



DEFENDOLOGIJA

Teorijsko-stručni časopis za pitanja zaštite, bezbjednosti, odbrane, obrazovanja, obuke i osposobljavanja

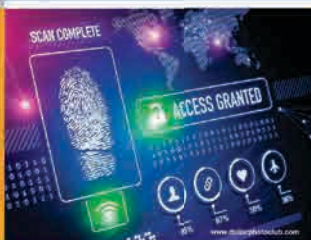
Godina XXI

Broj 41-42

Banja Luka 2018.



- **Bezbjednost i društvo**
- **Nove tehnologije**
- **Sport, obuka i borilačke vještine**



ISSN 1450-6157



DEFENDOLOGIJA

**TEORIJSKO-STRUČNI ČASOPIS ZA PITANJA ZAŠTITE, BEZBJEDNOSTI,
ODBRANE, OBRAZOVANJA, OBUKE I OSPOSOBLJAVANJA
GODINA XXI, BROJ 41-42, 2018.**

**BANJA LUKA
2018.**

Izdavač

EVROPSKI DEFENDOLOGIJA CENTAR

za naučna, politička, ekonomska, socijalna, bezbjednosna, sociološka i kriminološka istraživanja, Banja Luka

Za izdavača

prof. dr Duško Vejnović

Glavni i odgovorni urednik

prof. dr Duško Vejnović

Urednik

dr Velibor Lalić

Redakcija časopisa

Prof. dr Duško Vejnović, prof. dr Neven Brandt (Slovenija), prof. dr Miodrag Simović, prof. dr Dragan Koković (Srbija), akademik dr. Nenad Vunjak (Srbija), prof. dr Nedžad Bašić, prof. dr Mile Rakić (Srbija), dr Velibor Lalić, prof. dr Želimir Kešetović (Srbija), prof. dr Dilip Das (USA), prof. dr Laurence Armand French (USA), prof. dr Zoran Govedar.

Savjet časopisa

Akademik prof. dr Dragoljub Mirjanić, predsjednik, prof. dr Nenad Suzić, akademik prof. dr Drago Branković, Ranko Preradović, književnik, prof. dr Braco Kovačević, akademik prof. dr Vitomir Popović, prof. dr Ostoja Đukić, prof. dr Vaso Bojanić, prof. dr Ivan Šijaković, prof. dr Petar Kunić, prof. dr Boro Tramošljanin, prof. dr Miodrag Romić, doc. dr Mile Šikman, prof. dr Zoran Govedar, dr Darko Matijašević, mr Slavko Milić (Nikšić - Crna Gora), Miodrag Serdar, profesor, (Minhen), prof. dr Armin Kržalić (Sarajevo), dr Stevan Dakić (Banja Luka), dr Goran Maksimović (Banja Luka), prof. dr Milan Gužvica, doc. dr Dragan Radišić (Banja Luka), dr Predrag Obrenović, prof. dr Nenad Radović, prof. dr Mihajlo Mijanović, mr Lidija Nikolić-Novaković (Srbija), doc. dr Stevo Ivetić, dr Gojko Pavlović, doc. dr Nikolina Grbić Pavlović, prof. dr Mile Dmičić, dr Ostoja Barašin, dr Slobodan Simić, prof. dr Nedžad Bašić, prof. dr Zoran Đurđević (Beograd - Srbija), doc. dr Nenad Radović (Beograd - Srbija), prof. dr Ljubiša Mitrović (Niš - Srbija), prof. dr Zoran Milošević (Beograd - Srbija), prof. dr Vladimir Stojanović (Beograd - Srbija), prof. dr Tatjana Duronjić, prof. dr Nevzet Veladžić, prof. dr Slobodan Simović, prof. dr Radoja Radić, prof. dr. Gordana Ilić, dr Dragiša Jurišić, dr Goran Maksimović, doc. dr Saše Gerasimoski.

Štampa

Grafopapir, Banja Luka

Za štampariju

Petar Vukelić

Uredništvo i administracija

Srpska ulica 63, 78 000 Banja Luka, Republika Srpska - Bosna i Hercegovina

Telefon/faks: 051/309-470

Web stranica: www.defendologija.com, www.defendologija-banjaluka.come-mail: defendo@blic.net

Žiro račun: 562 099 0000236689

Lektor

Tatjana Ponorac, prof.

Korektor

Tin Vejnović

Prevod

Tatjana Ponorac, prof.

Tiraž

500 primjeraka

Godišnja pretplata

za pravna lica 200 KM

za fizička lica 100 KM

Rješenjem Ministarstva informisanja Republike Srpske, broj 01-439/ 97. od 25. decembra 1997. godine, javno glasilo teorijskostručni časopis «Defendologija» upisan je u Registar javnih glasila pod brojem 249.

UDK/359
ISSN 1450-6157

UVODNIK

BEZBJEDNOSNOM KULTUROM KA STABILNOM DRUŠTVU I DRŽAVI

Pred Vama je 41. broj časopisa *Defendologija*. Časopis *Defendologija* je bio, jeste i biće dosljedan svojoj programskoj orijentaciji multidisciplinarnog karaktera. Različitost tema je obilježje i ovoga broja kao što su: Bezbjednosna kultura u sociološkom diskursu; Uloga provajdera bezbjednosti na nacionalnom nivou u kontroli zločina mržnje; Značaj novih tehnologija i njihov uticaj na industrijski razvoj uslužne djelatnosti i nezaposlenost; Struktura morfoloških karakteristika studenata fakulteta bezbjednosnih nauka; Razlike u kvalitetu odbrana od različitih vrsta napada vršenih iz mirovanja i u uslovima fiziološkog stresa.

Bezbjednosna kultura i obrasci i stilovi ponašanja svih subjekata u društvu i državi je bitna determinanta zaštite i odbrane ustavom zagarantovanih društvenih i državnih vrijednosti. Doprinos stanju bezbjednosti je efikasna kontrola zločina mržnje od strane subjekata nacionalne bezbjednosti, posebno u etnički heterogenim društvima. Opasnost po društva u tranziciji je govor mržnje, siromaštvo i socijalna nepravda koji mogu ugroziti državu kao vojna prijetnja, nezaposlenost, nefunkcionisanje pravne države i demokratskih procedura kod donošenja važnih odluka, te neodgovornost nosioca javnih funkcija. Nove tehnologije, patentni, nova otkrića daju veliki doprinos razvoju društava i država i rješavanju nezaposlenosti uopšte. Društvene promjene i razvitak nedovoljno su izučene, a upravo su one osnovni zadaci za proučavanje društvenog razvoja. Postkomunistička tranzicija, političko-ekonomskih institucija i kulturnih obrazaca suočava se sa brojnim aspektima klasičnog problema interakcije, kulture uopšte, tako i bezbjednosne kulture i političke strukture, te iz tih razloga povećava prisustvo društveno štetnih, negativnih pojava u društvima u tranziciji u svim njegovim segmentima pa tako i u nekim segmentima zaštite, odbrane i bezbjednosti. Globalizacijski procesi su nametnuli raspodjelu rizika, umjesto ranijih unutar društvenih procesa koji su se odvijali u okvirima raspodjele dobara između aktera u procesima i rada.

Rješenja za državu i društva u tranziciji treba tražiti u jačanju uloge sigurne, bezbjedne, socijalne države, u moralnom preporodu svih subjekata, da bi mogli rješavati nagomilane društvene probleme u sferi svakodnevnog života i društvenih servisa, u mjesto njenog sve većeg ograničavanja koje izaziva otklon građana ka desničarskim opcijama. Treba uspostaviti održivu ravnotežu sukoba i konsenzusa u društvima u tranziciji...

Urednik i glavni i odgovorni urednik

SADRŽAJ

UVODNIK	3
---------------	---

BEZBJEDNOST I DRUŠTVO

<i>prof. dr Ostoja Barašin, dr Mičo Živojinović</i> BEZBJEDNOSNA KULTURA U SOCIOLOŠKOM DISKURSU	9
--	---

<i>doc. dr Velibor Lalić</i> ULOGA PROVAJDERA BEZBEDNOSTI NA NACIONALNOM NIVOU U KONTROLI ZLOČINA MRŽNJE	21
--	----

NOVE TEHNOLOGIJE

<i>dr Ognjen Erić</i> GLOBALNI ASPEKTI KRETANJA STRANIH INVESTICIJA	35
--	----

<i>Milan Šušić</i> ZNAČAJ NOVIH TEHNOLOGIJA I NJIHOV UTICAJ NA INDUSTRIJSKI RAZVOJ USLUŽNE DJELATNOSTI I NEZAPOSLENOST	47
--	----

SPORT, OBUKA I BORILAČKE VJEŠTINE

<i>doc. dr Darko Paspalj, doc. dr Milan Gužvica, mr Lazar Vulin</i> STRUKTURA MORFOLOŠKIH KARAKTERISTIKA STUDENATA FAKULTETA BEZBJEDNOSNIH NAUKA	71
--	----

<i>doc. dr Milan Gužvica, doc. dr Darko Paspalj, mr Lazar Vulin</i> RAZLIKE U KVALITETU ODBRANA OD RAZLIČITIH VRSTA NAPADA VRŠENIH IZ MIROVANJA I U USLOVIMA FIZIOLOŠKOG STRESA	83
---	----

UPUTSTVO AUTORIMA	93
-------------------------	----

BEZBJEDNOST I DRUŠTVO

BEZBJEDNOSNA KULTURA U SOCIOLOŠKOM DISKURSU

Pregledni rad

DOI: 10.7251/DEFSR1841001B	COBISS. RS-ID 7744280	UDK 316.7:316.334.3
----------------------------	-----------------------	---------------------

prof. dr Ostoja Barašin

Nezavisni univerzitet, Banja Luka

dr Mićo Živojinović

Apstrakt:

Savremeni globalizacijski procesi su u direktnoj vezi sa različitim izazovima i povezani su sa mnogobrojnim bezbjednosnim prijetnjama sa kojima sedanas susrećečovječanstvo. Život u zajednici čovjeka stavlja pred stalni izbor-sukob ili saradnja. Globalizacija sa sobom nosi izazove i bezbjednosne prijetnje, kako na globalnom, tako i na regionalnom i lokalnom nivou. Sve izraženija socijalna nejednakost, siromaštvo i nezaposlenost, međudržavni i međureligijski sukobi, terorizam, klimatske promjene i niz drugih industrijskih rizika i prijetnji sve više utiču na stabilnost planete i povećavaju bezbjednosne rizike do nemjerljivih razmjera. Dolazi do ekspanzije obrazovanja nevjerojatnih razmjera i dinamike, a broj naučnih organizacija i naučnih radnika raste geometrijskom progresijom. Na taj način obrazovanje izmiče društvenoj kontroli, a mogućnost zloupotrebe znanja, takođe, raste geometrijskom progresijom. Vojna industrija, genetski inženjering i proizvodnja genetski modificovanih organizama, najava ugradnje čipova u tijelo ljudi sa podacima o svakom čovjeku uvodi nas brzinom svjetlosti u zonu sumraka.

***Ključne riječi:** Bezbjednost, bezbjednosna kultura, bezbjednosni izazovi, rizici, bezbjednosne prijetnje*

1. BEZBJEDNOSNA KULTURA-RAZUMIJEVANJE POJMA

1.1. Bezbjednost

Veze među ljudima su neizbježne i mogu se temeljiti na međusobnoj sardnji i pomaganju ili na sukobima i neprijateljstvu. „Ljudi su predodređeni da budu rivali i da se međusobno bore za rjetka materijalna dobra ili, pak, da udružuju energiju radi povećanja

materijalnih dobara i općeg dobra” (Kukić, 2004:501). U daljoj raspravi Kukić navodi da bezbjednost od nasilja kao „stila života” je poželjna projekcija, ali i ambicija svakog društva, jer je nasilje, objektivno, najveća opasnost u funkciji nestajanja čovjeka i ljudske zajednice. Dilema kako urediti društvo utemeljeno na bezbjednosti svakog pojedinca i zajednice u cjelini zaokuplja čovjeka još od predistorijskog perioda, a sa njom se svakodnevno susreće i danas.

Prije bilo kakve rasprave o bezbjednosnoj kulturi bitno je razumjeti pojam bezbjednosti koji se može odrediti kao stanje u kom je obezbijedena uravnotežena fizička, duhovna, društvena i materijalna egzistencija pojedinca i zajednice kao cjeline u odnosu prema drugim pojedincima, društvenim zajednicama i prirodi.

„Društvene promjene nastale u posljednje dvije decenije 20. vijeka nošene na krilima neoliberalizma dovele su do turbulentne situacije u svim sferama ljudskog društva, a posebno u bezbjednosti, politici, ekonomiji, pravu, itd. Ove promjene omogućile su stvaranje mreža opasnih, kontinuiranih, sveprisutnih i manje vidljivih izazova, prijetnji, čija promjenljiva priroda i multiplicirane varijacije otežavaju njihovo definisanje. Prema jednoj od klasifikacija aktuelni izazovi i prijetnje globalnoj bezbjednosti se razvrstavaju na: terorističke (nacionalnih i transnacionalnih razmjera), za proliferaciju oružja radi masovnog uništavanja; prijetnje od nestabilnih režima; lokalne i transnacionalne mreže kriminala, trgovine ljudima, oružjem, opojnim sredstvima i, što je najčešća pojava, kombinovane prijetnje, u kojima transnacionalne mreže etno - vjerskih fanatika objedinjavaju više ekstremnih elemenata razorne moći.” (Vejnović-Obrenović, 2017:108).

Cjelokupno čovječanstvo je danas okrenuto pitanju bezbjednosti, kako njegovom razumijevanju, tako i funkcijom i opsjednuto je traganjem za modelom njegove efikasnosti i stalnog unapređenja. „Nikad nije bilo više, raznovrsnijih i efikasnijih ljudskih i materijalnih kapaciteta za zaštitu bezbjednosti i nikada se društvo nije osjećalo bespomoćnijim i ranjivijim na ugrožavajuće pojave, koje su sve destruktivnije. Često se postavlja pitanje: šta je bezbjednost? Još češće se pitamo da li uopšte treba postavljati ovakva pitanja jer je mnogo toga, samo po sebi jasno. Međutim, da li je tako?” (Mijalković-Keserović, 2010:33).

Suština i filiozofija bezbjednosti se nisu mijenjali kroz istoriju ljudskog društva, ali čestim promjenama su podložni priroda i oblici ugrožavanja bezbjednosti. Poznavanje pojma bezbjednosti nesporno potvrđuje da ne postoji riječ kao što je bezbjednost, koja se više koristi u svakodnevnom životu, a da je značenje koje se njome određuje je manje jasno i precizno. Ovim pojmom se koriste sve kategorije društva, naučnici koji se bave ovim problemom, predstavnici državnih struktura, političke vođe, domaće i međunarodne organizacije, privredni subjekti, zdravstveni radnici i ovaj spisak se može nizati u nedogled. Tako možemo zaključiti da je određenje bezbjednosti višeznačno i netipično.

„Problematika bezbjednosti, zbog svoje složenosti i činjenice da predstavlja imanentnu potrebu pojedinca, države i cijele međunarodne zajednice, te kao takvu je valja sagledavati cjelovito – teorijskim uopštavanjem i primjenom u praksi. U tom smislu, prvi korak jeste teorijsko određenje bezbjednosti i sistema bezbjednosti. U okviru navedenog određenja neumitno se nameće potreba pronalaženja neophodnih konstituenasa bezbjednosti kao nauke.

Nadalje, celovita obrada sistema bezbjednosti usmjerena je najpre na sagledavanje najznačajnijih vrsta sistema bezbjednosti: totalitarnih, demokratskih i nadnacionalnih.

Nakon toga, bilo je potrebno, u sažetom obliku, prikazati najznačajnije karakteristike pojedinih savremenih sistema bezbjednosti.” (Đorđević, 2013:6).

Riječ bezbjednost je, danas, u gotovo svim jezicima i kulturama, ušla u upotrebu u velikom broju veoma različitih društvenih oblasti, kao što su politika, zdravstvo, obrazovanje, informatika, ekologija, sport, psihologija, ekonomija i finansije, arhitektura itd. O njenom izuzetno velikom značaju i rasprostranjenosti najbolje govori činjenica da je ona na internetu zastupljenija od reči bog, mir, rat ili politika.¹

„Nastanak i definisanje bezbjednosti kao naučne discipline determinisali su sljedeći faktori:

- 1) činjenica da se u praksi javlja sve veći broj destruktivnih oblika koji ugrožavaju bezbjednost, ne samo pojedinca, već se mora imati na umu da je riječ o ugrožavanju kolektivne bezbjednosti;
- 2) unutrašnja i spoljašna bezbjednost država i čitave međunarodne zajednice je višestruko ugrožena, što nameće potrebu sistematskog izučavanja mogućnosti za očuvanje bezbjednosti, a to je moguće korišćenjem pouzdane analize prakse i korišćenjem adekvatnih naučnih metoda i postupaka,
- 3) postojeća znanja o izvorima i oblicima ugrožavanja bezbjednosti nameću potrebu da se, u skladu s tim, uspostavi efikasan integralni sistem bezbjednosti, čemu može znatno da doprinese primjena teorijskih i praktičnih saznanja.

Svakako je opravdano reći da bezbjednost spada u oblast društvenih nauka i da je, kao naučna disciplina u razvoju. Do toga dolazimo određivanjem pripadnosti pojedinih obilježja bezbjednosti kompleksu nauka (na osnovu klasifikacija nauka). To ne znači da bezbjednost odvajamo od ostalih nauka, već je to nastojanje da se tačno utvrdi područje, predmet, cilj, metod i jezik bezbjednosti kao naučne discipline”. (Đorđević, 2013:7).

Za temeljnu raspravu o konceptu bezbjednosti od vitalnog je značaja da se termin bezbjednosti definiše pažljivo, što podrazumijeva dvije stvari: slaganje o izvoru značenja pojma bezbjednosti i najširem opisu termina, sa odgovorom na pitanja: bezbjednost od koga, bezbjednost za koje vrijednosti, koliko bezbjednosti, od kojih prijetnji bezbjednosti i bezbjednost kojim sredstvima?

Pojam bezbjednost je kompleksan i složen društveni fenomen koji, etimološki posmatrano, potiče od latinske riječi *securitas-atris* što znači bezbjednost, odsustvo opasnosti, izvjesnost, samopouzdanje. U engleskom jeziku postoje dva izraza *security i safety*. Riječ *security* odnosi se na nacionalnu bezbjednost – *national security*. Pojam *safety* označava sposobnost djelovanja, kako ne bi došlo do nepoželjne bezbjednosne situacije, ili takvih prilika koje mogu da izazovu bezbjednosne implikacije. U francuskom se koriste izrazi *securite i surete*, u ruskom *bezopasnost* i znači odusustvo materijalne bijede, u italijanskom *sigurezza*, a u Nemačkoj *sicherheit*. U srpskom govornom području u upotrebi je riječ *bezbjednost*. Riječ je izvedena iz reči bezbjedno, što u suštini predstavlja bezopasnost, obezbjeđenje sa najvećom pouzdanošću, osobinu onoga ko je bezbjedan. Često dolazi do miješanja termina bezbjednost, sigurnost i zaštita. *Sigurnost* je uži pojam koji

¹ Filip Ejodus dobro primjećujeda je riječ bezbjednost na internetu zastupljenija od reči bog, mir, rat ili politika „Pretraga je izvršena na engleskom jeziku u pretraživaču Google, 3. oktobra 2011. godine. Rezultati o broju pojavljivanja ovih reči na mreži su: bezbednost (2, 410 miliona puta), bog (oko 289 miliona), mir (840 miliona), rat (509 miliona) i politika (909 miliona).” (Filip Ejodus, Međunarodna bezbjednost: teorije, sektori i nivoi, Službeni glasnik i Centar za bezbjednosnu politiku, 2012:25)

se prvenstveno odnosi na ličnu sigurnost, koju čine prvenstveno pravna, politička, ekonomska i socijalna sigurnost, dok je bezbjednost pojam koji obuhvata najširi dijapazon, od lične preko državne do integralne bezbjednosti. Zaštita je uži pojam i od pojmova bezbjednost i sigurnost i odnosi se samo na pasivnu komponentu bezbjednosti, dok savremeni pojam bezbjednosti obuhvata i aktivnu komponentu.

