This paper makes a special contribution to the literature through theoretical and practical implications, and especially by presenting a case study through case analysis. Forensic interviews, as a key step in the detection of criminal acts, are given below (Dragan Cvetković, Dragan Kecman, Želimir Kešetović). According to Breakwell (2007)⁸, and as the authors point out, being a good interviewer means much more than asking questions to which we want to get an answer, and being a successful interviewee means much more than answering the questions asked. As pointed out by Golden et al. (2006)⁹, and the authors state, an interview is a conversation with a purpose, and the purpose of conducting an interview is to gather information, sometimes confession. In this part, financial-accounting forensics for court expertise is also reviewed, through essential terms, regulations and a practical example (Željko Babić).

⁷Walklate, S. (2007), *Criminology: the basics*. London: Routledge.

⁸Breakwell, G. (2007), *Vještine vođenja intervjua*, Naklada Slap, Zagreb.

⁹Golden, T., Skalak, S. & Clayton, M. (2006), *A guide to forensic accounting in-*

The paper pointed out the key legal regulations related to the treated problem, gave an overview of experts in criminal proceedings (financial forensic expert, court expert, expert advisor, employees of the MUP units for financial investigations and experts engaged by the unit - financial investigators (p. 550). The procedure for determining the special tax (Luka Baturan), regulated in the Law on determining the origin of property and special tax, is detailed next. The provisions of this law are viewed in the context of other laws that already regulate the matter of tax procedures as a type of administrative procedure, that is, tax supervision as inspection supervision (p. 566). This work, among other things, describes the course of the first-instance procedure for determining a special tax, an appeal against a decision on the determination of a special tax, as well as the authority responsible for conducting the procedure for determining a special tax. In this section also features a theoretical overview of the financing of terrorism and increasing the capacity of financial reporting services (Dragan Živković, Žarko Radojičić). The paper begins with a conceptual definition of terrorism financing, through the modalities of terrorism financing and the use of legal and illegal means and assets. The types of requests for terrorist financing are also discussed, as well as the role and importance of financial intelligence services in the function of increasing the capacity in the fight against money laundering and terrorist financing and their functioning. In the continuation of the chapter, the Tax Police (Boban Ničić) is also reviewed. Organisational aspects of the Tax Police and the concept of criminal offenses under the jurisdiction of the Tax Police are part of this work. Key forms of tax evasion are also covered. The author states that financial crime and white-collar crime are becoming more sophisticated every year. That is why the Tax Police stands out as a body dealing with the suppression of tax crimes in the face of constant new challenges in finding ways to stop such occurrences (p. 648). The following explains the detection and prevention of money laundering, through legal and financial aspects (Uglješa Mrdić). As the author points out, and according to Zali i Maulidi (2018)¹⁰, an essential element in the money laundering process is the conversion of a wide range of illegal funds, including income from official corruption, street crime, corporate fraud, bribery, and even terrorist financing, into apparently legitimate income. In addition to money laundering, this paper also defines the process of money laundering, the consequences of money laundering, measuring the extent of money laundering and assessing the extent of money laundering. The prevalence of money laundering problems and common techniques and tools used in the money laundering process, as well as efforts to prevent money laundering, were also reviewed. The role of tax inspectors and forensic auditors, the challenge for accountants, as well as global anti-money laundering measures, typologies of money laundering and specific methods of prevention are reviewed below. The prospects for the prevention and survival of money laundering in the future were also pointed out. In this chapter, a case study is also presented that talks about the simulation of a real example from practice about the possibility of fraud in the process of devaluation of property in privatization (Dragan Vasilev). This paper shows the assessment in function of reduction in the value of the company's assets. It is extremely important from the point of view of users who want to see the way in which the property of a privatised company is devalued. At the end of this section, fraudulent actions are shown, through quo vadis (Miloš Lukić, Đorđe Mihailović, Slavica Đurić Dakić, Jelena Runjić). As the authors emphasise, and according to Button, Lewis i Tapley (2009)¹¹, most fraud victims want their money back and see the offender brought to justice. This paper examines the types and sources of data that law enforcement agencies use in preventing and processing fraudulent actions, as well as the specificity of frauds committed via the Internet and their investigation.

¹⁰Zali, M. & Maulidi, A. (2018), *Fighting Against Money Laundering*, *Brics Law Journal*, 5(3), 40–63.

¹¹Button, M., Lewis, C., Tapley, J. (2009). *A better deal for fraud victims: Research into victims needs and experiences*, London: NFA.

The third section, entitled: "Human Factor, Forensic Phonetics, Safety" is presented through six papers. It begins with a description of the selection of human resources and fraudulent actions (Tatjana Ivanović). Counterproductive behaviour at the workplace implies, according to Fine i sar. (2010)¹², and as the author states, the actions of employees that are in conflict with the goals and purpose of the organisation. The paper describes the detection of job candidates prone to fraudulent activities, as well as techniques for assessing the integrity of job candidates. After that, this section also talks about fraud in finances, specifically about the human factor through its roots and prevention (Ivan Marković, Nikola Vasiljević). Norms and principles of human behaviour are presented after the introductory considerations in the paper. Describing delinquent behaviour, the authors of the discussion begin with a quote from Petar Petrović Njegoš, from *The Mountain Wreath*: "He whose law is written by his cudgel leaves behind stench of inhumanity" (p. 756). This paper begins with a quote by Kluckhohn i Murray, (1953)¹³: „ Every man is like all other men, like some other men, and like no other man" (p. 762). The paper also talks about profiling. Psychological aspects in identifying fraudulent actions in financial reports are presented next (Stefan Milojević). The author indicates that "interest in examining the psychological profiles of people who commit fraudulent acts has been growing in recent decades and there is more and more research that defines new typologies of persons prone to committing fraudulent acts" (p. 786). In this work, the typology of fraudsters and the profile of serious perpetrators of fraud were reviewed. Microexpressions and deception, their reliability as indicators of fraud, as well as their perceptibility and role in distinguishing truth from deception are also pointed out. It also points to fraud as a cause of inconsistent and uncontrolled emotional expression, microexpressions as valid and reliable indicators of fraud, the connection between the ability to recognize microexpressions and fraud detection and, finally, the role of information technology in detecting fraud perpetrators. The following is a presentation of fraudulent activities and the human factor (Srđan Nikolovski, Stefan Milojević, Jasminka Marjanović), also within this section. This work shows three elements of fraudulent actions. After that, misappropriation and the influence of personality on work behaviour, dimensions and categories of fraud. As for the psychological factors of fraud, it would be too simplistic to explain it - greed and disrespect. To date, behavioural scientists, according to the authors, have been unable to identify a psychological characteristic that serves as a valid and reliable indicator of an individual's propensity to commit fraud (p. 813).

Regarding the future of examining personality factors in fraud prevention, Weber i Dwoskin (2014)¹⁴ point out, and according to the author, that the use of personality tests by employers in the process of assessing the characteristics of individuals, as well as skills, cognitive abilities and other characteristics, has been growing in the last decade. This section also talks about forensic phonetics, speaker identification (Mia Šešum). According to the author, "financial phonetics involves the application of methods and techniques of voice and speech analysis in order to shed light on criminal acts, and speaker identification is the most complex area of forensic phonetics and is considered the most complex forensic discipline" (p. 828). Security aspects of critical infrastructure protection in anthropogenic disasters, with the help of the Belgrade case study, are also part of this section (Vladimir Cvetković, Andrija Kezunović).

¹²Fine, S. Horowitz, I., Weigler, H., Basis, L. (2010). *Is character good enough? The effects of situational variables on the realation-ship between integrity and counterproductive work behaviors*, *Human Resource Management Review*, 20, 73-84.

¹³Kluckhohn, C., Murray, A.H. (1953). *Personality in Nature, Society and Culture*, New York.

¹⁴Weber, L. & Dwoskin, E. (2014), *Are workplace personality tests fair?*, *Wall Street Journal*, September 9.

In this paper, the phenomenology of anthropogenic disasters and the protection of critical infrastructure are also pointed out. In addition, an analysis of the research results was carried out, and it was concluded that, “overall, the results of the survey research indicate that the respondents are mostly informed about what critical infrastructure is, and what are technical-technological disasters and disasters in general” (p. 875). Likewise, it is emphasised that prevention is key to mitigating their consequences.