„Bezbednost se može definisati kao stanje organizacija i funkcija bezbednosti. Bezbednost kao stanje predstavlja zaštićenost nekog dobra, vrednosti i tekovine društva. Bezbjednost može biti spoljna i unutrašnja. Spoljna bezbednost se odnosi na nezavisnost, suverenitet i teritorijalni integritet države, a unutrašnja na nesmetano funkcionisanje konkretnog ustvanog poretka, odnosno društveno-političkog, ekonomskog i pravnog sistema i zaštićenosti dobara, vrednosti, i drugih objekata zaštite. Kao mehanizam zaštite bezbednost ima različite oblike organizacionih formi. Kao funkcija, bezbednost je nerazdvojni atribut države bez obzira na karakter uređenja, politički sistem i oblik vlasti.”(Vojna enciklopedija K-1, VIZ Beograd, 1970:597)

Mijalković i Keserović smatraju da se bezbjednost može smatrati procesom, a prije svega, željenim proizvodom tog procesa-stanjem. Biti bezbjedan znači biti zaštićen od uticaja neželjenih pojava i osjećati se zaštićenim u predvidivom i kontrolisanom ambijentu. Bezbjednost je rezultanta odnosa-balansa između stvarne i potencijalne ugroženosti referentnih vrijednosti i interesa i postojećih kapaciteta (ljudskih, materijalnih, organizacionih i funkcionalnih) koji ih štite. Apsolutna bezbjednost je idealna kategorija.

„Jednostavno shvatanje bezbjednosti kao subjektivne kategorije, odnosno kao osjećaja bezbjednosti, je vrlo problematično s obzirom na to da neuočavanje opasnosti ne znači da opasnosti nema. Dok s druge strane, pretjerano uočavanje opasnosti može dovesti u svojevrstnu paranoju koja opet može rezultovati kako fizičkom, tako i psihičkom destrukcijom pojedinca, grupe ili društva. Takođe, shvatanje bezbjednosti isključivo kao objektivne kategorije (na primjer očuvanje postojećeg stanja) može zavarati, odnosno može biti izgovor za izbjegavanje suočavanja sa savremenim problemima koje okružuju čovjeka, društvenu zajednicu, državu, pa čak i međunarodnu zajednicu“. (Tatalović, 2006:65).

D. Simić smatra da, osim istraživanja uzroka sukoba i samih nasilnih sukoba između organizovanih političkih zajednica, „zamisao bezbjednosti treba da uključi i uslove koji pogoduju odustajanju od upotrebe sile i ustanovljavaju odnose trajnog mira i plodotvorne saradnje”, odnosno „nauka o bezbednosti treba u sadržaj svog predmeta da uključi obe dimenzije: negativnu (uzroci rata), ali i pozitivnu (mir i saradnja, odnos demokratije i mira, bezbednost i udruživanje, kao i najšire, teoriju stabilnog i demokratskog mira)”. (Simić, 2002:22.)

U srpskom jeziku bezbjednost znači odsustvo opasnosti, bezopasnost, stanje u kome se ne osjeća nikakva opasnost. Bezbjedan je onaj koji je osiguran od opasnosti, zaštićen, pouzdan, siguran, obezbjeđen; pa bi bezbjednost bila stanje onoga koji je bezbjedan ili onoga što je obezbjeđeno. Iz ugla pojedinca, moglo bi se reći da bezbjednost znači odsustvo straha za sebe, svoje bližnje i svoja dobra, a iz ugla neke društvene grupe ili čitavog društva – odsustvo prijetnji opstanku te grupe, odnosno društva i njihovih vrijednosti koje smatraju bitnim za održanje i napredak i koje kao takve treba posebno štiti od ugrožavanja. Prihvatajući navedeni stav, a u cilju izbjegavanja određenih nejasnoća u vezi sa jezičkim pojmom u ovom radu se opredjeljujemo za termin bezbjednost.

Bezbjednost u savremenom svijetu se definiše kao vojno-odbrambena, politička, ekonomska i ekološka bezbjednost (oblast zaštite životne sredine). Vojno-bezbjednosni aspekt se odnosi na kapacitet države da vodi oružanu borbu. Politička bezbjednost se odnosi na organizacionu stabilnost države, sistema vlasti i ideologije koje im kao takvim daju legitimitet. Ekonomska bezbjednost se odnosi na mogućnost pristupa resursima, finansijama i tržištu koji su potrebni za održavanje prihvatljivog nivoa dobrobiti države i njene moći. Nacionalna bezbjednost se odnosi na održivost unutar prihvatljivih uslova za razvoj jezika, kulture i religije, nacionalnog identiteta i običaja. Bezbjednost u oblasti životne sredine se odnosi na stanje u biosferi na lokalnom i planternom nivou, kao osnovnog sistema od koga zavisi cjelokupna ljudska egzistencija.

Teoretičari razlikuju pet oblika prijetnji koje korespondiraju sektorima bezbjednosti:

- Vojna prijetnja je opasnost za sve strukture države
- Političke prijetnje imaju za cilj da unište internu organizacionu sposobnost, nacionalni identitet i institucije države.
- Društvene prijetnje je teško razgraničiti od političkih, ali je bitna njihova osobina da izviru iz samog društva
- Preostale dvije vrste prijetnji su ekonomske i prijetnje životnojsredini koje je teško razumjeti u bezbjednosnom smislu jer je teško odrediti ko je odgovoran za, na primjer, ekonomski pad ili devastiranu životnu sredinu.

Kakva će biti uopšte bezbjednosna politika jedne države (vanjska i unutrašnja), zavisi od niza faktora, a posebno se diferenciraju sljedeći:

- Kulturno-istorijsko nasljeđe,
- Geografski položaj

Nacionalna bezbjednost se odnosi na djelatnost države kojom ona, u skladu sa svojim ukupnim mogućnostima u sadašnjosti i resursima koje gradi za budućnost, štiti vlastiti integritet, suverenitet, identitet, opstanak i druge vrijednosti i interese. Društvene mogućnosti u svom najširem shvatanju su uslovljene i kulturnim obilježjima, kao što su tradicija, vrijednosti, vjerovanja, institucije, ali i način života. Kada je riječ o bezbjednostitrebama imati na umu da nije dovoljno samo odsustvo nekog ili nečeg što nas ugrožava, već se mora živjeti u društvu koje se temelji na pravdi, moralu i kulturi, odnosno društvu koje stalno unapređuje svoje vrijednosti

1.2. Bezbjednosna kultura

Bezbjednosnom kulturom se može smatrati bezbjednosna aktivnost koja izražava spremnost djelovanja i ponašanja u skladu sa stečenim znanjima i vještinama, kao i u skladu sa prihvaćenim vrijednosnim stavovima. Ogleda se u prepoznavanju opasnosti, reagovanju na njih izbjegavanjem ili otklanjanjem opasnosti ili upućivanjem na one subjekte koji će profesionalno reagovati i sačuvati ugrožene vrijednosti.

Bezbednosna kultura se može definisati kao skup usvojenih stavova, znanja, vještina i pravila iz oblasti bezbjednosti, ispoljenih kao ponašanje i proces, o potrebi, načinima i sredstvima zaštite ličnih, društvenih i međunarodnih vrijednosti od svih izvora, oblika i nosilaca ugrožavanja bez obzira na mjesto ili vrijeme njihovog ispoljavanja.

U samom sistemu bezbjednosti bezbjednosna kultura se kao dio funkcije samog sistema bezbjednosti može definisati i kao skup neformalnih profesionalnih normi i vrijednosti koje funkcionišu unutar hijerarhijske bezbjednosne organizacione strukture, a u funkciji su izvršavanja bezbjednosnih zadataka.

„Razumijevanje koncepta bezbjednosne kulture podrazumijevalo bi bezbjednosne aktivnosti i ponašanja koji proističu iz odgovornosti i spremnosti djelovanja svih subjekata u jednom društvu, u skladu sa stečenim znanjima i veštinama, kao i prihvaćenim vrijednostima i vrijednosnim orijentacijama, vjerovanjima i izgrađenim stavovima utemeljenim u datoj kulturi i kulturnom nasljeđu. Ogleda se u načinu na koji se najšire shvata okruženje, ispoljava razumijevanje za dinamiku društvenih odnosa (i na pojedinačnom i na širem planu), uočava važnost apsolutne kontrole nad sopstvenim dobrima (načelo suvereniteta), načina na koji se uočavaju i definišu opasnosti, rizici i prijetnje, zatim određuju interesi i biraju sredstva ili instrumenti za djelovanje. Bezbjednosna kultura može se razmatrati i kroz njene unutrašnje i spoljašnje manifestacije. Unutrašnje se odnose na promišljanje bezbjednosti ili razvoj ideje o bezbjednosti, a spoljašnje na ponašanje u sferi bezbjednosti, kao i odnos ili pristup bezbjednosti koji se prevashodno odnosi na spremnost i sposobnost da se odgovori na rizike i prijetnje, bilo u materijalnom bilo u duhovnom smislu”²

Prema ovoj definiciji bezbjednosne kulture uočljivo je da se ona određuje u odnosu na ugrožavanje, opasnost ili prijetnje, koji su ključne odrednice za uspostavljanje i razvijanje jednog ovakvog koncepta. Naravno, može se govoriti i o nekim drugim, novim dimenzijama koje se orijentišu prema bogatijem sistemu motivacije za djelovanje, kao što su, na primer, bolji uslovi razvoja i unapređenja odnosa između određenih aktera na međunarodnoj sceni ili unutar države uprkos prisutnim prijetnjama i opasnostima. Takođe, zanimljiva je i dimenzija koja integriše raznorodne društvene elemente i njihove specifične funkcije, kao i potkulture, i njihove različite uloge, obavljajući određene fundamentalne funkcije u procesu humanizacije čoveka i njegovog svijeta.

Dramatične društvene promjene koje u svim sferama ljudske egzistencije, kako na globalnom, tako i na lokalnom nivou tokom poslednjih nekoliko decenija dovele su do stanja u kojem se dešavaju događaji koji imaju značaj za nacionalnu bezbjednost. Osjećaj nesigurnosti koji pritiska čovjeka nikada nije bio jači i pored činjenice da sistem bezbjednosti nikada nije bio jači i razvijeniji. Tradicionalno shvatanje po kojem se država smatra ekskluzivnim nosiocem poslova bezbjednosti je jednostavno iščezlo i na sceni imamo transformaciju ka bezbjednosno samoorganizovanom društvu. Država se koncentriše na organizovanje mjera odgovora na snažnije bezbjednosne izazove, a manje opasan prostor se ustupa samoorganizovanom društvu koje treba da se štiti od manje opasnih pojava. Ovakav koncept podrazumijeva koordinisano i povezano djelovanje svih subjekata, bez obzira na značaj prijetnji i stepna ugrožavanja društva. Distribucija dijela odgovornosti na društvo ne znači i samostalno djelovanje, pa stoga govorimo o cjelovitom sistemu bezbjednosti sa definisanim nosiocima. Na taj način se stvara nova kultura bezbjednosti koja ima prvorazredni preventivni značaj i u kojoj učestvuju svi subjekti lokalne zajednice. Bezbjednosna kultura se, prvenstveno, oblikuje na nacionalnom nivou i kao takva bezbjednosna kultura je najdjelotvornija.

² http://www.odbrana.mod.gov.rs/odbrana-stari/vojni_casopisi/arhiva/VD_2014-prolece/66-2014-1-06-Stanarevic.pdf

„Bezbjednost i kultura su kategorije koje se nužno dopunjuju i grade određeni odnos međuzavisnosti. Ako se kultura definiše kao skup univerzalnih vrijednosti na osnovu kojih čovjek određuje svoj položaj u društvu i svijetu, a bezbjednost kao zaštita i zaštićenost tih vrijednosti, jasne su njihova povezanost i uslovljenost” (Mijalković-Keserović, 2010:199-200).

Iz prethodnog stava proizilazi da je bezbjednosna kultura ono ponašanje kojim se stvarabezbjednost ili doprinosi njenom jačanju. Dakle, bezbjednosna kultura se može shvatiti kao skup usvojenih stavova, znanja, vještina i pravila iz domena bezbjednosti ispoljenih kao ponašanje i proces o potrebi zaštite i očuvanja ličnih, društvenih i međunarodnih vrijednosti od svih oblika ugrožavanja bez obzira na mjesto, vrijeme i način njegovog ispoljavanja. Bezbjednosna kultura doprinosi definisanju odnosa između subjekta bezbjednosti, kako službi bezbjednosti tako i drugih subjekata i društvenih struktura. Ako je funkcija kulture, uopšte, unošenje reda u društvo, onda je bezbjednosna kultura svakako značajna sa stanovišta unošenja reda u primarnu funkciju bezbjednosti društva. Bezbjednosna kultura zaštite nacionalne bezbjednosti pokazuje stepen izgrađenosti svijesti o referentnim vrijednostima koje država i društvo štite svim raspoloživim resursima.

„Tako bi suštinu bezbjednosne kulture predstavljala svijest o neophodnosti suprotstavljanja pojavama ugrožavanja nacionalne bezbjednosti: otklanjanjem etioloških faktora, samostalnom akcijom protiv aktera ugrožavanja, ukoliko se time ne ugrožava sopstvena bezbjednost ili bezbjednost drugih; blagovremenim alarmiranjem drugih subjekata bezbjednosti koji će spriječiti nastanak štetne posljedice, ublažiti, ukloniti ili onemogućiti razvoj štetne posljedice, kao i što efikasnije revitalizovati napadnute referentne vrijednosti. Očigledno je bezbjednosna kultura mnogome posledica socijalnog i istorijskog nasleđa. Istovremeno, nesporan je njen inovativan i kreativan značaj u rješavanju problema na svim nivoima bezbjednosti”. (Mijalković-Keserović, 2010:201-202).

2. IZVORI UGROŽAVANJA BEZBJEDNOSTI

Savremeni sistem bezbjednosti društva predstavlja oblik organizovanja društva u zaštiti njegovih vitalnih vrijednosti. U organizovanju sistema bezbjednosti datog društva, u principu, se polazi od najmanje dva osnovna pitanja koja trebaju dati odgovor koji su to oblici i nosioci ugrožavanja od kojih treba štititi društvo, kao i na koji način elementi sistema trebaju djelovati u cilju ostvarenja osnovnog cilja njegovog uspostavljanja. „Ljudi su nasilni. Može se raspravljati o tome da li je ova sklonost nasilju dio naše biologije, ali je jasno da nasilje postaje uobičajeno kada ljudi oforme trajne zajednice. Direktno nasilje se obično smatra devijacijom i zločinom, dok kolektivno nasilje, nasilje u kome učestvuju mnogi pojedinci, može da ima nekoliko oblika: ponašanje mase koja napada određenu metu; revolucionarnu akciju mase u pokušaju da zbaci politički režim; terorizam koji obuhvata sporadično nasilje protiv vladinih i civilnih ciljeva, osmišljeno kako bi se stanovništvo obeshrabrilo a vlada delegitimisala” (Tarner, 2009:449).

Saglasnost o definiciji pojma ugrožavanje ne postoji jer se on različito koristi zbog korišćenja različitih termina koji sa sobom nose i različito viđenje njegove suštine. U krivično-pravnom smislu ugrožavanje znači opasnost koja u većoj ili manjoj mjeri predstavlja mogućnost oštećenja ili uništenja nekog dobra ili vrijednosti. Sociološki po-

smatrano, ugrožavanje bezbjednosti je vezano za društvene sukobe i protivrječnosti, kao i protivdruštvena ponašanja i njih nije moguće unaprijed odrediti. Pored navedenog, ugrožavanje se može smatrati procesom koji može nastati kao proizvod suprotnih interesa koji se ne mogu ostvariti u isto vrijeme niti se može postići kompromis o načinu uklanjanja konflikta ili protivrječnosti. Ugrožavanje ispoljava uticaj na sve društvene procese, pa je praktično nemoguće u okviru jedne naučne discipline utvrditi teorijsko-metodološke stavove o svim mogućim aspektima ugrožavanja. Nosioci različitih interesa mogu biti subjekti unutar samog društva ili spolja, kao spoljni faktor.

Već posmatrano krivično-pravno i sociološko određenje ugrožavanja društva ne određuju pojam ugrožavanja u cjelini, jer su zanemareni prirodni i tehnički činioci ugrožavanja društva koji nisu zanemarivi. Navedene definicije ne daju odgovor koji obim neke pojave i koliko trajanja je potrebno da bi se to smatralo pojavom ili procesom ugrožavanja. Posmatrano globalno može se zaključiti da živimo u svijtu rizika i da je globalno društvo utemeljeno na mnogim rizicima i protivrječnostima koji nisu ograničeni vremenski, prostorno, kao ni društveno. Izvori ugrožavanja se ne mogu smjestiti samo na prostor društvene interakcije, jer procesi u prirodi sve više čovjeka čine nemoćnim pred moćnim prirodnim katastrofama pred kojima on postaje mali i bespomoćan. Suočeni sa bezbrojnim rizicima društva čine ogromne napore da se odupru najvećem broju rizika kroz proces upravljanja rizicima. Proces upravljanja rizicima prinudio je institucije društva da se okreću procesu globalne saradnje sa drugim društvima i njihovim institucijama čime se postiže visok stepen sinergije napora, arezultat je veći stepen učinka. To, kako isiče Gidens, mora dovesti do višeg stepena društvene refleksivnosti, ili drukčije rečeno mora se kritički promišljati na date okolnosti. Takvim stanjem sociologija kao kritička nauka dobija bitnu ulogu i zadatak u procesu razumijevanja svih ovih pojava i njihovom uticaju na razvoj i funkcionisanje društva i društva, posmatrano globalno.

Uopšte posmatrano, ugrožavanje bezbjednosti postoji uvijek kada se dovodi u pitanje postojanje, ispoljavanje i uživanje onog što je za društvo vrijedno i značajno, odnosno kada se na referentnim vrijednostima javljaju ili se mogu javiti neželjene promjene ili se ne mogu nesmetano uživati. Znači, ugrožavanje bezbjednosti je process, ali i stanje koje je njegova posljedica.

„Geopolitičke promjene u zadnjim decenijama prošlog vijeka su prouzrokovale promjenu mnogih dotadašnjih strategija i politika bezbjednosti i inicirale nove pristupe u bezbjednosnim aspektima, kako u teoriji, tako i u praksi. U narednom periodu geopolitičke promjene će neminovno kreirati novo bezbjednosno okruženje, nove koncepte bezbjednosti i različite konsekvence. Otvoreno je pitanje kako će pojedini faktori uticati na oblik, sadržaj, domet i posljedice novih oblika i rizika.” (Kovačević, u Zbornik 2015:15-16).

Proces globalizacije teče sa svim svojim osobenostima, pozitivnim i negativnim, koji uključuje prijetnje i bezbjednosne izazove globalnog karaktera, kao što je međunarodni terorizam. „Imajući u vidu najavljeni proces globalizacije sa sobom neminovno nosi i odlučne otpore ovom procesu, SAD su se oredijelile za podrivanje i destabilizaciju iznutra „neposlušnih zemalja”. U tom opštem procesu destabilizacije svoje mjesto nalaze i i razne militatne, separatističke kriminogene, fundamentalističke i druge grupe, kao transmisija nasilja prema legalnim organima vlasti, zarad svojih ciljeva i interesa. Suprotnost između razvijenih i nerazvijenih zemalja je sve veća i izraženija, a to se posebno ispoljava u domenu energetske potreba. U današnje vrijeme SAD troše 25% svjetske proizvodnje nafte.” (Keserović, 2012:410).

Globalni rat protiv terorizma koji su SAD povele nakon 11. septembra, uključivanjem u procese održavanja mira u Avganistanu, Iraku, Libiji, Siriji, Balkanu, izazvao je kontraakcije terorističkih organizacija koje različitim oblicima terorističkih akcija nastoje da utiču na politiku SAD i drugih zemalja antiterorističke koalicije u regionu Bliskog i Srednjeg istoka.

„Po mišljenju stručnjaka sa prestižnog međunarodnog institut za strateške studije iz Londona, borba protiv terorizma koja je započela protivterorističkom operacijom u Avganistanu, invazijom i okupacijom Iraka, akcijama u Pakistanu koje su dovele do ubistva osnivača i vođe Al Kaide, Osame Bin Ladena, intervecijom u Libiji, prijetnjom intervencijom u Siriji, Iranu, Sjevernoj Koreji, tek je otvorila „pandorinu kutiju”, jer je omogućila regrutovanje novih terorista za nove poduhvate koji poprimaju karakter oružanih agresija, ne po angažovanim snagama, koliko po posljedicama koje prouzrokuju po nacionalne bezbjednosne sisteme i njihove vlade. Očiti primjer za to je i teroristički napad u Moskvi, Madridu i Londonu koji svjedoči o reorganizovanosti Al Kaide.” (Keserović, 2012:410).