The fourth section, entitled: “Applied Tools, Business Models, Statistics, Digitalisation, Corporate Social Responsibility” consists of nine papers. This section begins by elaborating the landscape of cyber security and digital forensics, through the Macedonian perspective (Hristina Runcheva Tasev, Aneta Stojanovska-Stefanova, Milena Apostolovska Stepanoska). According to Sammons (2015)¹⁵, and by decree of the author, the best scientific evidence in the world is worthless if it is inadmissible in court. The paper presents the Macedonian legislative framework for cyber security and institutional capacities, as well as the goals and expectations of the national cyber security strategy. This work is highly significant, given that the previous presentation of the research problems of the Republic of Serbia is complemented by this work through the prism of North Macedonia. A case study on the business model of the Airbnb company is presented below (Dušan Marković). This was done with the help of a presentation of the company’s history, business model and situational analysis. One of the main questions raised, according to the authors, is “whether the owner of the company is deliberately increasing the marketing costs in order to ‘inflate’ the business result at the end of the year and avoid paying taxes” (p. 921). An attempt to answer this question is given by the presented case study. This is followed by the application of the spreadsheet tool in the financial-forensic analysis of financial reports and the prevention of terrorist financing and money laundering (Slobodan Antić, Lena Đorđević Milutinović, Nikola Vuksanović). There are different definitions of spreadsheets, according to the authors. It seems appropriate to state that, according to Antić i Đorđević (2018)¹⁶, and as the authors state: Spreadsheet programs are used in a wide range of organizational functions, in different areas of the industry, when achieving different business goals. The paper discusses the definition of spreadsheet engineering, the concept of spreadsheet models and simulation spreadsheet models. It also indicates the determination of the level of risk of money laundering and terrorist financing in the work of financial institutions. Below is the development of a spreadsheet model and application for determining the level of risk of money laundering and terrorist financing in the work of financial institutions. Forensic accounting and the development of spreadsheet models and applications for financial-forensic analysis of financial statements are also presented. Identification of fraudulent actions by applying Benford’s law to a sample of companies, whose shares are in the A-agriculture, forestry and fishing sector on the Belgrade Stock Exchange, is also shown in this section (Bojan Mavrenski, Vesna Bogojević Arsić, Snežana Knežević). This paper begins by elaborating Benford’s law of anomalous numbers in detail. Benford (1938)¹⁷ noticed that the first pages of the logarithmic tables are much more worn, which indicates the fact that more searched numbers start with the digit 1 than with the digit 9.

This work is more than significant, because it shows the application of Benford’s law to a sample of companies whose shares are within of sector A-agriculture, forestry and fishing on the Belgrade Stock Exchange, individually for each company. In addition, in this section, an analysis of the problem of whether ESG frauds are important for investors was performed (Milica Latinović).

¹⁵Sammons, J. (2015), *Osnove digitalne forenzike – Priručnik za početak rada u digitalnoj forenzici*, Elsevier.

¹⁶Antić, S. i Đorđević, I. (2018), „Upravljački modeli i aplikacije u spređitovima“, u: Benković, S. (eds.): *Finansijski menagement, kontrola i menadžersko računovodstvo*, 245–277. Beograd: Fakultet organizacionih nauka.

¹⁷Benford, F. (1938), *The Law of Anomalous Numbers*, *Proceedings of the American Philosophical Society*, 551–572.

As the author emphasises, “the strategy of integrating environmental protection, social responsibility and corporate governance (ESG) is one of the most popular investment strategies in the world” (p. 1036). According to Arens et al. (2017)¹⁸ and according to the author’s quote, fraud is defined as any intentional deception intended to deprive another person or party of their property or rights. The paper also talks about ESG and fraudulent actions and eco-manipulations in the automotive industry. Blockchain and the financial services sector are also part of this section (Vesna Tornjanski). At the beginning, the blockchain was defined as a decentralised digital ledger, as well as its development and future perspective. An overview of both the block chain and the financial services sector is given. Below is a presentation of the Excel tool for forensics, through identifying irregularities in the data (Aleksandar Marković, Nikola Zornić). As the authors point out, according to Knežević (2019)¹⁹, irregularities may be unintentional, but in any case, they should be detected and corrected in an appropriate manner. This paper presents techniques for detecting anomalies in data. Revision of formulas, identification of duplicate transactions, analysis of transactions with rounded numbers, identification of transactions that deviate from the usual are given. After that, finding missing document numbers, company valuation models, stock valuation, using discounted cash flows and discounted dividend models are presented. Linguistic psychological predictors of profit management, shown through empirical research, are also part of this section (Mina Bulatović, Miloš Milosavljević). The aim of the research is to examine the complexity of financial statement narratives, especially the influence of complex language forms as one of the main factors that can influence earnings management. The conducted research determined that the complexity of the narrative, measured by the number of words and the number of constituent adverbs in the English language, significantly affects the management of the profit. In relation to creative accounting, the authors point out “that it refers to accounting manipulation, profit smoothing, aggressive accounting or false financial reporting” (p. 1101). The chapter and the book end with a presentation of a practical view of digital assets in the modern environment (Stefan Stojanović). Digital currencies and regulations are part of this work, and after their elaboration follows an introduction to cryptocurrencies. After that, investing and fraudulent activities were looked at, and an example of cryptocurrency trading was given.

Based on the previous presentation of the chapter, it can be concluded that the presented book entitled: Forensic Accounting, Investigative Actions, Human Factor and Applied Tools, analysed relevant topics from forensic accounting and related areas in an argumentative manner, and the importance of this book is manifold. The book is useful for improving both theoretical and practical foundations. From the point of view of one of the reviewers of this book, I emphasise its originality and the importance that the sublimation of the presented topics has for theorists and practitioners, i.e., its readers. We can freely see that the book is one of the most extensive works in this field, presented on 1132 pages, with a modern design and, above all, interesting, current and useful content. Let’s be responsible and educate ourselves, for the health and benefit of many generations. Education is the key to development, and development presupposes constant progress. In the light of progress, challenges also arise, and there will be challenges and fraud as long as there are people. Therefore, let this book serve the development of humanity among people.

¹⁸Arens, A., Elder, R., Beasley, M. & Hognsn, C. (2017), *Auditing and Assurance Services: An Integrated Approach*, USA: Pearson Education, Inc.

¹⁹Knežević, S. (2019), *Finansijsko izveštavanje (samostalno izdanje autora)*, Valjevo.

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BAROMETAR/BAROMETER

NOVEMBAR 2021 – OKTOBAR 2022. / NOVEMBER 2021 – OCTOBER 2022

1.PROMET / TURNOVER

Mesec/ Month	Listing	Open Market	Regulisano Tržište/Regu- lated market	MTP/MTF	Ukupno/ Total	Broj transakcija/ Number of transactions
Oktober 2022	1.382.479.554	84.339.714,00	1.466.819.268	440.877.757,00	1.907.697.025	1.642,00
Septembar 2022	850.312.236	92.472.647,00	942.784.883	22.516.108,00	965.300.991	1.774,00
Avгust 2022	4.479.060.082	459.733.906,00	4.938.793.988	29.345.450,00	4.968.139.438	2.300,00
Jul 2022	354.339.606	178.637.741,00	532.977.347	53.487.861,00	586.465.208	1.775,00
Jun 2022	1.934.625.257	200.481.199,00	2.135.106.456	142.514.8770	2.277.621.333	2.299,00
Maj 2022	9.919.443.195	304.783.345,00	10.224.226.540	41.664.773,00	10.265.891.313	2.788,00
April 2022	2.174.994.092	157.561.026,00	2.332.555.118	251.428.547,00	2.583.983.665	2.071,00
Mart 2022	3.151.301.502	22.364.765,00	3.173.666.267	120.761.401,00	3.294.427.668	2.119,00
Februar 2022	1.959.662.678	11.539.264,00	1.971.201.942	48.167.269,00	2.019.369.211	1.137,00
Januar 2022	2.749.265.371	30.937.162,00	2.780.202.533	18.277.405,00	2.798.479.938	808,00
Decembar 2021	4.001.970.725	79.976.538,00	4.081.947.263	232.917.610,00	4.314.864.873	1.429,00
Novembar 2021	2.972.330.624	37.088.592,00	3.009.419.216	60.560.485,00	3.069.979.701	1.669,00
	35.929.784.921	1.659.915.899,00	37.589.700.820	1.462.519.543,00	39.052.220.363	21.811,00

*RSD

2. INDEKSI / INDICES

Novembar/November 2021. Oktobar/October 2022		BELEX15	BELEXline
	Poslednja vrednost / Last value	794,31	1.751,59
	Promena (abs) / Change (abs)	-0,84	84,48
	Promena (%) / Change (%)	-0,11%	5,07%
	Najviša vrednost / Maximum value	868,47	1.789,15
	Najniža vrednost / Minimum value	792,51	1.647,62
	Istorijski max / History maximum value	3.335,2	5.007,34
	Istorijski min / History minimum value	347,46	841,99
	Vrednost prometa / Value of turnover	2.012.635.540	3.004.391.356