Globalizacija je učinila da se društva otvaraju, dovela je do uspona individualizma i sve manjeg interesa za probleme društva. To, na određen način, dovodi do pasivnosti pojedinca prema problemima bezbjednosti. S jedne strane, neupitan je i nepodijeljen interes, kako pojedinca, tako i društva da sistem bezbjednosti funkcioniše, dok sa druge strane mogućnost da pojedinac uoči, razumije i adekvatno reaguje na prijetnje je u najmanju ruku, upitna. „Posljedice globalizacije su dalekosežne i dopiru praktično od svih aspekata društvenog svijeta. Pa ipak, s obzirom da je globalizacije nezavršen proces koji po svojoj unutrašnjoj prirodi kontradiktoran, ona proizvodi posljedice koje je teško predvidjeti i kontrolisati. O tom procesu možemo razmišljati i u kategoriji *rizika*. Mnoge promjene do kojih je dovela globalizacija rađaju nove oblike rizika koji se u velikoj mjeri razlikuju od onih koji su postojali u prošlosti. Za razliku od nekadašnjih rizika koji su imali utvrđene uzroke i poznate posljedice, rizicima savremenog doba ne može se odrediti porijeklo niti im se mogu sagledati efekti.” (Gidens, 2007:71-72).

U nedostatku definitivnog odgovora u vezi sa uzrocima i ishodištima različitih rizika i prijetnji, pojedinac je prinuđen da samostalno donosi odluke o tome koje rizike je spreman da prihvati, što može djelovati vrlo zbunjujuće. Čak i jednostavne odluke, kao što je odluka o tome šta jesti se donose u opštoj zbrci kontradiktornih informacija o pojedinim prehrambenim proizvodima. Slična situacija je i sa vakcinama, kao sredstvu za preventivnu zaštitu od teških bolesti koje mogu imati epidemijske razmjere.

„Pod uticajem naučno-tehnološkog napretka pojavljuju se novi činioци u procesu proizvodnje i prometa kao što su informacija, prostor i vrijeme. Dolazi do ekspanzije obrazovanja nevjerovatnih razmjera i dinamike, a broj naučnih organizacija i naučnih radnika raste geometrijskom progresijom. Na taj način obrazovanje izmiče društvenoj kontroli, a mogućnost zloupotrebe znanja, takođe, raste geometrijskom progresijom. Vojna industrija, genetski inženjering i proizvodnja genetski modifikovanih organizama, navedena ugradnje čipova u tijelo ljudi sa podacima o svakom čovjeku uvodi nas brzinom svjetlosti u zonu sumraka. Multinacionalne kompanije osvajaju apsolutni monopol na znanje i potčinjavaju ga logici profita i vladanju ljudskim umom, a za to vrijeme škole su izgubile trku sa vaspitanjem o kojem je govorio Lok.” (Barašin, Zbornik 2015:207).

Osnovna funkcija sistema bezbjednosti je preventivna, koja svojim postojanjem i znanjem predstavlja instrument odvratanja neprijateljske i druge kriminalne djelatnosti

organizacija, grupa ili pojedinaca. Ako do nepoželjne aktivnosti dođe, sistem mora energično i represivno djelovati, otklanjanjem uzroka opasnosti i eliminisanjem njihovih nosilaca na pravno dozvoljen način.

3. LJUDSKA PRAVA I BEZBJEDNOST

Bezbjednost je jedna od osnovnih ljudskih potreba kao što su neupitna garancija opstanka, napretka i blagostanja, ekonomska sigurnost, humanost i poredak; slobodan život bez straha i teškoća; univerzalno dobro na koje svi imaju pravo, ali i svečano obećanje političkih vođa kojima je bezbjednost ljudi prvorazredna obaveza, najvažniji cilj u unutrašnjoj i spoljašnjoj politici; spremnost da se uspostavi jaka veza između pojedinaca i svijeta, države i građanina.

Stvaranje nove politike nacionalne bezbjednosti je preduslov i okvir za stabilnost u regionu i uključivanje u svjetske tokove. Pitanje kreiranja nacionalne bezbednosne politike je posebno značajno jer je ono ujedno i dio procesa tranzicije BiH, kao pokazatelj smjera, tempa i dohvata reforme celokupnog društva. Sa druge strane, kreiranje nacionalne bezbjednosne politike podrazumijeva izbalansiran sistemski pristup, kako prema potrebi za uspešnim i efikasnim eliminisanjem pojava ugrožavanja bezbjednosti, tako i prema očuvanju i unapređenju ljudskih prava i sloboda. Samo na taj način moguće je maksimalno isključiti zloupotrebe, kao što je pravo na privatnost linosti i drugih tekovina opšteg civilizacijskog dostignuća. Neprestano treba imati u vidu da ljudska prava predstavljaju osnovna moralna prava svih ljudi i da su neophodna za dostojanstven život. Poštovanje ljudskih prava, kao ideal i imperativ, s kraja XX i početka XXI veka, postalo je prirodno povezano sa međunarodnim mirom i bezbjednošću, što ukazuje na novi model koncepta ljudske bezbjednosti. Zbog toga su ova prava univerzalna, neotuđiva, urođena i nedjeljiva. Da bi se ostvarila, ljudska prava moraju da budu identifikovana i kodifikovana u okviru međunarodnog, regionalnog i nacionalnog pravnog sistema. Države i njihove izvršne vlasti moraju imati zakonsku obavezu da ih poštuju prema međunarodnim, univerzalnim i regionalnim standardima, kao i po nacionalnom ustavu i zakonima. Koncept ljudskih prava moraju da brane nezavisni sudovi zakonom propisnim procedurama. Da bi bila efikasna, ljudska prava moraju se inkorporirati u nacionalne zakone, a zakonski elementi prava ne mogu se ignorisati.

ZAKLJUČAK:

Glavno obilježje bezbjednosti na početku 21. vijeka je mješavina kontinuiteta i promjena, neizvjesnosti i međuzavisnosti. Dramatične promjene u međunarodnim odnosima, započete rušenjem blokovske podjele svijeta i raspadom Varšavskog pakta, doprinijele su značajnom napretku, ali i brojnim protivrječnostima. Bezbjednosni izazovi u interesno polarizovanom svijetu su u porastu. Kraj „hladnog rata“ donio je promjene u međunarodnim odnosima koje su se najznačajnije odrazile na bezbjednost. Novi pristupi bezbjednosti usmjereni su na širenje stabilnosti, saradnje i bezbjednosnog okruženja, kao glavnih načina za dostizanje i očuvanja nacionalne i globalne bezbjednosti. U najnovijim

idejama, u tzv. kooperativnoj bezbjednosti, nacionalna bezbjednost više nije jedini objekt bezbjednosne pažnje, a država nije jedini subjekat. Briga o zaštiti i bezbjednosti jednako se usmjerava na bezbjednost pojedinca, kolektivnu bezbjednost i odbranu, kao i na širenje saradnje u oblasti bezbjednosti. U očuvanju i jačanju bezbjednosti, pored države i njene vojne moći, sve veći uticaj imaju međunarodne organizacije, nevladine organizacije, pojedinci, kao i drugi subjekti međunarodnih odnosa.

Pronalaženje novih strategija i efikasnih i provodivih programa koji će pravovremeno i efikasno odgovoriti na bezbjednosne izazove, rizike i prijetnje, kao i osposobljavanjесvih društvenih struktura za život u svijetu koji se konstantno mijenja imperativ je savremenog društva.

LITERATURA:

- Ejodus, F. (2012). *Međunarodna bezbjednost: teorije, sektori i nivoi*. Službeni glasnik i Centar za bezbjednosnu politiku.
- Đorđević, M. (2013). *Sistem bezbednosti, praktikum*. Niš: Visoka škola strukovnih studija za kriminalistiku i bezbednost.
- Gidens, E. (2007). *Sociologija*. Beograd: Ekonomski fakultet.
- Keserović, D. (2012). *Sistem bezbjednosti Evropske Unije*. Banja Luka: Fakultet za bezbjednost i zaštitu.
- Kukić, S. (2004). *Sociologija, Teorije društvene strukture*. Sarajevo Publishing: Sarajevo.
- Mijalković, S., Keserović, D. (2010). *Osnovi bezbjednosti*. Banja Luka: Fakultet za bezbjednost i zaštitu.
- Simić, D. (2002). *Nauka o bezbednosti: savremeni pristup bezbednosti*. Beograd: Službeni list SRJ i Fakultet političkih nauka.
- Tarnier, Dž. (2009). *Sociologija*. Novi Sad/Beograd: Mediteran Publishing.
- Tatalović, S. (2006). Koncepti sigurnosti na početku 21. stoljeća. *Međunarodne studije*, 6(1).
- Vejnović, D., Obrenović, P. (2017). *Defendološki izazovi u međunarodnim odnosima sa pogledom na BiH*. Banja Luka: Evropski defendologija centar.
- Vojna enciklopedija. (1970). K-1. Beograd: VIZ.

ULOGA PROVAJDERA BEZBEDNOSTI NA NACIONALNOM NIVOU U KONTROLI ZLOČINA MRŽNJE¹

Pregledni rad

DOI 10.7251/DEFSR1841002L	COBISS.RS-ID 7744536	UDK 004.738.5:343.6
---------------------------	----------------------	---------------------

doc. dr Velibor Lalić²

Fakultet bezbjednosnih nauka

Univerzitet u Banjoj Luci

Apstrakt:

U ovom radu se analizira uloga provajdera bezbednosti na nacionalnom nivou u kontroli zločina mržnje. Poseban osvrt je dat na ulogu policije i tužilaštva, ali i drugih subjekata koji imaju društveni značaj u stvaranju pogodnog ambijenta za prevenciju ovih krivičnih dela. To su prvenstveno vaspito-obrazovne institucije, političke elite, i mediji. Efikasna kontrola zločina mržnje je sveobuhvatan proces u kome aktivno treba da budu uključeni različiti subjekti u društvu, ne samo organi formalne društvene kontrole. Integralni prisup ovom problemu dugoročno može dati pozitivne rezultate, bilo da je reč o represivnom delovanju ili o prevenciji.

Ključne reči: *Zločini mržnje, policija, tužilaštvo, vaspitno-obrazovne institucije, mediji.*

UVOD

Iako se radi o fenomenu koji je duboko ukorenjen u ljudskoj istoriji, sintagma zločini mržnje je relativno novijeg datuma, kao i prava rešenja na koji način pojedine države tretiraju ovu problematiku. U sociološkom kontekstu zločini mržnje su posledica konflikata društvenih grupa koje imaju različite društvene identitete. Pojedinaac kao objekat napada nije bitan, bita je njegova grupna pripadnost. Takva pozadina ovih krivičnih

¹ Rad je nastao kao deo istraživanja u okviru izrade doktorske disertacije „Zločini mržnje u Bosni i Hercegovini“ na Fakultetu bezbednosti Univerziteta u Beogradu (Lalić, 2013).

² Korespondent: doc. dr Velibor Lalić, Fakultet bezbjednosnih nauka, Univerzitet u Banjoj Luci.
E-meil: lalicvelibor@gmail.com.

dela sadrži veliki konfliktan potencijal i predstavlja bezbednosnu pretnju, posebno u društvima koja su se već suočila sa etničkim, rasnim ili drugim oblicima nasilja zasnovanim na identitetnim razlikama. U psihološkom smislu zločini mržnje su počinjeni zbog predrasuda prema identitetno različitim društvenim grupama.

Kontrola nasilja koje je motivisano mržnjom i predrasudama veliki je izazov sa kojim se suočavaju organizacije na supranacionalnom nivou. Prvenstveno je reč o Ujedinjenim nacijama, preciznije o Komitetu Ujedinjenih nacija za eliminaciju rasne diskriminacije (UNCERD), zatim Savetu Evrope – Evropskoj komisiji protiv rasizma i netolerancije (ECRI), Agenciji Evropske unije za fundamentalna prava (FRA), i Organizaciji za evropsku bezbednost i saradnju (OEBS) (Lalić & Matijašević, 2015). Međutim, pored supranacionalnog nivoa suprotstavljanje ovom fenomenu na nacionalnom nivou od ključnog je značaja. Predmet ovog rada jeste sagledavanje delovanja provajdera bezbednosti na nacionalnom nivou u kontroli zločina mržnje. Prvo biće analizirana uloga policije, zatim tužilaštava, a potom i ostalih subjekata koji svojim delovanjem mogu doprinijeti efikasnijoj kontroli ove vrste nasilja. To su prvenstveno vaspito-obrazovne institucije, političke elite, i mediji.

1. ULOGA POLICIJE U SPREČAVANJU I SUZBIJANJU ZLOČINA MRŽNJE

Policija ima ključnu ulogu u društvu u vezi sa sprečavanjem i suzbijanjem zločina mržnje. Od posebnog značaja svakako je obučenost i uspešnost policije u rasvetljavanju ovih krivičnih dela, postupanju sa žrtvama, te odnosima sa zajednicom i sa medijima.

Specifičnosti organizacione kulture³ policijskih organizacija jesu jedan od činioca koji utiču na prijavljivanje zločina mržnje (Nolan & Akiyama, 1999). Nolan i Akiyama navode sledeće činioce: stavove u organizaciji u vezi s ovim pitanjima, poverenje zajednice u policiju, resurse, kulturne konflikte uzrokovane razlikama između dominantnih vrednosti kulture društva u kojoj organizacija egzistira i kulturnih vrednosti ugroženih grupa (Nolan & Akiyama, 1999:124). Prijavljivanje zločina mržnje zavisi i od individualnih karakteristika policijskih službenika, tačnije od ličnih stavova i vrednosti, odgovornosti u sprovođenju organizacionih pravila, podrške rukovodilaca i kolega, ličnog uverenja u kojoj meri organizacija posvećuje pažnju ovom problemu kroz obuku i dodeljene resurse (Nolan & Akiyama, 1999:124), te od sposobnosti i spremnosti policijskog službenika da za određeno krivično delo prepozna da je počinjeno iz mržnje (Saucier et al., 2006:891).

Spremnost žrtava da prijave ova krivična dela od ključne je važnosti. Jedan od bitnih razloga zašto je velika tamna brojka ovih krivičnih dela jeste činjenica da ih žrtve ne prijavljuju zbog straha od sekundarne viktimizacije od strane okruženja ili zbog nepoverenja prema policiji (Perry, 2001; Cogan, 2002; Levin et al., 2007; McVeigh et al., 2003; Berrill, 1992; Herek, 1992). Nepoverenje prema policiji može biti posledica specifičnosti policijske supkulture koju karakteriše grupna zatvorenost, nedostatak senzibilnosti prema različitim društvenim grupama i njihovoj kulturi i životnim stilovima. Često su

³ Organizaciona kultura predstavlja skup stavova, vrednosti, normi i obrazaca ponašanja koji su svojstveni određenoj organizaciji (Brown, 1995; Janjićević, 1997).

tu i policijska brutalnost, rasne i druge predrasude, konzervativizam, mačizam i cinizam, što može voditi formiranju radikalnih, desničarskih stavova prema rasnim, etničkim i seksualnim manjinama i osobama koje preferiraju slobodnije nekonvencionalne životne stilove (Reiner, 1985; Skolnick, 1966). Imigranti često ne prijavljuju ova krivična dela zbog kulturnih razlika: tradicionalnog nepoverenja u policiju u zemljama iz kojih dolaze, te zbog jezičkih barijera i nezakonitog statusa (Levin & Amster, 2007:331).

Istraživanje zločina mržnje zavisi od zakonskog osnova za postupanje policijskih službenika kada su ova krivična dela u pitanju. Organizacioni činioci takođe imaju veliki značaj. To se prvenstveno odnosi na postojanje u okviru policijskih organizacija posebnih odeljenja za suzbijanje zločina mržnje. Od značaja je i da svi policijski službenici budu osposobljeni da prepoznaju određeni događaj kao akt nasilja motivisan mržnjom ili predrasudama, u cilju pokretanja dalje istrage. Potrebni su i drugi uslovi, poput poverenja i dobrih odnosa sa zajednicom, posebno s ugroženim, manjinskim grupama čiji su pripadnici često žrtve zločina mržnje (Strobl et al., 2005:638). Za uspostavljanje poverenja u rad policije od velikog značaja je i zastupljenost manjinskih grupa u policijskim strukturama (Multilingual Orientation Service Association for Immigrant Communities [MOSAIC], 2003).

Efikasna kontrola zločina mržnje od strane policije moguća je i u vrlo kompleksnim demografskim i kulturnim sredinama. Primer za to je grad Njujork, SAD, koji je jedan od gradova sa najheterogenijom strukturom stanovništva na svetu. Iako su zločini mržnje bili znatno izraženi u ranijem periodu, nakon usvajanja zakonskih propisa koji regulišu ovu oblast i nakon pojačane aktivnosti njujorške policije, od sredine 90-ih naovamo, došlo je do trendova opadanja ovih krivičnih dela. Pozitivni rezultati vidljivi su uprkos složenom društvenom okruženju, uzrokovanom intenzivnim demografskim, ekonomskim, tehnološkim i bezbednosnim promenama. Iskustva njujorške policije ukazuju da se povećanje efikasnosti rada policije na suzbijanju zločina mržnje može postići formiranjem specijalizovanih odeljenja za suzbijanje zločina mržnje, uspostavljanjem jasnih protokola za postupanje, obukom policije, efikasnim prikupljanjem podataka, kontaktima sa zajednicama, oštrijom kaznenom politikom, saradnjom sa medijima i uspostavljanjem višejezičnog servisa za žrtve (Levin & Amster, 2007:338).

Primer dobre prakse jeste i Baltimorska kantonalna policija, SAD (engl. *Baltimore County Police – BCPD*), koja je jedna od prvih policijskih agencija u SAD koja je još davne 1981. godine uvela program za postupanje u vezi sa incidentima motivisanim religijskom, rasnom i etničkom mržnjom. Takva praksa je ustanovljena zbog učestalih aktivnosti Kju kluks klana, posebno spaljivanja krstova u cilju zastrašivanja crnačkog stanovništva. Posebna pažnja posvećuje se osetljivosti postupanja policije prema žrtvama, njihovim porodicama i zajednici – zbog emocionalnih trauma koje su doživele. U skladu sa procedurama, policija beleži sve događaje koji imaju elemente incidenta mržnje ili zločina mržnje. Policajac prvi dobija saznanje o događaju, zatim obaveštava istražitelje, istražitelji nakon prikupljenih dokaza sačinjavaju izveštaj koji se dostavlja verifikacionoj komisiji, koja procenjuje da li određeni događaj ima elemente zločina mržnje ili ne. Iz iskustava baltimorske policije proizlaze preporuke za povećanje efikasnosti policije, a to su prvenstveno postojanje jasnih procedura u policijskim organizacijama za postupanje u vezi sa zločinima mržnje, zatim obuka policijskih službenika i programi rada policije u zajednici (Martin, 1999).

Pozitivna iskustva o kontroli zločina mržnje i povećanje efikasnosti rada policije dolaze iz Velike Britanije. Naime, reč je o iskustvima jednog od programa Ministarstva unutrašnjih poslova čiji je fokus na zločinima mržnje i porodičnom nasilju. Cilj programa jeste transformacija rutinskih policijskih evidencija u evidencije od koristi za praktičnu politiku, strategiju i policijsku praksu. Pored londonske policije i kriminologa, u programu su učestvovali i drugi istraživači iz oblasti društvenih nauka koji nemaju iskustva u radu sa policijskim organizacijama. U projektu su primenjivali kombinaciju kvantitativnih i kvalitativnih metoda, na osnovu kojih su dobili korisne podatke o zločinima mržnje i radu policije – na osnovu kojih se mogu identifikovati i razumeti problemi, time i unaprediti delovanje policije. Ovakvi programi predstavljaju dobar primer primene naučnih istraživanja u praktične svrhe (Stanko, 2004).