3. TRŽIŠNA KAPITALIZACIJA / MARKET CAPITALISATION

	JUL	AVGUST	SEPTEMBAR	OKTOBAR
Ukupna tržišna kapitalizacija/ Total market capitalisation	484.783.924	491.362.845	403.774.649	393.713.140
Regulisano tržište/Regulated Market	329.595.518	337.152.852	251.709.360	241.146.728
Listing	258.687.333	262.080.388	179.461.410	173.381.808
Prime Listing – akcije/ Prime Listing – shares	170.089.662	173.529.663	174.258.422	168.182.900
Standard Listing – akcije/ Standard Listing – shares	88.597.671	88.550.725	5.202.988	5.198.908
Open Market	70.908.185	75.072.464	72.247.950	67.764.920
MTP/MTF	155.188.406	154.209.993	152.065.289	152.566.413
BELEX15	218.264.357	222.718.067	221.150.369	213.003.138
BELEXline	232.399.176	236.046.091	232.372.129	224.877.099

*u hiljadama RSD / in RSD thousands

4. UČEŠĆE STRANIH INVESTITORA / FOREIGN INVESTORS PARTICIPATION

Novembar/November 2021. Oktobar/October 2022.	Učešće stranih investitora / Foreign Investors Participation		
	FIS	total	66,74%
		b-FIS	65,40%
		s-FIS	68,08%
	FIB		3,08%
	FIT		21,22%