Od stručnih radova koji se mogu naći u literaturi o postupanju policije na suzbijanju zločina mržnje, tu je priručnik koji je sačinila Radna grupa za pitanja rase i različitosti Asocijacije šefova u policiji i Jedinica za policijske standarde Ministarstva unutrašnjih poslova Velike Britanije Association of Chief Police Officers [ACPO] & The Home Office Police Standards Unit, 2005). Svrha priručnika je preispitivanje dosadašnjih praksi policijskih agencija i razvoj novih pristupa i taktika delovanja. Priručnik je napravljen na osnovu proverenih iskustava raznih policijskih agencija širom Engleske, Velsa i Severne Irske. U priručniku se navodi strateški značaj policije u zaštiti lične i imovinske sigurnosti svih građana, kao vitalnih civilizacijskih vrednosti demokratskih društava. Izostanak ili neadekvatne reakcije na ova krivična dela utiču na poverenje javnosti u policiju, jer posledice zločina mržnje utiču ne samo na žrtvu već i na njenu porodicu i zajednicu kojoj pripada. U priručniku je dat sadržajan prikaz uputstava za operativno delovanje, a tu su definicije pojma, zakonski propisi, načini prikupljanja informacija, pitanja prijavljivanja krivičnih dela i statističkog praćenja, postupak sa žrtvama, uputstva za vođenje istraga, saradnja sa drugim agencijama, zatim objašnjeni su specifični pojmovi oblici zločina mržnje, zločini mržnje i incidenti unutar policijskih organizacija, obuka policijskih službenika, odnosi sa medijima i, na kraju, evaluacija radnih rezultata.

Takođe i Međunarodna asocijacija policijskih šefova (engl. *International Association of Chiefs of Police*) sačinila je sažeta uputstva za policijske službenike u vezi sa istraživanjem i prevencijom zločina mržnje (Turner, 2001). Korisna su ova uputstva za razumevanje prirode ovih krivičnih dela, kao i uputstva policijskim službenicima šta treba da čine na mestu kriminalnog događaja. Od posebnog su značaja indikatori koji ukazuju na postojanje zločina mržnje,⁴ te uputstva kako postupati sa žrtvama i zajednicama kojima žrtve pripadaju. Od značaja je spomenuti i program OSCE – ODIHR obuke za policijske službe za suzbijanje zločina mržnje. Program se sastoji iz četiri faze:

- 1) reagovanje, istraga, sakupljanje i razmena informacija i saradnja sa tužiocima,
- 2) razvijanje strategija za suzbijanje zločina mržnje koji su zasnovani na proaktivnom rukovodstvu policije i saradnji sa zajednicama,

⁴ Percepcije žrtve i svedoka u vezi sa krivičnim delom; komentari izvršilaca, gestovi ili pismene izjave koje ukazuju na predrasude, uključujući grafite ili druge simbole; svaka razlika između izvršioca i žrtve, bilo stvarna ili pretpostavljena od strane izvršioca; slični incidenti na istim lokacijama ili naselju koji ukazuju na iste oblike ponašanja; žrtva je bila angažovana na aktivnostima promovisanja svoje grupe ili zajednice; postojanje koincidencije vremena dešavanja incidenta sa praznikom ili datumom od posebnog značaja; članstvo izvršioca u ekstremističkim grupama ili saradnja sa njihovim članovima; odsustvo drugog motiva, poput materijalne koristi i sl. (Turner, 2001).

- 3) razvijanje efikasnog procesa sakupljanja i prosleđivanja podataka zločina mržnje,
- 4) obuke tužilaca kako da koriste dokaze u cilju dokazivanja krivičnog dela.⁵ Program je prilagođen specifičnostima i potrebama svake države posebno.

U celini posmatrano, uloga policije u sprečavanju i suzbijanju zločina mržnje od suštinskog je značaja. Efikasan pristup prvenstveno podrazumeva osposobljenost policije, organizacionu kulturu koja uvažava različitosti, zatim odnose sa građanima zasnovan na međusobnom poverenju, posebno sa manjinskim zajednicama.

2. ULOGA PRAVOSUDNIH ORGANA U SPREČAVANJU I SUZBIJANJU ZLOČINA MRŽNJE

Efikasan rad organa pravosuđa takođe je od velike važnosti za društvenu kontrolu zločina mržnje. Krivično gonjenje i utvrđivanje krivične odgovornosti jasan je pokazatelj društvene osude ovih krivičnih dela. Utvrđivanje krivične odgovornosti izvršilaca krivičnih dela počinjenih iz mržnje nema samo značaj u smislu specijalne i generalne prevencije, već je bitno sa stanovišta stvaranja poverenja žrtve i žrtvine zajednice u sistem krivičnog pravosuđa i društveni sistem u celini. U suprotnom, ako sistem nije u stanju da vrši svoje kontrolne i usmeravajuće funkcije, zakonito se javljaju krize,⁶ stvaraju se pogodni društveni uslovi za nastanak novih rasnih, nacionalnih, verskih i drugih konflikata i produbljivanje postojećih, posebno u društvenim okruženjima gde su ti odnosi tradicionalno narušeni.⁷

U postojećoj svetskoj literaturi iz ove oblasti vrlo je malo naučnih radova koji se specifično ili bar delimično bave postupanjem pravosuđa i odgovornosti izvršilaca ovih krivičnih dela. Jedan od radova značajnih za ova pitanje jeste *Hate Crime Offenders: An Expanded Typology* (McDevitt et al., 2002), u kome Mekdevit i saradnici predlažu da se prilikom krivičnog gonjenja i izricanja kazne izvršiocu krivičnog dela počinjenog iz mržnje, ukoliko je izvršeno u grupi, uzme u obzir stepen učešća i odgovornosti svakog od učesnika, imajući u vidu ulogu koju je imao tokom incidenta. S tim u vezi autori razlikuju četiri vrste učesnika u incidentu: vođe i saučesnike, nevoljne učesnike i heroje. Za svaku od četiri vrste izvršilaca po klasifikaciji ovih autora odgovara jedna od navedenih uloga – time i stepen odgovornosti. Po njima, vođe i saučesnici snose najveću odgovornost, bilo da ohrabruju druge na izvršenje dela ili aktivno učestvuju u izvršenju. Nevoljni učesnici ne učestvuju aktivno u incidentu ili pokušavaju da spreče zločin ili da pomognu

⁵ Program obuke za policijske službenike, http://www.osce.org/publications/odihr/2006/09/20673_676_sr.pdf. Vebsajt posećen 23.12.2009. godine.

⁶ Takvo stanje se u sociološkoj teoriji naziva disfunkcionalnost društvenog sistema, a u političkoj teoriji kriza legitimnosti vlasti (Milašinović, 2008:70).

⁷ Primera radi, 17. i 18. maja 1980. u Majamiju, SAD, desili su se veliki rasni nemiri i sukobi zbog presude kojom su oslobođena krivične odgovornosti četiri bela policajca koji su, zbog navodno počinjenog prekršaja, na smrt pretukli crnca Mekdafija. U neredima je bilo petnaest mrtvih i više od dvesta ranjenih. U Los Anđelesu su izbili neredi 29. aprila 1992. zbog oslobađajuće presude četiri bela policajca koji su optuženi zbog fizičkog zlostavljanja mladog crnca. U neredima je bilo 47 mrtvih i 2.328 ranjenih (De Fontet, 1999:104).

žrtvi. Heroji pokušavaju da spreče druge učesnike da izvrše zločin, upozoravaju žrtve ili prijavljuju aktivnost grupe policiji (McDevitt et al., 2002:313).

Takođe treba spomenuti i akademski članak *The Prosecution of Hate Crimes: The Limitations of the Hate Crime Typology* (Phillips, 2009), u kome se kritikuje tipologija izvršilaca krivičnih dela zločina mržnje koju su sačinili Mekdevit i saradnici, jer ne obuhvata slučajeve gde mržnja nije osnovni već periferni motiv, što je od velikog značaja u dokazivanju krivičnog dela počinjenog iz mržnje i signal zakonodavcu da treba da predvidi i takve slučajeve, jer se često dešavaju u praksi.

Džems Morš (James Morsh) u citiranom članku *The Problem of Motive in Hate Crimes: The Argument against Presumptions of Racial Motivation* bavi se problemom dokazivanja motiva zločina mržnje, analizirajući argumente da se kompleksan problem dokazivanja rasističkog motiva reši tako da teret dokazivanja motiva bude na odbrani a ne na tužiocu, tj. da se uvede pretpostavka rasističkog motiva kada su u pitanju rasistički napadi belaca na manjinske grupe u SAD, jer bi se na taj način obezbedio veći broj osuđujućih presuda. U tom slučaju optuženi bi morao dokazati da njegov akt nije motivisan rasnom mržnjom, već nekim drugim motivom (Morsch, 1991:674). Zagovornici ovog pristupa navode da se na ovaj način eliminiše mogućnost arbitrarnih i nezakonitih presuda (Morsch, 1991:675), a njegovi kritičari smatraju da to ne bi bilo u skladu sa Ustavom SAD, jer se narušava princip jednakosti pred zakonom (Morsch, 1991:681). Morš navodi da države treba da usvoje jasne standarde za dokazivanje motiva optuženih za krivična dela počinjena iz mržnje i da tužioci treba da dokažu da je ponašanje optuženog dominantno rukovođeno rasnom mržnjom. Takođe smatra da države treba da uspostave kontrolne mehanizme za nadzor nad radom organa pravosuđa, jer odluke koje oni donose isto tako mogu biti rasistički motivisane (Morsch, 1991:689).

Pored malog broja naučnih radova, prisutan je skroman broj stručnih radova. U tom segmentu važno je spomenuti Priručnik za tužioce, Američkog istraživačkog instituta za tužioce⁸(APRI, 2001). Priručnik sadrži osnovna objašnjenja šta su to zločini mržnje, pregled problematike i zakonskih propisa, saradnju sa drugim agencijama, uputstva za identifikaciju i istraživanje zločina mržnje, uputstva za pripremu predmeta za krivično gonjenje i, na kraju, uputstva za prevenciju ovih krivičnih dela.

Ovde ćemo pomenuti priručnik koji je priredila Kancelarija za demokratske institucije i ljudska prava (ODIHR), Organizacije za evropsku saradnju i bezbednost (OSCE) *Hate Crime Laws: A Practical Guide* (OSCE – ODIHR, 2009a), u kome se objašnjavaju argumenti za postojanje zakonskih propisa o zločinima mržnje i navode se primeri iz prakse na koji su način različita zakonodavstva rešila ovaj problem. Takođe, u priručniku su obrađena ključna pitanja koja zakonodavac treba da uzme u obzir pri izradi propisa iz ove oblasti. Iako je ovaj priručnik prvenstveno namenjen zakonodavcima kao pomoć pri izradi propisa iz ove oblasti, svakako predstavlja korisno štivo javnim tužiocima i sudijama za razumevanje pravne prirode ovih krivičnih dela. Pored toga, navedena su i dragocena iskustva iz drugih zakonodavstava. Posebno koristan u priručniku jeste deo o dokazivanju krivičnih dela počinjenih iz mržnje (OSCE – ODIHR, 2009a:47–52), gde se govori o dokazivanju motiva predrasude ili mržnje, kako u slučajevima gde je motiv evidentan, tako i za situacije gde pored motiva predrasude ili mržnje postoje i drugi motivi.

⁸ Engl. *Hate Crimes: A local Prosecutor's Guide for Responding to Hate Crimes*.

Rad pravosuđa u vezi sa krivičnim gonjenjem krivičnih dela počinjenih iz mržnje zavisi od mnoštva činilaca. Osnovni činioci su adekvatna zakonska rešenja, dakle pravni osnov za postupanje tužilaštva i sudova. Ukoliko postoji jasan pravni okvir za krivično gonjenje izvršilaca ovih krivičnih dela, stvoreni su formalno- pravni uslovi za delovanje svih organa formalne društvene kontrole, od policije, do javnih tužilaštava i sudova. Međutim, zbog nedostatka iskustva iz ove oblasti, neadekvatnih zakonskih rešenja ili sumnje da se neće uspeti dokazati motiv izvršioca, sudije i tužioci često kvalifikuju određeno krivično delo gde je motiv predrasude ili mržnje evidentan – kao neko drugo krivično delo (Morsch, 1991:672). Pored toga, sudije olako prihvataju priznanje krivice izvršioca za neko drugo krivično delo, negirajući motiv predrasude ili mržnje (Burney & Rose, 2002:111). Ukoliko javni tužioci u svojoj praksi ne uspevaju da dokažu ovaj motiv ili suđenja izuzetno dugo traju, nakon čega sud izriče blage kazne za izvršioca ovih krivičnih dela od strane suda (Strobl et al., 2005:638), čitav koncept zločina mržnje gubi društveni smisao i krivičnopravni značaj. Sprovođenje zakonskih odredaba o zločinima mržnje šalje poruku podrške manjinskim grupama, a mali broj osuda indikator je koji ukazuje na neuspeh slanja te poruke (Morsch, 1991:673). Iz tog razloga efikasan rad organa pravosuđa treba da omogući potvrdu validnosti zločina mržnje kao posebne vrste krivičnih dela – ili da se čitav koncept temeljno preispita.

3. OSTALI SUBJEKTI U KONTROLI ZLOČINA MRŽNJE

a) Vaspito-obrazovne institucije

Vaspitno-obrazovne institucije imaju ključnu ulogu u formiranju stavova mladih generacija. Društvo prenosi na mlada pokoljenja one vrednosti koje su izdržale sud vremena i koje su se iskustvom pokazale kao značajne za održanje određene društvene grupe. Sociološki gledajući, nijedno društvo nije homogeno, već heterogeno po raznim kulturnim, političkim, socijalnim i drugim osnovama. Društvene razlike u pogodnim uslovima stvaraju paradigmu različitosti – ideološki pogled isključivosti vlastite kulture kao vredne, uz istovremeno negiranje ili omalovažavanje vrednosti drugih društvenih grupa. Stereotipi i predrasude prenose se s generacije na generaciju u vidu tradicije (Ueckert, Kakuska, & Nagorny, 1978:282). Postavlja se pitanje da li se ti neosnovani stavovi mogu smatrati kulturnim nasleđem i kakve posledice dugoročno imaju na društvo i pojedinca? Posledice nisu bezazlene jer se ispoljavaju u vidu sukoba među različitim društvenim grupama, a zločini mržnje su nasilan oblik manifestovanja različitosti. S obzirom na negativne društvene posledice stereotipa, predrasuda, etnocentrizma i mržnje, koja je njihov nužni pratilac i esencija, enkulturacija takvih stavova više spada u domen socijalne patologije nego u domen kulture. Rezultati socijalno-psiholoških istraživanja govore nam da se nasilno ponašanje uči (Bandura, 1977). U skladu sa tom teorijom može se postaviti suprotna tvrdnja: da se nenasilno ponašanje isto tako uči. Svakako da je objašnjenje nasilnog ponašanja vrlo kompleksno i ne može se *a priori* svesti na proces obrazovanja, ali ovaj činilac je značajan u objašnjenju nasilnog ponašanja. Ako prihvatimo pretpostavku da obrazovanje ima pozitivan uticaj na formiranje stavova o društvenim grupama koje

počivaju na drugačijim kulturnim vrednostima, možemo govoriti o značaju i ulozi obrazovanja i vaspitanja u prevenciji zločina mržnje.

Dugoročno gledajući, prevencija zločina mržnje treba da obuhvati obrazovanje školske dece u kulturnim različitostima uvođenjem nastavnih planova i programa koji će omogućiti učenicima da bolje razumeju kulturu različitosti i nediskriminacije (Tilley, 2007:549). Tu je i edukacija mladih kroz organizovanje školskih seminara o ksenofobiji i posete komemorativnim centrima nacističkih zločina (Strobl et al., 2005:640). Takvi pristupi posebno su od velikog značaja za društva gde tradicionalno postoji mržnja i nepoverenje između antagonističkih grupa, čije je bolno istorijsko pamćenje deo kolektivne svesti.

Proces usvajanja kulturnih vrednosti dijaloga i tolerancije ne odnosi se samo na deo populacije u društvu koja učestvuje u procesu formalnog obrazovanja, već i na sve građane. Uspešne strategije za prevenciju zločina mržnje moraju se fokusirati na jačanje demokratskih normi i vrednosti, što uključuje niz aktivnosti građana, institucija i medija. Za primer se mogu navesti iskustva iz Nemačke, gde se sprovodi koncept pozitivne generalne prevencije koji se sastoji u podizanju svesti građanstvu o važnosti normi u društvu. Naime, ukoliko se kršenje normi toleriše, vremenom će svest o obaveznosti poštovanja tih normi oslabiti, a zatim i nestati. Upravo pozitivnom generalnom prevencijom vrši se reafirmacija normi u društvu (Strobl et al., 2005:635). Na građanstvo se može edukativno delovati održavanjem skupova ili koncerata sa kojih se promoviše tolerancija i nenasilje. Usvajanje demokratskih normi ne zavisi od odbacivanja totalitarističkih i neonacističkih ideologija, već u većoj meri od prihvatanja demokratskog životnog stila. Ovakvi pristupi imaju pozitivne efekte i, dugoročno gledano, mogu uticati na smanjenje zločina mržnje (Strobl et al., 2005:636).

b) Političke elite

Političke elite često stvaraju društveno pogodne uslove za nasilje motivisano nacionalnim, rasnim, religijskim ili drugim oblicima mržnje, pružajući aktivnu ili pasivnu podršku stigmatizaciji, demonizaciji ili marginalizaciji tradicionalno potlačenih društvenih grupa. Na taj način država daje legitimitet politici nasilja i politici hegemonije (Perry, 2001:179). Političke elite imaju odgovornost da obezbede ravnopravnost svih građana, vladavinu zakona i da razvijaju uistinu demokratsku političku kulturu koja promoviše, a ne osuđuje, različitosti u društvu. Zločini mržnje su pretnja osnovnim demokratskim vrednostima, time nosioci političke vlasti imaju ustavnu obavezu da štite prava građana i da sprečavaju razne oblike diskriminacije i nasilja u društvu. Postoji čitav niz mera koje se mogu sprovesti na ovom planu, poput ispunjenja međunarodnih obaveza koje proizilaze iz međunarodnih konvencija i drugih akata, uključujući i uspostavljanje saradnje sa međunarodnim telima koja se bave ovom problematikom.

Jedno od esencijalnih pitanja jeste pravna zaštita manjina i njihovo ravnopravno učešće u političkom, ekonomskom i kulturnom životu. Podržavanjem inicijativa kojima se predlažu adekvatna zakonska rešenja može se uticati na izvršnu vlast da omogući efikasnu implementaciju postojećih zakonskih propisa iz ove oblasti. Političke elite mogu podržati, ili bar omogućiti, nesmetan rad nevladinim organizacijama za zaštitu ljudskih prava, posebno onih koje se bave pitanjima rasizma, ksenofobije, verske i drugih oblika diskriminacije i netolerancije. Od posebnog je značaja uloga političkih elita u postkon-

fliktnim društvima, gde su izražene subjektivne posledice konflikta u vidu sentimenta mržnje prema pripadnicima drugih, suprotstavljenih nacionalnih, religijskih ili drugih grupa. Socijalni psiholozi smatraju da se na neutralisanje mržnje može delovati usmeravanjem mržnje na učesnike u ratnom zločinu, zatim zakonskim merama, informisanjem, interakcijom i obrazovanjem i vaspitanjem (Milosavljević, 2004:395).

Koja je uloga političkih elita u tim društvenim okruženjima i šta oni mogu učiniti na neutralisanju nastalih posledica? Predstavnici političkih elita mogu usmeravati i lokalizovati mržnju na učesnike u ratnom zločinu – organizatore, ideologe i izvršioce, umesto na jedan narod ili drugu grupu. Lokalizacijom mržnje identifikuju se odgovorni za zločine i na taj način se sprečava da mržnja bude isključivi i dugoročni pokretač odnosa između antagonističkih društvenih grupa. Na neutralisanje mržnje političke elite mogu uticati tako što daju političku podršku efikasnom delovanju sistema krivičnog pravosuđa, čime se šalje jasna poruka da će takva ponašanja biti oštro sankcionisana. Takođe, u javnim istupima mogu izbegavati nasilnu komunikaciju i govor mržnje, čime se evociraju sentiment mržnje. Sa druge strane, svojim umerenim izjavama i političkim delovanjem mogu promovisati vrednosti političke kulture dijaloga, tolerancije i nenasilja. Ukoliko je delovanje političkih elita usmereno na interakciju i dijalog s antagonističkim grupama, kao i definisanje zajedničkih, mogućih ciljeva, dugoročno gledajući, to bi trebalo doprineti redukciji postojećih tenzija. I, na kraju, političke elite mogu uticati na proces vaspitanja i obrazovanja mladih generacija, tako što će davati političku podršku nastavnim planovima i aktivnostima kojima se promovišu demokratske vrednosti.

c) Mediji

Mediji imaju ključnu ulogu u oblikovanju javnog mnjenja, posebno kada je reč o osetljivim temama poput zločina mržnje. Mediji se bave prodajom vesti, a zločin mržnje je uvek vest koja pobuđuje interesovanje javnosti. Mediji mogu da imaju dvostruku ulogu, prva se odnosi na objektivno informisanje, druga na manipulaciju. Na koji način će mediji postupati, etičko je pitanje.

Kritičari koncepta zločina mržnje kritikuju i ulogu medija, jer su stvorili lažnu sliku o stanju zločina mržnje, često bez osnova ukazujući na alarmantno stanje (Jacobs & Potter, 1998:50–51). Grin i saradnici navode da su mediji imali značajnu ulogu u stvaranju plime ksenofobičnog nasilja u Nemačkoj 1990-ih (Green et al., 2001:496). Važno je pomenuti i činjenicu da je razvoj informacionih tehnologija, posebno interneta, omogućio nove načine širenja raznih vidova mržnje. Mržnja na internetu rasprostranjen je fenomen, jer ga ekstremisti koriste kao globalno sredstvo komuniciranja za širenje ideologija mržnje (Perry, 2001:174). Saradnja medija i policije takođe je od velikog značaja kada su u pitanju zločini mržnje. Pristupi u saradnji mogu biti proaktivni i reaktivni. Proaktivni pristup sastoji se od aktivnosti kojim se promoviše nenasilje i izbegava uvredljiva terminologija pri izveštavanju. Od značaja je i da mediji informišu javnost o detaljima vezanim za lišavanje slobode, podignutim optužnicama i presudama za zločine mržnje, jer takav pristup jača poverenje javnosti u sistem krivičnog pravosuđa (ACPO & Home Office, 2005:95). U reaktivnom pristupu, dakle kada se već desi određeni događaj, saradnja policije i medija je prilika da policija demonstrira otvorenost i odgovornost prema javnosti (ACPO & Home Office, 2005:95).

ZAKLJUČAK

U ovom radu dat je kraći prikaz uloge provjadera bezbednosti na nacionalnom nivou u kontroli zločina mržnje. Svako društvo u skladu sa svojim institucionalnim kapacitetima, politikom suzbijanja kriminaliteta i nivoom poštovanja demokratskih vrednosti reaguje na ova specifična krivična dela. Posledice zločina mržnje prevazilaze neposrednu žrtvu, oni su pored napada na pojedinca i napad na grupu kojoj žrtva pripada. To je njihova specifičnost u odnosu na ostala krivična dela. Zločini mržnje mogu da predstavljaju pretnju za mir i stabilnost u društvu. Time i uloga subjekata koji to treba da obezbede je velika. Značaj policije kao tradicionalnog provjadera bezbednosti je nezaobilazan. Uspešna kontrola zavisi od obučenosti i uspešnosti policije u rasvetljavanju ovih krivičnih dela, postupanju sa žrtvama, te odnosima sa zajednicom i sa medijima. Rad pravosudnih organa, tužilaštava i sudova ima jasan cilj, a to je krivično gonjenje i utvrđivanje odgovornosti počinitelaca ovih krivičnih dela. Samo na takav način je moguće stvoriti poverenje žrtve i zajednice kojoj žrtva pripada u sistem krivičnog pravosuđa, i društvo u celini. Međutim, pored organa formalne društvene kontrole značajnu ulogu u ostvarivanju tog cilja imaju i drugi subjekti. Sistem obrazovanja ima značajnu ulogu. U tom sistemu mladi ljudi se pripremaju za budućnost. Učenje o kulturnim različitostima i nenasilnoj komunikaciji treba da bude sastavni deo procesa obrazovanja na svim nivoima. Značaj poštovanja demokratskih normi ne odnosi se samo na proces formalnog obrazovanja već i na sve građane. Uspešne strategije za prevenciju zločina mržnje uključuju niz aktivnosti građana, institucija i medija. Političke elite snose veliku odgovornost kada je kontrola ovih krivičnih dela u pitanju. Oni su ti koji kreiraju društveni ambijent i koji mogu da osude prakse diskriminacije, mržnje i nasilja, ili da ih podstiču. Neutraln stav takođe doprinosi društvenom ambijentu nasilja jer poruka osude nedostaje. Političke elite su inicijatori promena i jačanja institucionalnih kapaciteta za suzbijanje zločina mržnje. Mediji isto tako imaju veliki značaj u ovom procesu. Neobjektivno i tendenciozno informisanje vodi stvaranju plime netrpeljivosti i nasilja. Može se zaključiti da je sprečavanje i suzbijanje zločina mržnje sveobuhvatan proces, koji zahteva aktivno učešće subjekata iz različitih sfera društvenog života. Samo takav integralni pristup ovom problemu dugoročno može dati pozitivne rezultate.

LITERATURA:

- American Prosecutors Research Institute [APRI] (2001). *A local prosecutor's guide for responding to hate crimes*. Retrieved August 18, 2009, from http://www.ndaa.org/pdf/hate_crimes.pdf
- Association of Chief Police Officers [ACPO], & The Home Office Police Standards Unit. (2005). *Hate Crime: Delivering a Quality Service – Good Practice and Tactical Guidance*. Retrieved October 15, 2009, <http://www.bedfordshire.police.uk/pdf/tacticalguidance.pdf>
- Bandura, A. (1977). *Social Learning Theory*. New Yerssy: Pretince Hall.
- Berrill, K. (1992). Anti-Gay Violence and Victimization in the United States: An Overview. In G. Herek & K. Berrill (Eds.), *Hate Crimes: Confronting Violence against Lesbians and Gay Men* (pp.19–45). K. Newbury Park, CA: Sage.

- Brown, A. (1995). *Organizational Culture*. London: Pitman.
- Burney, E., & Rose, G. (2002). *Racist Offences – How is the Law Working? Implementation of the Legislation on Racially Aggravated Offences in the Crime and Disorder Act 1998. Home Office Research Study 244*. London, United Kingdom: Home Office.
- Cogan, J. C. (2002). Hate Crime as a Crime Category worthy of Policy Attention. *American Behavioral Scientist*, 46(1), 173–185.
- De Fontet, F. (1999). *Расизам*. Београд & Земун: Плато & XX век.
- Green, D. P., McFalls, L. H., & Smith, J. K. (2001). Hate crime: An emergent research agenda. *Annual Review of Sociology*, 27, 479–504.
- Herek, G. (1992). Primary and Secondary Victimization in Anti-Gay Hate Crimes: Official Response and Public Policy. In G. Herek, & K. Berrill (Eds.), *Hate Crimes: Confronting Violence against Lesbians and Gay Men*. (pp.289–305). Newbury Park, CA: Sage.
- Jacobs, J. B., & Potter, K. A. (1998). *Hate crimes: criminal law & identity politics*. New York: Oxford University Press.
- Janjićijević, N. (1997). *Organizaciona kultura*. Novi Sad: Ulix.
- Lalić, V. (2013). *Zločini mržnje u Bosni i Hercegovini*. Doktorska disertacija. Fakultet bezbednosti. Univerzitet u Beogradu.
- Lalić, V., Matijašević, D. (2015). Suprotstavljanje rasizmu, ksenofobiji i zločinima mržnje u Evropi – supranacionalni, normativni i institucionalni aspekti. *Godišnjak Evropskog Defendologija centra*, br.4. Banja Luka: Evropski defendologija centar. str.100–111.
- Levin, B., & Amster, S. E. (2007). Making Hate History: Hate Crime and Policing in America's Most Diverse City. *American Behavioral Scientist*, 51(2), 319–348.
- Levin, J., Rabrenovic, G., Ferraro, V., Doran, T., & Methe, D. (2007). When a Crime Committed by a Teenager Becomes a Hate Crime Results From Two Studies. *American Behavioral Scientist*, 51(2), 246–257.
- Martin, S. E (1999). Police and the Production of Hate Crimes: Continuity and Change in One Jurisdiction. *Police Quarterly*, 2(4), 417–437.
- McDevitt, J., Levin, J., & Bennett, S. (2002). Hate crime offenders: An expanded typology. *Journal of Social Issues*, 58, 303–317.
- McVeigh, R., Welch, M. R., & Bjarnason, T. (2003). Hate Crime Reporting as a Successful Social Movement Outcome. *American Sociological Review*, 68(6), 843–867.
- Milašinović, S. (2008). Suština i uzroci društvenih konflikata. *Nauka, bezbednost, policija*, 13(1), 55–77.
- Milosavljević, B. (2004). *Socijalna patologija i društvo*. Banja Luka: Filozofski fakultet Univerziteta u Banjoj Luci.
- Morsch, J. (1991). The Problem of Motive in Hate Crimes: The Argument against Presumptions of Racial Motivation. *The Journal of Criminal Law and Criminology*, 82 (3), 659–689.
- Multilingual Orientation Service Association for Immigrant Communities [MOSAIC]. (2003). *Diverse Cultures, Responsive Policing: A Policy Framework*. Vancouver, BC, Canada: MOSAIC Settlement Services.
- Nolan, J. & Akiyama, Y. (1999). An Analysis of Factors that Affect Law Enforcement Participation in Hate Crime Reporting, *Journal of Contemporary Criminal Justice*, 15(1), 111–127.

- OSCE Office for Democratic Institution and Human Rights [OSCE – ODIHR]. (2009a). *Hate Crime Laws – A Practical Guide*. Warsaw: OSCE (ODIHR). Retrieved March 15, 2010, from <http://www.osce.org/odihr/36426>
- Perry, B. (2001). In *the Name of Hate: Understanding Hate Crimes*. New York: Routledge.
- Phillips, N. D. (2009). The Prosecution of Hate Crimes: The Limitations of the Hate Crime Typology. *Journal of Interpersonal Violence*, 24(5), 883–905.
- Reiner, R. (1985). *The Politics of the Police*. Brighton: Wheatsheaf Books.
- Saucier, D. A., Brown, T. L., Mitchell, R. C., & Cawman, A. J. (2006). Effects of Victims' Characteristics on Attitudes toward Hate Crimes. *Journal of Interpersonal Violence*, 21(7), 890–909.
- Skolnick, J. (1966). *Justice Without Trial*. New York: Wiley.
- Stanko, E. A. (2004). Reviewing the evidence of hate – Lessons from a project under the Home Office Crime Reduction Programme. *Criminal Justice*, 4(3), 277–286.
- Strobl, R., Klemm, J., & Wurtz, S. (2005). Preventing Hate Crime: Experiences from two East-German Towns. *British Journal of Criminology*, 45, 634–646.
- Tilley, N. (2007). *Handbook of crime prevention and community safety*. Cullompton: Willan Publishing.
- Turner, N. (2001). Responding to Hate Crimes: A Police Officer's Guide to Investigation and Prevention. International Association of Chiefs of Police. Retrieved January 16, 2010, from <http://www.theiacp.org/PublicationsGuides/LawEnforcementIssues/Hatecrimes/RespondingtoHateCrimesPoliceOfficersGuide/tabid/221/Default.aspx>
- Ueckert, H., Kakuska, R., & Nagorny, J. (1979). *Психологија у служби човјека*. Загреб: Младост.

NOVE TEHNOLOGIJE

GLOBALNI ASPEKTI KRETANJA STRANIH INVESTICIJA

Pregledni rad

DOI 10.7251/DEFSR1841003K	COBISS.RS-ID 7744792	UDK 338.124.4:341.232.1
---------------------------	----------------------	-------------------------

dr Ognjen Erić¹

Krajinapetrol a.d. Banja Luka

Apstrakt:

Fond stranih ulaganja u svijetu se višestruko multiplicirao u posljednje dvije decenije. Međutim, rastući trend kretanja stranih investicija je prekinut izbijanjem skorašnje finansijske krize u svijetu. Smanjen priliv investicija u zemlje u razvoju iz inostranstva otežao je finansiranje njihovog tekućeg računa, jer su istovremeno teže dolazile do zajmovnih sredstava na međunarodnom tržištu kapitala. Većina neto uvoznica kapitala su neto dužnici na međunarodnom tržištu kapitala, što ih je pokretalo na povećanje investicione privlačnosti za međunarodne investitore. Time su nastojale da smanje svoju izloženost zajmovnom tržištu. Iako strane investicije predstavljaju poželjan izvor finansiranja deficita tekućeg računa, neto priliv ovih sredstava vremenom generiše negativan saldo u računu dohotka i vrši pritisak na platni bilans zemlje. Tokovi svjetskih investicija su se vratili uzlaznom trendu 2013. godine.

U radu se analizira kretanje stranih investicija u svijetu, po grupacijama zemalja. Grupacije zemalja, predmet analize ovog rada u radu su: Azija, Latinska Amerika, Afrika, zemlje u tranziciji i razvijene zemlje. Najznačajnije zemlje neto izvoznici kapitala u svijetu su Evropska unija i SAD, a najveći uvoznici su rastuće azijske zemlje. Kao startni period za analizu se uzima 1990. godina, a krajnji 2013. godina. Dakle vremenska serija analize obuhvata ekonomske cikluse, tj. uzlet od devedesetih godina prošlog vijeka, te period globalne finansijske i ekonomske krize koja je trajala sve do kraja 2012. godine.

Ključne riječi: *FDI, razvijene zemlje, zemlje u razvoju, zemlje u tranziciji, ekonomska kriza.*

¹ Korespondentni autor: dr Ognjen Eric; E-mail: ericognjen@yahoo.com

UVODNA RAZMATRANJA: TEORIJA I PRAKSA STRANIH INVESTICIJA

Strane direktne investicije su globalna, aktualna ali i kontroverzna ekonomska tema. U literaturi preovladava stanovište da strane direktne investicije (FDI) podstiču ekonomski rast ali se sve češće mogu pročitati i suprotna mišljenja. Naučno relevantna istraživanja iz ove oblasti koriste se za nova naučna saznanja, i kreiranje nacionalnih ekonomskih politika. Na pozitivan odnos prema globalnoj mobilnosti investicija utiču povoljni trendovi tokova i stokova FDI. Iako na njih utiču brojni faktori, neki autori ih vežu za razvijena tržišta roba i kapitala, način proizvodnje i tehnologije, liberalne ekonomske politike, te ostale faktore: radnu snagu, kulturne i istorijske momente itd. (Sethi, Guisinger, Phelan, & Berg, 2003). Dakle, FDI su nezaobilazan razvojni resurs svih, a posebno tranzicionih zemalja. Lipsi (2001) je primjenio pokazatelje veličine i rasta tržišta da objasni priliv, odliv, neto tokove i stanje FDI. Koristio je varijable: nominalni GDP i bruto fiksne investicije. Zaključio je da stanje ulaznih i izlaznih FDI i njihovi tokovi imaju sličan trend tokom vremena. Ako se tržišta razlikuju po veličini, trendovi kretanja FDI se razlikuju. Atraktivnost određene zemlje za ulaganja FDI zavisi od brojnih uslova i faktora.

Dunning (1993) vidi faktore privlačenje kao specifične prednosti u prirodnim resursima, tehnologijama, dostupnom kapitalu i radnoj snazi. Dunning ističe značaj konkurentnosti. Smatra da atraktivnost zemlje u privlačenju stranih direktnih investicija (FDI) zavisi od konkurentnosti, mikroekonomske klime i makroekonomske stabilnosti. U tom kontekstu je važna uloga analize konkurentnosti. Uz Dunning-ovu teoriju razvoja i investicija ističu se istraživanja o podsticanju dinamičnog razvoja, tokovima FDI i uticaju vlade na povećanju opšte konkurentnosti (Buckley, & Castro, 1998). Dunning (2004) predstavlja tri preovlađujuće determinante lokacije zemlje primaoca: državne politike privlačenja stranih investicija, ekonomske determinante i podsticaje za razvoj biznisa. Ekonomsko okruženje se odnosi na resurse i kapacitete zemlje, dok su državne politike, strateški ciljevi, makroekonomske i mikroekonomske mjere vlade.

Od radova koji FDI vide kao faktor ubrzanja rasta, konkurentnosti i ulaganja u razvoj, i boljih ekonomskih i proizvodnih performansi na mikroekonomskom i makroekonomskom planu, ističu se studije: Wie and Lui (2006) i Buckley, Clegg and Weng (2005). Campos and Kinoshita (2008) ukazuju da ni veličina tržišta, ni niska cijena radne snage nisu značajne determinante FDI, u poređenju sa kvalitetom institucija.

Bevan and Estrin (2004) istražili su determinante direktnih stranih ulaganja u evropske tranzicione privrede pomoću panel analize bilateralnih FDI tokova između zapadnoevropskih i tranzicionih zemalja. Utvrdili su da na tokove direktnih ulaganja pozitivno utiču GDP zemalja ulagača i primaoca kapitala, kao i postupak pridruživanja i integracija u Evropsku uniju. Negativan uticaj imali su troškovi rada u zemlji domaćinu te udaljenost između dvije zemlje, što se objašnjava činjenicom da se preduzeća odlučuju za ulaganja na lokacijama sa nižim troškovima rada i bližim tržištima. Nakov (2004) panel metodom analizira uticaj FDI na GDP u dvadesetak tranzicionih zemalja, te uticaj FDI na GDP Mađarske koristeći kointegracionu analizu. Panel analiza pokazuje da FDI negativno utiče na kretanje GDP u tranzicionim ekonomijama. Kointegraciona analiza na slučaju Mađarske pokazuje kointegracionu vezu stranog kapitala i industrijske proizvodnje. U ovoj analizi, elastičnost GDP na promjenu FDI iznosi oko 0,5. Grendžerovim testom uo-

čava relevantnost FDI u objašnjavanju ekonomskog rasta, pa zaključuje da FDI uzrokuje u Grendžerovom smislu rast, dok rast u Grendžerovom smislu ne uzrokuje FDI.

Al-Iriani and Al-Shamsi (2007) koriste se Pedronijevom kointegracionom analizom za testiranje veze među FDI i privrednim rastom u šest zemalja Zaliva za period od 1970. do 2004. U istraživanju, dobijeni rezultati pokazuju dvosmjernu uzročnost među FDI i GDP u zemljama Zaliva.

Hisarciklilar, Kayam, Kayalica, and Ozkale (2006) istražuju odnos ekonomskog rasta, FDI i međunarodne trgovine za odabrane mediteranske zemlje od 1970. do 2003. Odnos između navedenih varijabli ispituje se dvodimenzionalnom kointegracionom analizom i pomoću dvostrukog Grendžerovoga test kauzalnosti. Za većinu ovih zemalja između varijabli su utvrđene neznčajne relacije.

Bogdan (2009) analizira uticaj FDI na ekonomski rast evropskih tranzicionih zemalja u periodu 1990-2005. Panel analizom testira hipotezu da veći dotok FDI potiče ekonomski rast tranzicionih zemalja. Rezultati nisu opravdali hipotezu jer se uticaj FDI na rast pokazao negativnim, ali ne i statistički značajnim, dok statistički značajnu ulogu na rast imaju makroekonomska stabilnost i otvorenost privrede. Utvrdio je da priliv FDI podstiču makroekonomska stabilnost i veličina tržišta.

Analizirajući stanje u BiH, Domazet (2016) smatra da su FDI doprinijele restrukturiranju nekih javnih kompanija, poboljšanju investicione klime i dijelom rastu zaposlenosti. Ipak, po njemu, ovi pokazatelji su ispod mogućnosti i potencijala FDI. Pregled istraživanja pokazuje različita istraživanja o uticaju FDI, efekata njihovog rasta i uloge stranih investicija u ubrzanju pozitivnih ekonomskih kretanja, prije svega rasta GDP. S obzirom na sve veći značaj u stručnoj ali i naučnim krugovima, u nastavku će se analizirati globalna svjetska kretanja stranih investicija sa naglaskom na predkrizni i krizni period, sa ciljem ekstrapolacije njihovog kretanja u budućnosti.

SAVREMENI GLOBALNI I GEOPOLITIČKI ASPEKTI KRETANJA STRANIH INVESTICIJA

Dosadašnje tokove stranih investicija karakteriše investiranje transnacionalnih kompanija iz razvijenih zemalja u zemlje u razvoju i tranzicione zemlje. Rastući trend stranih investicija je prekinut izbijanjem skorašnje finansijske krize u svijetu. Smanjen priliv investicija iz inostranstva otežao je finansiranje njihovog tekućeg računa, jer su istovremeno teže dolazile do zajmovnih sredstava na međunarodnom tržištu kapitala. Većina ovih zemalja su neto dužnici na međunarodnom tržištu kapitala, što ih je pokretalo na povećanje investicione privlačnosti za međunarodne investitore. Time su nastojale da smanje svoju izloženost zajmovnom tržištu. Iako strane investicije predstavljaju poželjan izvor finansiranja deficita tekućeg računa, neto priliv ovih sredstava vremenom generiše negativan saldo u računu dohotka i vrši pritisak na platni bilans zemlje.