Indeks_Belex15	Indeks_BELEXLine	Datum	BELEX15	BELEXLine
BELEXLine				
BELEX15	BELEXLine	1.11.2021	795,91	1.668,63
BELEX15	BELEXLine	2.11.2021	794,82	1.663,83
BELEX15	BELEXLine	3.11.2021	798,25	1.668,24
BELEX15	BELEXLine	4.11.2021	793,73	1.662,03
BELEX15	BELEXLine	5.11.2021	803,42	1.671,66
BELEX15	BELEXLine	8.11.2021	801,84	1.670,80
BELEX15	BELEXLine	9.11.2021	804,82	1.676,56
BELEX15	BELEXLine	10.11.2021	806,30	1.680,14
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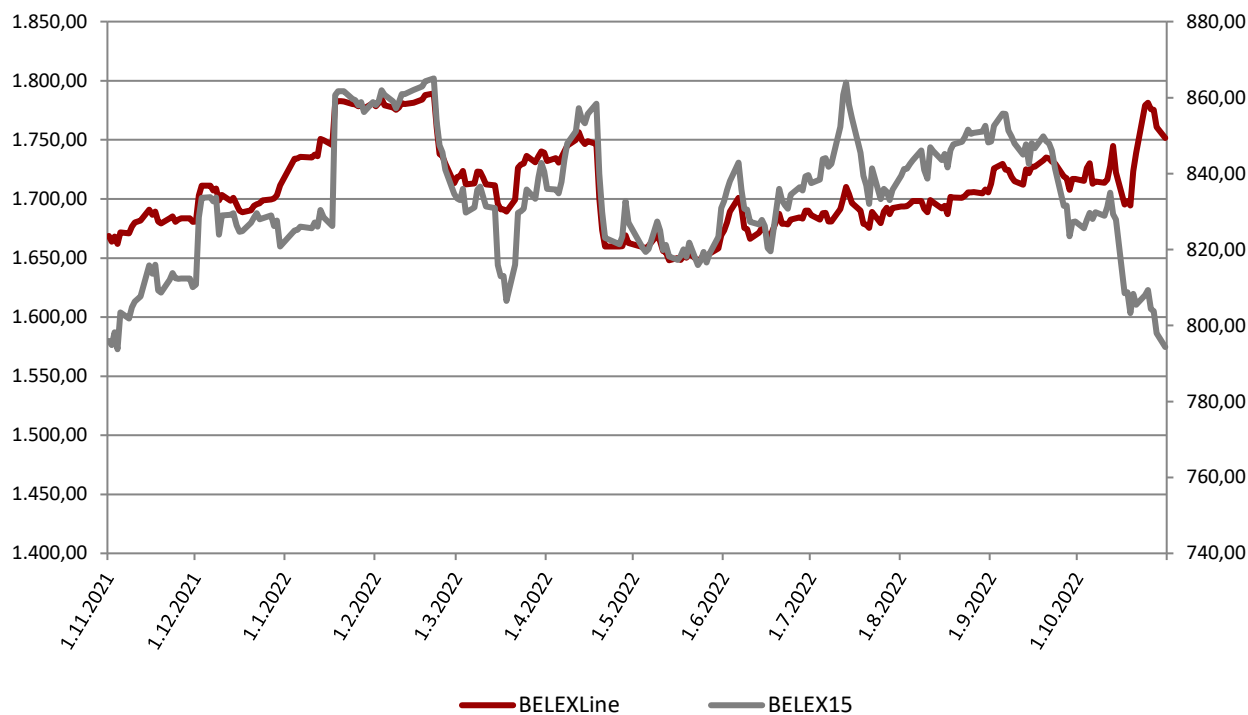
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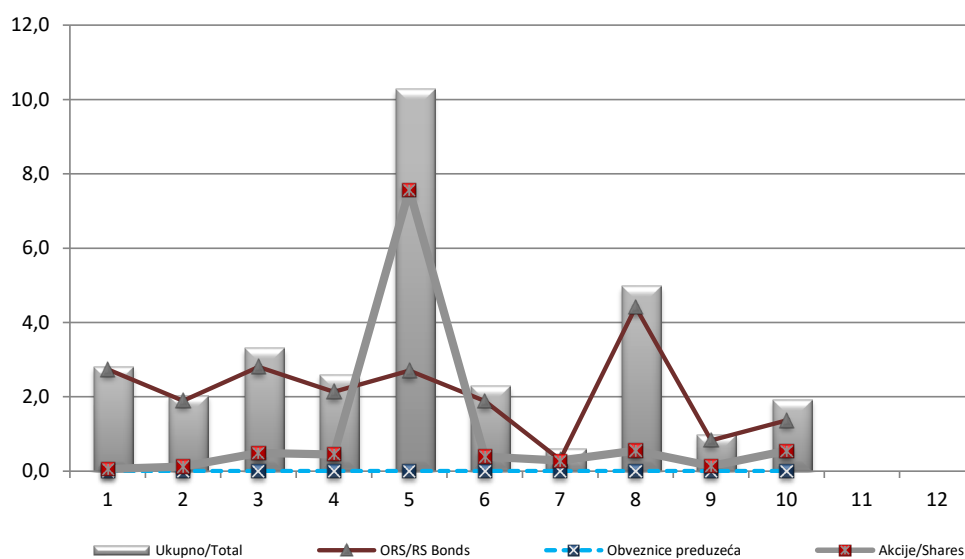
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U mlrd dinarima / RSD

2022.



2022	Ukupno/Total	ORS/RS Bonds	Obveznice preduzeća	Akcije/Shares
1	2.798.479.938	2.736.693.452	0	61.786.486
2	2.019.369.211	1.894.745.001	0	124.624.210
3	3.294.427.668	2.805.469.107	0	488.958.561
4	2.583.983.665	2.135.040.364	0	448.943.301
5	10.265.891.313	2.701.476.264	0	7.564.415.049
6	2.277.621.333	1.884.010.963	0	393.610.370
7	586.465.208	305.113.671	0	281.351.537
8	4.968.139.438	4.415.054.752	0	553.084.686
9	965.300.991	829.521.701	0	135.779.290
10	1.907.697.025	1.361.147.451	0	546.549.574
11				
12				



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- Rad treba da bude u A4 formatu, sve margine 20 mm.
- Dužina rada najviše 10 strana uključujući grafikone, tabele, literaturu i ostale priloge. Ukoliko rad po obimu prevazilazi date propozicije, na uredništvu je odluka da li će ga publikovati ili ne.
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- Posle rezimea dati do 10 ključnih reči, pogodnih za indeksiranje i pretraživanje.
- Osim glavnog naslova (naslova rada) koristiti u tekstu do dva nivoa naslova, bez numeracije.
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- Tabela po širini ne sme da prelazi margine, a po dužini ne sme biti duža od jedne stranice i mora imati naslov i izvor.
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