Tokovi svjetskih investicija su se vratili uzlaznom trendu 2013. godine. Priliv stranih ulaganja porastao je za 9%, na 1,45 biliona dolara u 2013. Priliv stranih ulaganja je povećan u svim većim ekonomskim grupacijama (razvijenim, u razvoju i tranzicionim zemljama). Stanje stranih ulaganja (stok) poraslo je za 9%, ili 25,5 biliona dolara. Strana ulaganja dostigla 1,6 biliona dolara u 2014. godini, te 1,75 biliona dolara u 2015. godini i 1,85 biliona dolara u 2016. godini. Rast će uglavnom je podstaknut ulaganjima u razvi-

jenim ekonomijama, kao rezultat otpočetog oporavka. Osjetljivost nekih tržišta u nastajanju, politički rizici te regionalni sukobi bi mogli ugroziti očekivani porast tokova stranih investicija. Kao rezultat očekivanog rasta stranih investicija u razvijenim zemljama, regionalna distribucija ulaganja bi se mogla formirati prema “tradicionalnom obrascu” većeg učešća razvijenih zemalja u globalnom prilivu. Ipak, tokovi investicija u zemljama u razvoju će ostati na visokom nivou i u narednim godinama (UNCTAD, 2015).

Tokovi priliva stranih investicija zemalja u razvoju iznose 778 milijardi dolara, što čini 54 % globalnih priliva. Stopa rasta priliva u ovaj region je usporena na 7 %, u poređenju sa prosječnom stopom rasta od 17 %, prethodnih 10 godina. Azija je i dalje region sa najviše investicionih priliva, znatno iznad Evrope. Priliv stranih ulaganja je rastao i u drugim razvojnim regionima, Afrika (4%), Latinska Amerika i Karibi (6%, isključujući offshore finansijske centre). Strana ulaganja u razvijenim ekonomijama bilježe oporavak, nakon oštrog pada u 2012. Međutim, i dalje su na istorijski niskim učešćem u ukupnim globalnim tokovima (39%), i 57 % ispod vrhunca iz 2007. godine.

Tabela 1. Prilivi i odlivi stranih investicija u svijetu, 1990-2013 (milijardi dolara)

Prilivi stranih investicija									
Region/zemlja	1990	2000	2007	2008	2009	2010	2011	2012	2013
Razvijene zemlje	173	1142	1323	1032	619	703	880	517	566
Evropska unija	97	703	864	551	363	384	490	216	246
SAD	48	314	216	306	144	198	224	161	188
Japan	2	8	23	24	12	-1	-2	2	2
ZUR	35	267	591	669	533	648	725	729	778
Kina	3	41	84	108	95	115	124	121	124
Hong Kong, Kina	3	71	62	67	54	83	96	75	77
Svijet	208	1415	2002	1819	1222	1422	1700	1330	1452
Odlivi stranih investicija									
Region/zemlja	1990	2000	2007	2008	2009	2010	2011	2012	2013
Razvijene zemlje	230	1091	1889	1599	846	989	1216	853	857
Evropska unija	131	809	1258	984	384	483	585	238	250
SAD	31	143	394	308	288	278	387	367	338
Japan	51	32	74	128	75	56	108	123	136
ZUR	11	147	327	338	277	421	423	440	454
Kina	1	1	27	56	57	69	75	88	101
Hong Kong, Kina	2	70	68	57	58	98	96	88	92
Svijet	241	1241	2267	1999	1171	1468	1712	1347	1411

Izvor: UNCTAD (2015), [www.unctad.org/FDIstatistics; pristupljeno: 09.3. 2018.]

Zemlje u razvoju i tranzicione zemlje čine polovinu među prvorangiranih 20 zemalja po prilivu stranih ulaganja. Meksiko je na desetom mjestu. Kina je zabilježila do sada najveći priliv, i ostala drugi primaoc investicija u svijetu. Strana ulaganja, koja se

odnose na transnacionalne korporacije iz zemalja u razvoju, iznose 454 milijardi dolara. Zajedno s tranzicionim ekonomijama, čine 39 % globalnih odliva ulaganja. Taj podatak sa početka 2000-tih je bio samo 12 %.

REGIONALNI TREND OVI STRANIH ULAGANJA U SVIJETU

Azija. Ukupan priliv stranih ulaganja u Aziju je 426 milijarde dolara u 2013. godini, što čini gotovo 30 % globalnog priliva investicija. Priliv stranih ulaganja u Istočnoj Aziji je porastao za 2%, na 221 milijardu dolara. Stabilne performanse podregiona podstiču priliv stranih ulaganja u Kinu, Južnu Koreju i Tajvan. S prilivom od 124 milijarde dolara u 2013. godini, Kina je na drugom mjestu u svijetu. U međuvremenu, odliv ulaganja iz Kine je porastao za 15 %, na 101 milijarde dolara, podstaknut projektima u razvijenim zemljama. Nastavkom ovog trenda, očekuje se da će odlivi kapitala iz zemlje nadmašiti prilive, u roku od dvije do tri godine. U Hong Kongu je primjetno povećanje priliva investicija na 77 milijardi dolara. Priliv u jugoistočnoj Aziji porastao je za 7 %, na 125 milijardi dolara. Od toga Singapur učestvuje sa 50%. Više od 15 godina, proaktivni naponi regionalne investicione saradnje u Istočnoj i Jugoistočnoj Aziji, doprinijeli su porastu ukupnih stranih ulaganja, te intra-regionalnim investicijama. Intra-regionalne investicije u infrastrukturu i proizvodnju, donose razvojne mogućnosti za niskodohodovne zemlje ovog podregiona, kao što su Laos i Mjanmar. Priliv investicija u Južnoj Aziji porastao za 10%, na 36 milijardi dolara u 2013. godini. Najveći primaoc stranih ulaganja u podregionu je Indija, sa porastom od 17%, tj. 28 milijardi dolara. Uspostavljeni su ekonomski koridori koji povezuju Južnu, Istočnu i Jugoistočnu Aziju (Bangladeš-Kina-Indija-Mjanmar, te Ekonomski koridor Kina-Pakistan). To će poboljšati povezanost između azijskih podregiona i pružiti mogućnosti za regionalnu ekonomsku suradnju. Tokovi stranih investicija u Zapadnoj Aziji su smanjeni za 9% u 2013. godini, na 44 milijarde dolara. Konstantne regionalne tenzije i politička nesigurnost odvraćaju ulaganja investitora, iako postoje razlike među zemljama.

Latinska Amerika. Strana ulaganja u Latinskoj Americi i Karibima dostigla su 292 milijardi dolara u 2013. godini. Iako najvećem primaocu investicija, Brazilu, je uočen blagi pad, za 2%, uprkos povećanju tokova u primarnom sektoru. Inostrana ulaganja u Čileu i Argentini su pala za 29 % i 25 %, respektivno, tj. na 20 milijarde dolara i 9 milijardi dolara. Tokovi strane investicije Perua smanjeni su za 17 %, na 10 milijardi dolara. Nasuprot tome, prilivi investicija u Kolumbiju su povećani za 8 posto, na 17 milijardi dolara, uglavnom kao rezultat prekograničnih merđžera i akvizicija u energetiku i bankarstvo. Prilivi Srednje Amerike i Kariba (isključujući offshore finansijske centre) povećani su za 64 posto, na 49 milijarde dolara, od toga je priliv u Meksiko 38 milijardi dolara. Registrovan je priliv u Panami (61%), Kosta Riki (14%), Gvatemali i Nikaragvi (5%). Odliv ulaganja iz Latinske Amerike i Kariba (isključujući offshore finansijske centre) opao je za 31 %, na 33 milijarde dolara, zbog zastoja akvizicija u inostranstvu, te otplate kredita matičnim brazilskim i čileanskim kompanijama od strane filijala u inostranstvu. U ovom regionu se otvaraju nove mogućnosti za buduća strana ulaganja, posebno u industriju nafte dobijene iz škriljca u Argentini. Takođe, sektorske reforme u Meksiku, mogle bi biti pozitivan signal za značajna strana ulaganja.

Afrika. Priliv stranih ulaganja u Afriku je porastao za 4 posto, na 57 milijarde dolara u 2014. godini. Odnose se na međunarodne market-seeking i infrastrukturne investicije. Očekivanja su u smjeru daljeg rasta, i to u privlačenju ulaganja u potrošački orijentisane industrije, uključujući hranu, turizam, finansije i maloprodaju. Ukupni porast je vođen rastom investicija u istočnom i južnom Afričkom podregionu, dok je u ostalim primjetan pad investicija. U Južnoj Africi, tokovi su gotovo udvostručeni, na 13 milijardi dolara, uglavnom zbog tokova u Južnoafričkoj republici i Mozambiku. U obje zemlje, infrastruktura je preovlađujuća, ali i investicije u sektor plina. Na istoku Afrike, priliv strane investicije je porastao za 15%, ili 6,2 milijardi dolara. Odnose se na porast tokova u Etiopiji i Keniji. Kenija postaje atraktivno poslovno središte, ne samo za istraživanja nafte i plina, nego i proizvodnje i trgovine. Etiopljanska industrijska strategija posjeduje potencijal privlačenja azijskog kapitala, te na taj način može razvijati svoju proizvodnu bazu. Tokovi strane investicije u podregionu Sjeverne Afrike su smanjeni za 7 %, na 15 milijardi dolara. Takođe je uočen pad priliva investicija u Centralnoj i Zapadnoj Africi za 8 i 14 milijardi dolara, respektivno, najvećim dijelom zbog političkih i sigurnosnih rizika. Intra-afričke investicije su u porastu, a vodeće zemlje porijekla intra-afričkih investicija su Južno-afrička republika, Kenija i Nigerija. Između 2009. i 2013. godine, udio prekograničnih greenfield investicija, koje potiču iz Afrike povećane su na 18%. Intra-afrički projekti su koncentrisani u proizvodnji i uslugama. Samo je 3 % vrijednosti intra-regionalnih greenfield projekata, u poređenju sa 24 % izvan-regionalnih greenfield projekata (tokom 2009-2013).

Zemlje u tranziciji. Priliv stranih ulaganja u tranzicionim ekonomijama povećan je za 28 %, na 108 milijardi dolara u 2013. godini. U Jugoistočnoj Evropi, prilivi su povećani sa 2,6 milijarde dolara u 2012. godini, na 3,7 milijardi u 2013. Investicije su podstaknute privatizacijom preostalih firmi u državnom vlasništvu. Kada se posmatra Zajednica Nezavisnih Država (ZND), 28% više priliva investicija 2013. godine je zbog rasta priliva u Ruskoj Federaciji. Izgledi budućih priliva investicija u tranzicione zemlje su neizvjesni, zbog regionalnih bezbjednosno-političkih nestabilnosti u odnosima Rusije sa zemljama Sjeveroatlanskog saveza.

U 2013. godini, ulaganja iz regiona u inostranstvo su porasla za 84%, ili 99 milijardi dolara. Kao i proteklih godina, ruske kompanije su bile nosioci većine tih investicija. Vrijednost prekograničnih merdžera i akvizicija iz regiona je porastao više od šest puta, a greenfield investicije su porasle za 87%, na 19 milijardi dolara. Tokom protekle decenije, tranzicione zemlje su najbrže rastući region dolaznih i odlaznih investicija. Zemlje EU su najvažniji partneri, kao investitor i primatelj. Unija ima najveći udio u fondu stranih ulaganja u regionu, sa učešćem većim od dvije trećine od ukupnih. U zemljama bivšeg Sovjetskog saveza, većina primljenih investicija odlazi u resursno orjentisane, potrošačke sektore. U jugoistočnoj Evropi, ulaganja EU podstaknuta su privatizacijom, ali i niskim troškovima proizvodnje, te mogućnošću članstva ovih zemalja u EU. Odlazne investicije iz tranzicionih privreda, u zemlje EU, najvećim dijelom dolaze iz Ruske Federacije. Investitori ulažu u stratešku imovinu na tržištu Evropske unije, uključujući i downstream djelatnosti u energetske industriji, te proizvodne djelatnosti više faze prerade.

Razvijene zemlje. Nakon oštrog pada u 2012. godine, priliv investicija u razvijenim ekonomijama svijeta se oporavio u 2013., te iznosio 566 milijardi dolara, što je povećanje od 9 %. Priliv u Evropskoj uniji je 246 milijardi dolara (porast 14 %), što je manje za 30 % od vrhunca iz 2007. godine. Prilivi kapitala u Sjevernoj Americi su bili

250 milijardi dolara, a Sjedinjene Američke Države su povećale priliv za 17 %, na 188 milijardi dolara, što ih čini najvećim svjetskim primaocem investicija. Odlazne investicije iz razvijenih zemalja iznose 857 milijardi dolara u 2013. godini, gotovo nepromijenjeno u odnosu na prethodnu godinu. Oporavak privrede u 2013. godini u Evropi i nastavak širenja ulaganja iz Japana, uticali su na smanjene odlive kapitala iz Sjeverne Amerike. Odlazne investicije iz Evrope su se povećale za 10 %, na 329 milijardi dolara. Švicarska je postala najveći evropski investitor. Nasuprot ovog trenda, u Francuskoj, Njemačkoj i Velikoj Britaniji je registrovan pad odlaznih ulaganja.

Odlazne investicije iz Sjeverne Amerike su smanjene za 10 %, na 381 milijardi dolara, dijelom i zato što su Sjedinjene Države povukle sredstva svojih fondova iz Evrope, na lokalno tržište obveznica. Odliv kapitala iz Japana raste treću godinu za redom, i iznosi 136 milijardi dolara u 2013. godini.

Prilivi i odlivi investicija razvijenih zemalja su na 45% nivou iz 2007. godine. U pogledu globalnog učešća, razvijene zemlje učestvuju sa 39% ukupnog priliva i 61% ukupnih odliva, što je na istorijski niskom nivou. Iako se udio transatlantskih tokova ulaganja smanjio u posljednjih nekoliko godina, EU i Sjedinjene Države su važni investicioni partneri - više nego što implicira njihova veličina ekonomija ili obim bilateralnih trgovinskih tokova. Od ukupno primljenih stranih investicija u Sjedinjenim državama, 62% učestvuju zemlje Evropske unije, a 50% odlaznih investicija iz Sjedinjenih država se nalazi u EU. Gledano iz ugla Evropske unije, jednu trećinu tokova stranih ulaganja čine investicije Sjedinjenih država.

Tabela 2. *Ulazni i izlazni fond stranih investicija, po regionu/zemlji, 1990-2013. (milijardi dolara)*

Ulazni fond									
Region/zemlja	1990	2000	2007	2008	2009	2010	2011	2012	2013
Razvijene zemlje	1.564	5.682	12.842	10.857	12.470	13.041	13.426	14.536	16.053
Evropska unija	762	2.353	7.589	6.702	7.471	7.314	7.482	8.020	8.583
SAD	540	2.783	3.551	2.486	2.995	3.422	3.510	3.924	4.935
Japan	10	50	133	203	200	215	226	205	171
ZUR	514	1.771	4.660	4.424	5.364	6.597	6.943	7.945	8.483
Kina	21	193	327	378	473	588	712	833	957
Hong Kong, Kina	202	492	1.227	873	994	1.163	1.185	1.356	1.444
Svijet	2.078	7.511	18.136	15.680	18.428	20.371	21.117	23.304	25.464
Izlazni fond									
Region/zemlja	1990	2000	2007	2008	2009	2010	2011	2012	2013
Razvijene zemlje	1.947	7.100	16.350	13.709	16.298	17.400	17.521	18.859	20.765
Evropska unija	809	3.509	8.742	8.188	9.118	9.315	9.518	9.830	10.617
SAD	732	2.694	5.275	3.102	4.322	4.810	4.514	5.250	6.350
Japan	201	278	543	680	741	831	963	1.055	993
ZUR	141	888	2.604	2.579	2.958	3.486	3.983	4.601	4.993
Kina	4	28	118	184	246	317	425	513	614
Hong Kong, Kina	12	436	1.108	858	929	1.039	1.129	1.274	1.352
Svijet	.088	8.008	19.343	16.519	19.589	21.289	21.913	23.916	26.313

Izvor: UNCTAD (2015) [www.unctad.org/FDIstatistics ; pristupljeno: 09.3.2018.]

Stanje ulaznih strane investicija u EU u 2013. godini poraslo je za 11,26 puta u odnosu na 1990. godinu, u SAD za 9,14 puta, Japanu 17,1 puta, ZUR 16,5 puta, Kini 45 puta, Hong Kongu 7,14 puta, a u Svijetu 12,25 puta. Prosječna godišnja stopa rasta fonda ulaznih strane investicija u EU u periodu 1990-2013. godine je iznosila 11,1%, i bila je neznatno manja od prosječne stope rasta fonda izlaznih investicija od 11,84%. Finansijska kriza je uslovlila pad stanja ulaznih stranih investicija u EU u 2008. u odnosu na 2007. godinu za 11,7 %. Već u narednoj godini poraslo je stanje za 11,47%, da bi u 2010. godini ponovo uslijedio pad za 2,1%, tako da je stanje u 2010. godini bilo za 3,6% manje od vrhunca u 2007. godini. Evropska unija je 2008. godine bila nosilac 42,7% svjetskih dolaznih investicija, koji je 2009. godine opao na 40,54%, 2010. godine na 35,9%, te 2011. godine na 35,4%, 2012. na 34,4%, a 2013. na 33,7 ukupnih dolaznih investicija. Sličan trend se uočava kada su u pitanju i odlazne investicije iz EU.

SAD su drugi po veličini svjetski izvoznik stranih investicija, gdje je stanje izlaznih investicija u 2013. godini bilo veće od izlaznih investicija za 1.450 milijardi dolara. Učešće SAD u svjetskim ulaznim investicijama u 2013. godini je 19,38%, i odlaznim 24,13%.

Kada se posmatra stanje stranih investicija u zemljama u razvoju (ZUR), uočava se da je fond ulaznih investicija rastao po prosječnoj godišnjoj stopi od 12,96% u periodu od 1990-2013. godine, dok je fond izlaznih investicija rastao po stopi od 15,1%. Mada je dinamika rasta izlaznih investicija bila jača od dinamike ulaznih investicija, ZUR su i dalje neto uvoznice kapitala (stanje ulaznih investicija u 2013. godini je bilo veće od izlaznih investicija za 3.490 milijardi dolara i činilo 33,1% stanja ulaznih strane investicijeu svijetu).

Tabela 3. *Neto međunarodni merđžeri i akvizicije, 1990-2013 (milijardi dolara)*

Neto kupovina region/zemlja	1990	2000	2007	2008	2009	2010	2011	2012	2013
Razvijene zemlje	85	895	870	486	192	226	430	184	152
Evropska unija	53	659	538	322	121	23	141	19	-1
SAD	12	111	184	-26	24	86	137	72	59
Japan	13	3	30	50	17	31	62	38	55
ZUR	9	60	146	116	78	102	105	128	129
Kina	1	-0	2	36	23	31	37	38	50
Hong Kong, Kina	1	40	-9	1	6	13	10	16	17
Svijet	98	959	1045	626	285	349	556	332	349
Neto prodaja region/zemlja	1990	2000	2007	2008	2009	2010	2011	2012	2013
Razvijene zemlje	89	869	916	480	237	260	439	269	240
Evropska unija	39	491	533	261	119	118	185	129	121
SAD	36	252	181	222	66	84	147	66	60
Japan	0	12	19	10	-6	7	5	2	4
ZUR	10	89	97	121	42	85	85	56	113
Kina	-	38	8	18	11	7	12	10	27
Hong Kong, Kina	0	2	8	9	3	13	2	3	0
Svijet	98	959	1045	626	285	349	556	332	349

Izvor: UNCTAD (2015), [www.unctad.org/FDIstatistics; pristupljeno 10.03.2018.]

Za razliku od devedesetih godina prošlog vijeka, kad su merdžeri i akvizicije predstavljali dominantan vid priliva stranih investicija, nakon 2005. godine situacija se promjenila u korist grinfild investicija. Ovaj vid investiranja je činio oko 24% ukupnog priliva investicija u svijetu 2013. godine. U zemljama u razvoju ovaj vid investiranja je činio oko 17%, u EU oko 49%, a u SAD oko 31,9% ukupnih investicija. Naročito se isti-če trend rasta grinfild investicija na tržištima u nastajanju. Zemlje iz ove grupe, nastoje da mjerama ekonomske politike podstaknu veći priliv ovih investicija, jer računaju sa preli-vanjem tehnologije u zemlju, a i nezadužuju se na tržištu kapitala. Glavni izvori grinfild investicija u 2013.godini, prema vrijednosti su Evropska unija, ZUR i SAD, dok se kao glavna destinacija javljaju ZUR, zatim EU i SAD.

ZAKLJUČAK

U globalnoj ekonomiji FDI predstavljaju najznačajniji oblik međunarodnih po-slovnih aktivnosti. Ne podrazumijevaju samo prekogranično kretanje kapitala, već tran-sfer tehnologije i znanja, te se smatra da doprinose povećanju ukupne proizvodnje, rastu konkurentnosti, zaposlenosti i međunarodnoj trgovini.

Zemlje u razvoju i tranzicione zemlje čine polovinu među prvorangiranih 20 zemalja po prilivu stranih ulaganja. Kina je zabilježila do sada najveći priliv, i ostala drugi primaoc investicija u svijetu. U pogledu globalnog učešća, razvijene zemlje su 2012. godine učestvovala sa dvije petine ukupnog priliva i preko polovine ukupnih svjet-skih odliva. Iako se udio transatlantskih tokova ulaganja smanjio u posljednjih nekoliko godina, EU i Sjedinjene Države su važni investicioni partneri - više nego što implicira njihova veličina ekonomija ili obim bilateralnih trgovinskih tokova. Od ukupno primlje-nih stranih investicija u Sjedinjenim državama, 62% učestvuju zemlje Evropske unije, a 50% odlaznih investicija iz Sjedinjenih država se nalazi u EU. Gledano iz ugla Evropske unije, jednu trećinu tokova stranih ulaganja čine investicije Sjedinjenih država. Stanje ulaznih stranih investicija u EU u 2013. godini poraslo je za 11,26 puta u odnosu na 1990. godinu, u SAD za 9,14 puta, Japanu 17,1 puta, Kini 45 puta, a u Svijetu 12,25 puta. Pro-sječna godišnja stopa rasta fonda ulaznih stranih investicija u EU u periodu 1990-2013. godine je iznosila 11,1%, i bila je neznatno manja od prosječne stope rasta fonda izlaznih investicija od 11,84%

Rastući trend stranih investicija je prekinut izbijanjem skorašnje finansijske kri-ze u svijetu. Smanjen priliv investicija iz inostranstva otežao je finansiranje tekućeg raču-na ekonomija zavisnih od uvoznog kapitala, jer su istovremeno teže dolazile do zajmov-nih sredstava na međunarodnom tržištu kapitala. Finansijska kriza je usloвила pad stanja ulaznih stranih investicija i u EU u 2008. u odnosu na 2007.godinu za 11,7 %. Evropska unija je 2008. godine bila nosilac 42,7% svjetskih dolaznih investicija, koji je 2009. go-dine opao na 40,54%. Taj trend je nastavljen i narednih godina da bi 2013. godine, učešće EU u ukupnim svjetskim investicijama bilo nivou 33,7% ukupnih svjetskih dolaznih in-vesticija. Sličan trend se uočava kada su u pitanju i EU odlazne investicije. SAD su drugi po veličini svjetski izvoznik stranih investicija, gdje je stanje izlaznih investicija u 2013. godini bilo veće od izlaznih investicija za 1.450 milijardi dolara. Učešće SAD u svjetskim ulaznim investicijama u 2013. godini je 19,38%, i odlaznim 24,13%.

Tokovi svjetskih investicija su se vratili uzlaznom trendu 2013. godine. Rast je uglavnom podstaknut ulaganjima u razvijenim ekonomijama, kao rezultat otpočetog oporavka. Osjetljivost nekih tržišta u nastajanju, politički rizici te regionalni sukobi predstavljaju opasnost za buduće tokove stranih investicija. Kao rezultat očekivanog rasta stranih investicija u razvijenim zemljama, regionalna distribucija ulaganja bi se mogla formirati prema obrascu većeg učešća razvijenih zemalja u globalnom prilivu. Ipak, tokovi investicija u zemljama u razvoju tendiraju da ostanu na visokom nivou i u narednim godinama.

LITERATURA

- Al-Iriani, M., & Al-Shamsi, F. (2007). Foreign Direct Investment and Economic Growth in the GCC Countries: A Casualty Investigation Using Heterogeneous Panel Analysis'. *MEEA Annual Meeting*. January 4-7. Loyola university. Chicago. Preuzeto sa: <http://www.luc.edu>
- Bevan, A., & Estrin, S. (2004). The determinants of foreign direct investment into European transition economies, *Journal of Comparative Economics*, Vol. 32, pp. 775.-787. Preuzeto sa:
<http://emit-project.net/wp-content/uploads/2012/11/sug33.pdf>
- Bogdan, Ž. (2009). Utjecaj FDI-ja na gospodarski rast europskih tranzicijskih zemalja, *Seriya članaka u nastajanju, Ekonomski fakultet Zagreb, 06*. Preuzeto sa:
<http://web.efzg.hr/repec/pdf/Clanak%2009-06.pdf>
- Buckley, P.J., Clegg J., & Weng C.(2005). The impact of inward FDI on the performance of Chinese Manufacturing. *Journal of International Business Studies* 33 (3): 637-655. DOI: 10.1057/palgrave.jibs.8491037
- Buckley, P. J., & Castro, F.B., (1998). The investment development path: The case of Portugal. *Transnational Corporations*, vol. 7, no.1: pp 1-15. Preuzeto sa: <https://www.fep.up.pt/docentes/pcosme/Artigos/13-TC.pdf>
- Domazet, A. (2016). Foreign direct investment in Bosnia and Herzegovina: From The Delusions of Neoliberalism to drivers of Economic Growth. *Academy of Sciences and Arts of Bosnia and Herzegovina . Conference proceedings: The Dayton Peace Agreement and the future of Bosnia and Herzegovina, Vol. 7, pp.126-145*. Preuzeto sa:
http://www.anubih.ba/images/publikacije/posebna_izdanja/ODN/07_osebna_izdanja_CLXVI%20_7/07_osebna_izdanja_CLXVI%20_7.pdf
- Dunning, J.H. (2004). Institutional Reform, FDI and European Transition Economies. *Henley Business School, University of Reading, WhiteknightsReading*. <http://www.henley.ac.uk/web/FILES/management/014.pdf>
- Dunning, J. H. (1993). *Multinational enetrprises and the global economy*. Workingham: Addison Wesley.
- Campos, N. F., & Kinoshita, Y. (2008). Foreign Direct Investment and Structural Reforms: Panel Evidence from Eastern Europe and Latin America. *IMF Working Papers, WP/07/190*. Preuzeto sa: <https://www.imf.org/external/np/seminars/eng/2008/strureform/pdf/foreign.pdf>

- Lipsey, R. E. (2001). Foreign Direct Investors in Three Financial Crises, NBER Working Paper Series, No. 8084. Retrieved from: <http://www.nber.org/papers/w8084.pdf>
- Nakov, A., (2004). Foreign Direct Investment and Growth in Transition: Panel Data and Time Series Evidence, 1991-2001, Croatian International Relations Review, (10), 34-35:7-16. Preuzeto sa: <http://hrcak.srce.hr/6674>
- Hisarciklilar, M., Kayam, S.S., Kayalica, M.O., & Ozkale, N.L. (2006). Foreign Direct Investment and Growth in Mediterranean Countries, Euro-Mediterranean observatory, <http://emo.pspa.uoa.gr/data/papers/2-papers.pdf>
- Sethi, D., Guisinger S. E., Phelan, S. E., & Berg, D. M., (2003). Trends in foreign direct investment flows: A theoretical and empirical analyses. Journal of International Business Studies 34 (4): 315–326. DOI: 10.2307/3557177
- Wie Y., & Lui, X. (2006). Productivity spillovers from R&D, exports and FDI in China's manufacturing sector. Journal of International Business Studies 37 (7): 554-577. DOI: 10.1057/palgrave.jibs.8400209
- UNCTAD (2015). World Investment Prospects Survey 2010-2015. New York and Geneva: United Nations Conference on Trade and Development. Preuzeto sa: <http://www.unctad.org>

ZNAČAJ NOVIH TEHNOLOGIJA I NJIHOV UTICAJ NA INDUSTRIJSKI RAZVOJ USLUŽNE DJELATNOSTI I NEZAPOSLENOST

Pregledni rad

DOI: 10.7251/DEFSR1841004S	COBISS.RS-ID 7745304	UDK 658.5:004.384]:666.3/7
----------------------------	----------------------	----------------------------

Milan Šušić¹

*Univerzitet za poslovne studije Banja Luka,
Fakultet za poslovne i finansijske studije, Bosna i Hercegovina*

Apstrakt:

Nove Informaciono-komunikacione tehnologije pronašle su svoju primjenu u svim područjima djelatnosti (prerađivačka industrija, građevinarstvo, trgovina na veliko i na malo, prevoz i skladištenje, informacije i komunikacije, obrazovanje, zdravstvena zaštita i socijalna briga i druge djelatnosti). CAD/CAM aplikacija se koriste u industriji za projektovanje, izradu prototipova, gotovih proizvoda i realizaciju proizvodnih programa, a u uslužnim djelatnostima kao što je zdravstvena zaštita-stomatologija je proces kojim se postiže završna obrada zuba kroz fino mljevenje gotovih keramičkih blokova radi postizanja efikasnijeg rada. CAD/CAM tehnologija u suštini omogućava kreiranje dvodimenzionalnih, trodimenzionalnih, petodimenzionalnih modela i njihovu materijali-zaciju numeričkim kontrolisanim mašinama. Da bi efikasnije funkcionisali, smanjili troškove, povećali efikasnost prerađivačke industrije i usluga, postigli zadovoljstvo korisnika-pacijenta i na kraju ostvarili profit, mnoge kompanije i stomatološke ordinacije na svijetu usmjerile su pažnju na implementaciju savremenih IT rješenja u svakodnevnoj praksi. Od namjenski izgrađenih keramičkih blokova stomatolog može vrlo brzo pružiti uslugu (precizna nadoknadu u vidu mostova i krunica) koristeći CAD/CAM tehnologiju (računarsko-pomoćno-dizajnirani / kompjuterski podržanu proizvodnju). Prednosti ove tehnologije su predstavljene u ovom radu. Postoje mnogi sistemi poput PoverMill, PoverShape, DeskProto 3D CAM, DeskProto V 7.0 u industriji kao i Cercon, Celai, Cerec, Lava, Everest, koji predstavljaju imperativ moderne stomatologije.

Ključne reči: *projektovanje, dizajn, novi proizvodi, 3D skeniranje, protetika, keramički blokovi, mostovi i krune.*

¹ Autor, Milan Šušić, doktorand, e-mail: i.susic51@gmail.com

UVOD

CAD / CAM aplikacije se koriste za dizajniranje proizvoda i programa za proizvodne procese, konkretno CNC obradu. CAM softver koristi modele i sklopove kreirane u CAD softveru za generisanje alatnih puteva koji daju mašinske alate da pretvore dizajn u fizičke dijelove. CAD / CAM softver se koristi za projektovanje i izradu prototipova, gotovih dijelova i proizvodnih programa.

CAMWorks sa mašinskom inteligencijom je najnapredniji softver za programiranje CAM-a dostupan za brže, efikasnije i brže traženje proizvoda. CAMWorks je najnovija generacija najboljih CNC programskih rješenja sledeće generacije koja omogućava svojim korisnicima da programiraju pametnije i brže mašine. CAMWorks nudi istinitu mašinsku obradu koja automatski prilagođava promjene u dijelu modela, što eliminiše preusmjeravanje radnog vremena CAM-a zbog ažuriranja dizajna.

Budući da je integrisan u dizajn okruženje, CAMWorks omogućava korisniku da: Održavate asocijativnost između modela dizajna i alata koje osiguravaju da najnovije promjene u dizajnu odražavaju se u traci alata; Uklanjanje dosadašnjih transfera datoteka koristeći standardne formate datoteka kao što su IGES i STEP; Koristite samo jednu datoteku za čuvanje CAD i CAM podataka koji drastično smanjuju upravljanje datotekama; Radite sa istim poznatim korisničkim interfejsom koji obezbeđuje kratku krivu učenja; Koristite drvo i komande za CAMWorks mašinsku obradu pritiskom na dugme i generiranje alatnih puteva bez napuštanja okruženja dizajna; CAMWorks pruža korisnicima mogućnost rada sa više platformi uključujući sopstvenu integrisanu CAD / CAM platformu. CAMWorks Milling softver za programiranje G-kod CNC mlin mašina je dostupan u različitim konfiguracijama, tako da se danas možete kupiti tačno ono što nam je potrebno sada i dodati u svoj CAM sistem kako poslovanje raste.

Danas u uslužnim djelatnostima savremena praksa podrazumijeva povećanu primjenu informacionih i komunikacionih tehnologija. Postoje brojne prednosti za olakšavanje rada u uslužnim djelatnostima, ali i u korištenju stomatoloških usluga koji postaju sve zahtjevniji u pogledu estetike, sa jasno izraženom željom za minimalnim boravkom i ostankom u stomatološkoj ordinaciji. Naime, kada je neophodno zamjeniti uklonjeno patološki izmjenjeno tkivo i proizvoditi fiksne protetske inlee, naznačene su onlive, krune i furniri, ili kada je potrebno napraviti nedostajuće zube, a samim tim i mostovi su prodviđeni, dolazi u načelu do primjene CAD/CAM tehnologije.

U ranim devedesetim, više od 70% privatnih stomatoloških praksi u Sjedinjenim Državama koristilo je računare (Casanova, A. V. Marshall, V.1986), nesumnjivo je prednost takve organizacije rada da poveća brzinu rada, komunikaciju sa pacijentima i smanjenje prostor za skladištenje podataka (Gilboe, D. B. Scott, D. A.1991). Važna uloga je i smanjenje mogućnosti unosa pogrešnih, nelogičnih ili nepotpunih podataka (Chasteen, J. A.1992). Ova računarska aplikacija danas predstavlja najčešći oblik korišćenja u našoj profesiji. Upotreba kompjutera u terapiji je izazov za entuzijaste i vizionare koji su razvili potpuno novo polje: kompjuterizovana stomatologija CAD/CAM sistemi predstavljaju vrhunac računarske tehnologije sa puno realizovanih i potencijalnih aplikacija u stomatologiji. CAD/ CAM sistemi u stomatologiji se sastoje, u osnovi, od tri komponente (Rekov, D.1987): Prva komponenta je uređaj koji odražava pripremu zuba i drugih potpornih tkiva i odgovoran je za digitalizaciju prostornih podataka (CAI - Computer Aided Inspection); Druga komponenta se sastoji od kompjutera koji planira i izračunava oblik tijela

obnove, što je ekvivalentno području CAD-a; Treća komponenta predstavlja numerički kontrolisanu glodačku mašinu koja iz osnovnog oblika proizvodi restauraciju zuba, odgovarajuće CAM područje. Po pravilu se preporučuje dodatna obrada, kao što je poliranje ili pojedinačna preferencija zubnog tehničara ili doktora (Todorović, A.2005).

1. RAVOJ CAD/CAM SISTEMA

Sa razvojem software-skih paketa (CAD, CAM i drugi) te kompjuterski upravljanih mašina (CNC) i čitavih postrojenja u procesnoj industriji, kao i sa nastojanjima da se izađe u susret individualiziranim potrebama potrošača, neke od bitnih tačaka razgraničenja pripreme i proizvodnje gube na oštini.

Planiranje procesa prevodi informaciju o dizajnu proizvoda (geometrijski input) u stadijume procesa i instrukcije o efikasnoj proizvodnji. Slično drugim funkcijama razvoja proizvoda i dizajna, planiranje procesa je razvijano uz pomoć kompjutera u computer aided process planing (CAPP).

CAPP podržano većim brojem alata podržanih računarom može biti efikasnije u korišćenju resursa za proizvodnju pojednostavljenjem i unapređenjem planiranja procesa. CAPP je zasnovan na Grupnoj Tehnologiji (GT) kodiranja i klasifikacije za identifikaciju većeg broja osobina ili parametara elemenata proizvoda ili proizvoda. Ovi atributi omogućuju sistemu da odabere osnovni plan procesa za familiju dijelova i obavi veliki dio planiranja. Ostali rad završava planer modifikacijom finog podešavanja plana.

Sledeći stadijum u razvoju je generišući CAPP. Generišuće planiranje procesa određuje pravila odlučivanja zasnovano na grupnu tehnologiju dijelova, odnosno takođe koristi tehnologiju kodiranja. Rezultujući plan procesa zahtjeva minimalnu manualnu interakciju i modifikaciju (na primjer unos dimenzija). Čisto generišući sistem koji može proizvesti cjelokupni plan procesa na osnovu klasifikacije komada i drugih dizajnerskih podataka je cilj za budućnost. Ovakav tip čisto generišućeg sistema uključivaće upotrebu vještačke inteligencije za izradu planova procesa i biće potpuno integrisan u CIM okruženje.

Dalji iskorak u ovom stadijumu je dinamičko, generišući CAPP, koji će uzeti u obzir kapacitete mašina i postrojenja, mogućnosti izrade alata, radne centre i raspored opreme kao i status opreme (npr. Zastoje usljed održavanja) u razvoju planova procesa. Dinamički, generišući CAPP zahtjevaće tijesnu integraciju sa sistemima planiranja proizvodnih resursa, pratiće trenutnu situaciju akvizicijom podataka iz rada postrojenja. CAPP će direktno davati podatke kontrolorima procesa ili, u manje automatizovanom okruženju, davati grafikone o stanju i rasporedu opreme i tokovima materijala u vezi sa tokom razmatranog procesa.

Computer Aided Draughting (*u nekom izvorima Design*) (CAD) ili Crtanje pomoću računara, je izvršilo revoluciju u procesu dizajna. U poređenju sa tradicionalnim tehnikama rada, proizvođači mogu raditi efikasnije korišćenjem CAD sistema jer mogu ostvariti bolji dizajn brže i sa nižom cijenom. Dizajner sa lakoćom može da koristi CAD sistem za generisanje višestruko povezanih, kompleksnih, objekata i njihovo pozicioniranje prema zahtjevima. Dalje, CAD sistem ima mogućnost da stornira entitete, omogućava

korisniku da izabere širok varijetet često korišćenih dijelova iz formirane interaktivne baze. Ovo unapređuje kvalitet i vjerodostojnost predmeta rada kao i brzinu njihove izrade.

Mnogi CAD sistemi su sposobni za davanje geometrijskih podataka kod formiranja čvrstih modela i prototipa čime se vrši integracija sa RP tehnikama. Komercijalno je isplativo integrisati CAD sa CAM (Computer Aided Manufacture) gdje je to moguće. CAM softver koristi geometrijske podatke iz CAD programa za generisanje instrukcija za kontrolu i upravljanje automatskih mašina i alata (CNC strugovi, bušalice, itd).

Razvoj CAM softvera omogućio je spregu CAD/CAM u cilju unapređenja industrije. Istorijski posmatrano, izbušena papirna traka (matrica) je upotrebljavana za programiranje Numerički Kontrolisane (NC) mašine, dok su kasniji modeli koristili mašinske kodove (npr. ASCII) koji su se ukucavali u tekst editor (***.txt). U oba slučaja, program je upravljao brzinom kretanja reznih alata, dubinom rezanja itd. Moderni CAD/CAM sistemi, automatski generišu kretanje alata na osnovu 3D CAD podataka i omogućavaju prethodnu simulaciju procesa mašinske obrade na ekranu računara. Proširenje CAD/CAM je potpuno integrisanje svih aspekta proizvodnje i usluga upotrebom podataka generisanih računarom. To je proces poznat kao Computer Integrated Manufacture (CIM). Industrija koja prihvata filozofiju fleksibilne proizvodnje koristi najviše razvijene CIM sisteme u cilju inkorporacije svih proizvodnih informacija u lokalno dostupnu bazu podataka. Sistemi kontrole i obezbjeđivanja kvaliteta mogu biti inkorporirani u CIM sisteme.

Digitalna proizvodnja je pojam koji predstavlja široku mrežu digitalnih modela i metoda kojima se opisuje svaki aspekt životnog ciklusa proizvoda. Ona predstavlja integraciju različitih alata za dizajn proizvoda (CAD), planiranje procesa (CAPP), upravljanje vremenom i poslovne aplikacije, planiranje izgleda fabrike, ergonomiju, simulacije rada robota, softvere za analizu, simulaciju procesa, CAM softvere i ostale aplikacije koje se koriste za planiranje i optimizaciju procesa i objekata stvarnog preduzeća.

U cilju obezbjeđivanja NC instrukcija CAM opremi, moraju biti donijete osnovne odluke koje se tiču upotrebe opreme, alata i sekvenci operacija. Ovo je funkcija CAPP-a. Bez nekih elemenata CAPP-a integracija CAD/CAM ne bi bila moguća.

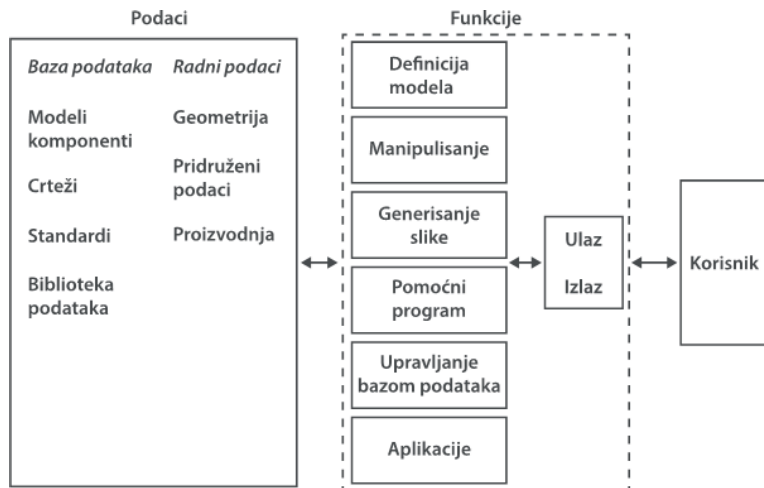
Prednosti CAPP-a su: Smanjenje napora na planiranju procesa; Direktna ušteda na radnoj snazi; Ušteda materijala; Smanjenje škarta; Ušteda alata; Smanjenje rada u procesu.

U tržišnoj ekonomiji, razvoj proizvoda će biti odgovor na projektovane potrebe tržišta, i to obično treba biti identifikovano u formi kratkog dizajna, koji će biti osnova za dalji razvoj proizvoda.

Ovo je veoma širok opis inženjerskog procesa i detalj u svakoj fazi se zanatno razlikuje po broju ljudi koji su uključeni i po prirodi i složenosti proizvoda. Treba voditi računa o tome da je process projektovanja, na primjer vazduhoplovnih motora ili računarskih sistema, vrlo složen proces koji uključuje velike timove i usko je ograničen tehničkim faktorima. U nekim oblastima proizvod može da bude rezultat rada jednog projektanta (dizajnera) ili malog tima, ili može da bude uslovljen nekim faktorima koji imaju dominantnu ulogu.

Arhitektura CAD sistema je prikazan na slici 1. i ona opisuje dizajn kao niz faza, u ovom slučaju napredak od zahtjeva preko konceptualnog dizajna i idejnog projekta na dizajna detalja. U ovom slučaju, međutim, različite faze procesa projektovanja se generalizuju u zajednički obrazac u kojem su modeli dizajna razvijeni kroz proces analize i procjene, vodeći ih do prerade i dorade modela. U ranim fazama dizajna, privremeno

rješenje predlaže projektant (dizajner). Ovo je procjena u odnosu na određen broj gledišta da bi se postigao prikladan dizajn u odnosu na ono što se traži. Ako je prijedlog neupotrebljiv, onda se taj prijedlog modifikuje. Proces se ponavlja sve dok se ne postigne da je projekat dobar, gdje može da se razvija više u dubinu i faza preliminarnog dizajna može da počne.



Slika 1.: Arhitektura CAD sistema

U ovoj fazi projekat je prečišćen, tako da procjena i modifikacija može da se obavlja na većem nivou detalja. Konačno, faza dizajna detalja doprinosi na sličan način da se završi definisanje dizajna za proizvodnju.

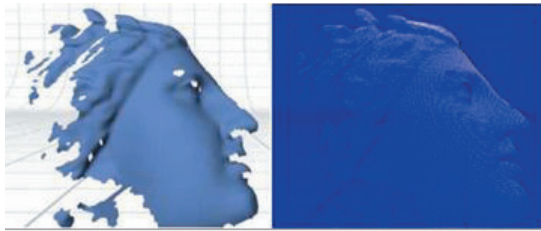
Do sada, CAD sistemi su opisani u veoma opštim pojmovima. Tačnije, mogu da sadrže sledeće elemente: hardver: računar povezan sa perifernom opremom; softver: računarski program(e) koji radi(e) na hardveru; podatke: struktura podataka koju je stvorio i kojom manipuliše softver; ljudska znanja i aktivnosti.

2. NAPREDNE METODE I UREĐAJI ZA KREIRANJE GEOMETRIJE I BRZU IZRADU PROTOTIPA

Kao što klasično skeniranje fotografija ili teksta predstavlja ulazne veličine u razne računarske aplikacije, a štampanje i crtanje izlaznu formu računarskih aplikacija i dok se sve to dešava u dvodimenzionalnom prostoru, razvojem novih naprednih tehnologija perifernih jedinica granice su pomaknute prema trodimenzionalnom prostoru. Upravo, industrijski dizajn ima velike koristi od ovih novih metoda koje omogućavaju jednu novu dimenziju u radu industrijskih dizajnera. Kao što je CAD predstavljao veliki korak naprijed u odnosu na klasično crtanje bazirano na ortogonalnoj projekciji i papiru, tako trodimenzionalno (3D) skeniranje i brza izrada prototipa omogućava jednu potpuno novu dimenziju u prezentaciji ideja i konceptata dizajnera.

3D skeniranje

Pod 3D skeniranjem podrazumijevamo prikupljanje prostornih podataka o geometriji posmatranog objekta putem uređaja koje u širem smislu nazivamo 3D skeneri i koji predstavljaju vezu između realnog objekta i CAD modela. 3D skeniranje ima svoju široku primjenu u industriji, kontroli geometrije proizvedenih dijelova, osiguranju kvaliteta, inženjerskom dizajnu, antropometriji, građevini, urbanizmu, geodeziji, filmskoj industriji i računarskoj animaciji, zaštiti spomenika i kulturne baštine, arheologiji, medicini, itd. 3D skenere dijelimo u dvije osnovne kategorije: kontaktne i beskontaktni skeneri. U beskontaktnu skenere ubrajamo čitav niz tehnologija poput „*Time of flight*” — skenera, triangulacij skih skenera, skenera sa strukturisanim svjetlom (*white light*), kompjutersku tomografiju (CT), mikrografiju, magnetnu rezonancu (MRI), fotogrametriju i niz drugih. Osnovna svrha 3D skenera je stvaranje oblaka tačaka (*point cloud*) koje predstavljaju prostorne koordinate tačaka posmatrane površine (Slika 2.).



Slika 2.: Skenirana skulptura Artemide i oblak tačaka

Kontaktne skeneri

Kontaktne skeneri (CMM - coordinate measuring machine) predstavljaju jednu od prvih tehnologija 3D skeniranja (Slika 3.). Funkcionišu na principu pipala, koje dodiruju objekta očitavaju koordinatu tačke dodira, a sastoje se od pomičnog stalka, čije se koordinate očitavaju na mikrometarskom nivou, i samog pipala, te upravljačkog softvera koji uz upravljanje ima mogućnost provlačenja osnovnih geometrijskih oblika kroz očitane tačke. Nedostaci ovih skenera su sporost prikupljanja podataka i dodir koji može, ili oštetiti objekt (npr. krhki arheološki nalazi), odnosno deformisati ili pomaknuti manje dijelove.



Slika 3.: CMM skener i kontaktno pipalo

Time of flight skeneri

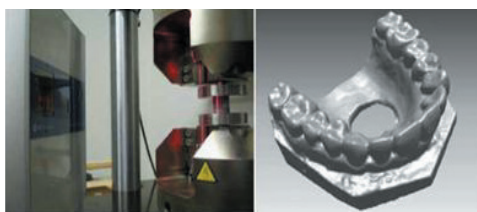
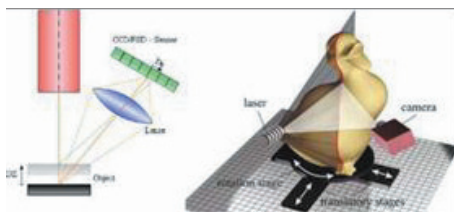
„Time of flight“ (vrijeme leta) laserski skeneri (Slika 4.) se temelje na očitavanju razlike vremena između odaslato impulsa laserskog svjetla i refleksije odbijene zrake koju prima detektor. Na temelju veličine vremenskog intervala Δt i poznate brzine laserske zrake (brzina svjetlosti c), izračunava se udaljenost kao $s = (c \times \Delta t) / 2$. Pomično ogledalo velikom brzinom prenosi emitovani zrak preko površine objekta i tako stvara oblak tačaka. Ovi skeneri su pogodni za vrlo velike udaljenosti, ali nemaju veliku preciznost (rezolucija je nekoliko milimetara). Tipična primjena ovih skenera je u građevini, odnosno konzervatorskim i restauratorskim radovima, te očuvanju kulturne baštine.



Slika 4.: Time of flight skener

Triangulacijski skeneri

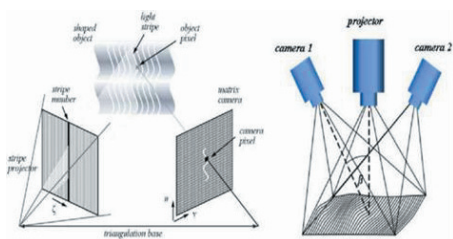
Triangulacijski laserski skeneri (Slika 5.) se sastoje od izvora laserske zrake, te objektivna i zaslona na koji se projektuje reflektovana zraka. Objektiv je postavljen tako da se nalazi na konstantnoj udaljenosti od laserskog zraka i pod konstantnim uglom s obzirom na zrak. Kako se posmatrani objekt pomiče, tako dolazi do pomicanja reflektovane zrake na zaslonu. Iz ovih poznatih veličina (ugao objektivna i zraka te udaljenost objektivna od zraka) i pozicije reflektovane zrake na zaslonu određuje se nepoznata udaljenost objekta. Češće se ne radi samo o jednom zraku, već o laserskom snopu, čime se očitava pozicija čitave linije tačaka, a prelaskom snopa preko objekta čitava površina. Kako se ovim načinom prikuplja geometrija vidljive strane objekta, često se za manje objekte koristi zakretno postolje kojim se zakreće objekt oko svoje ose, čime se dobija niz skeniranih površina, a iz poznatog ugla zakreta omogućava se jednostavno povezivanje površina u zatvoreno tijelo. Za veće objekte koje nije moguće smjestiti na rotacijsko postolje, vrši se skeniranje sa raznih strana objekta, a kasnije putem zajedničkih markera (barem tri za svaki susjedni sken) preklapanjem se spajaju susjedni skenovi. Metoda temeljena na triangulaciji je brza, a preciznost skeniranja je velika. Tako, npr. NextEngine 3D Desktop skener (Slika 6.) (www.nextengine.com) čija cijena iznosi 3 000 USD, ima rezoluciju od 0.125 mm.



Slika 5.: Princip triangulacije laserskog zraka i Slika 6.: Triangulacijski i skenirana geometrija laserski NextEngien skener laserskog snopa

Skeneri sa strukturisanim svjetlom

Skeneri sa strukturisanim svjetlom, koji se još nazivaju i White light skeneri (skeneri bijelog svjetla), temelje se na principu projekcije crta bijelog svjetla te očitavanja dobijenih projekcija, najčešće digitalnim (CCD) kamerama (Slika 7.). Obično se sistemi temelje na dvjema CCD kamerama, koje pod istim uglom, s obzirom na projektor među njima, softverski raspoznaju rub između svjetla i tame projektovane linije, te se na osnovu poznatog ugla gledanja određuje udaljenost. U ovu grupu spadaju i skeneri koji se temelje na prelasku zrake svjetlosti preko objekta, te se iz dinamičke promjene projektovane konture rekonstruiše površina. Puno su češći skeneri koji se temelje na uzorku niza paralelnih linija svjetla i tame. Prednost ove metode je ta što se mogu vrlo brzo projektovati uzorci s linijama, te se znatno brže od triangulacijskih laserskih skenera može očitati geometrija objekata. Mana im je ta što im je ograničeno korištenje pri dnevnom svjetlu, te prostorije u kojima se vrši skeniranje treba zatamniti, odnosno skeniranje na otvorenom vršiti u sumrak ili noću. Što je projektor jači, a samim tim i skuplji, to je ovaj problem manje izražen. Takođe, zbog karakteristika optike, prije sprovođenja mjerenja zahtijeva se često kalibriranje CCD kamera. Rezolucija im se kreće do reda veličine jednog mikrona. Robusnost skeniranja ovom metodom je nešto veća nego što je to slučaj kod triangulacijskih laserskih skenera, a prekrivanjem površine bijelim prahom titanovog dioksida u potpunosti se eliminiše problem refleksije oko bridova, prisutan kod triangulacijskih skenera. Cijena ovih skenera je nešto veća od triangulacijskih laserskih pa se tako cijena GOM-ovog skenera ATOS (Slika 8.) kreće oko nekih 70 000 EUR i više (zavisi od jačine projektor i vrsti objektiva).

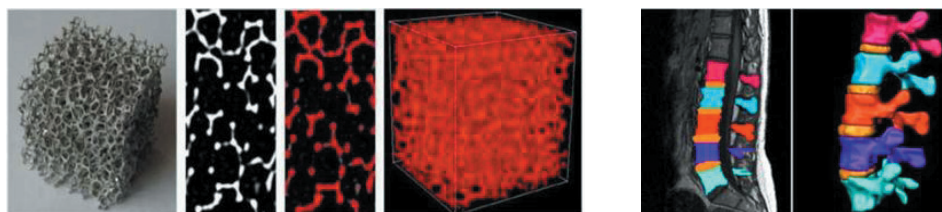


Slika 7.: Princip projekcije strukturiranih linija očitavanja konture površine

Slika 8.: GOM-ov skener ATOS i skenirani rotor Francis turbine

Kompjuterska tomografija, mikrotomografija i magnetna rezonanca

Radi se o metodama koje se pretežno koriste u medicini te proučavanju strukture materijala. Ovim metodama se dobijaju uzastopni presjeci objekata različitog sastava, a kasnije se softverskom obradom kreira 3D geometrija. Kompjuterska tomografija (CT) trodimenzionalne slike kreira iz niza dvodimenzionalnih presjeka nastalih zračenjem X zraka (Slika 9.). Mikrotomografija je tomografija koja omogućava skeniranje sitnih struktura na mikronivou, a naročito primjenu ima u nauci o materijalima. Magnetna rezonanca (MRI) (Slika 10.), za razliku od CT-a koji se koristi jakim jonizirajućim zračenjima, radi na principu magnetnog polja te omogućava veće kontraste i bolju rezoluciju kod snimanja mekih tkiva. Za razliku od MRI-a, kompjuterska tomografija nalazi veću primjenu kod određivanja strukture raznih materijala poput betona, kamena, metalnih pjena i sl.



Slika 9.: Metalna pjena, presjek dobijen CT-om Slika10.: Geometrija kičme dobijena rekonstrukcijom MRI snimaka

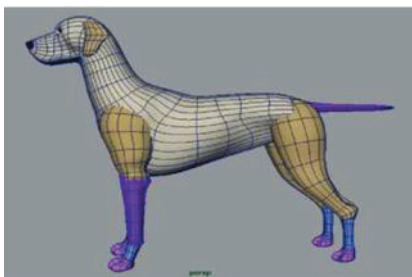
Pretvaranje oblaka tačaka u CAD geometriju

Samim skeniranjem i obradom skenirane površine posao nije završen i tek iza skeniranja predstoji mukotrpan rad pretvaranja skeniranog u CAD geometriju. Sam format zapisa, STL format, predstavlja velik broj podataka (koordinate oblaka tačaka) koje je potrebno smanjiti kako bi se skenirana geometrija koristila u drugim aplikacijama. Formiraju se modeli sastavljeni od ravnih poligonih (najčešće trougaonih) površina, te modeli površina definisani putem NURBS prostornih površina, a koji se dalje pretvaraju u CAD zapis tijela. Modeli sastavljeni od mreže trougaonih površina, gdje se pojedini trouglovi definišu između tačaka oblaka, sadrže još uvijek previše podataka za manipulisanje. Često sam softver skenera omogućava definisanje mreže trougaonih površina (Slika 11.). Ovakva mreža je i dalje previše kompleksna i glomazna da bi se mogla koristiti u raznim CAD aplikacijama i neophodna je njena simplifikacija matematičkim funkcijama i primitivnim geometrijama.



Slika 11.: Skenirana površina definisana preko mreže trougaonih površina

Većina ozbiljnijih CAD aplikacija poput CATIA-e, SolidWorksa, Rinocerosa i sl., omogućava učitavanje oblaka tačaka u STL formatu, te definisanje primitivnih ploha poput ravni, kugle, kupe, cilindra i kompleksnih matematičkih površina poput NURBS-ova. NURBS, čije ime dolazi od *Non-uniform rational basis spline*, svoje početke nalaze u industriji brodogradnje kod aplikacija za definisanje linija broda, a kasnije se ove matematičke formulacije trodimenzionalnih ploha naveliko koriste u računarskoj grafici za kreiranje krive i ploha koje omogućuju veliku fleksibilnost u definisanju analitičkih i slobodnih oblika. Poslednjih godina je došlo do znatnog razvoja softvera u području računarske animacije, gdje se NURBS površine (Slika 12.) koriste za opisivanje animiranih likova, a sami likovi se kreiraju na osnovu modela iz modelarskog plastelina, koji se skenira 3D skenerima poput NextEngine skenera.

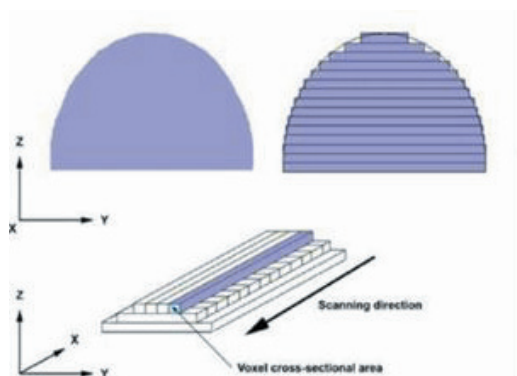


Slika 12.: Model kera sastavljen od NURBS površina

Brza izrada prototipa

Brza izrada prototipa (*Rapid Prototyping*) je automatizovana izrada tijela temeljena na formiranju slobodnih oblika. S ovim metodama se započelo oko 1989. godine, kada su se na temelju računski zadanih oblika mašina izrađivali modeli i dijelovi prototipa. Danas je brza izrada prototipa uznapredovala do nivoa da se čak koristi u proizvodnji maloserijskih dijelova proizvoda. Iako je cijena jednog izrađenog predmeta znatno veća nego cijena istog tog oblika proizvedenog na klasičan način, npr. brizganjem, uštede pri razvoju su znatne. Cijena uređaja za brzu izradu prototipa (zavisno o tehnologiji) iznosi od 40 000 EUR, do 120 000 EUR (za uređaje koji mogu izraditi objekte manjih dimenzi-

ja). Ako se ovo uporedi s gubicima jednog lošeg kalupa za brizganje plastičnih materijala, gdje uzrok greški leži u krivoj interpretaciji crteža od strane alatničara ili čak greški u CAD modelu, tada je dovoljno približno tri do četiri škart kalupa da bi gubici bili jednaki cijeni 3D štampača. Greške u izradi kalupa su vrlo česte u industriji polimernih proizvoda. Princip brze izrade prototipa je građenje dvodimenzionalnih presjeka tijela (xy ravni) u smjeru ose okomite na ravan presjeka (z ravan). Prvi uređaji za brzu izradu prototipa temeljili su se na izrezivanju kartona prema konturi presjeka u xy ravni i slaganje tih izrezanih poprečnih presjeka u smjeru z ravni. Pri tom je korak presjeka koji se izrezuje odgovarao debljini kartona iz kojeg se presjek izrezuje. Većina uređaja za brzu izradu prototipa upravo funkcioniše na ovim temeljima, gradi se sloj po sloj poprečnih presjeka u smjeru z ravni. Na slici 13. je prikazan princip stvaranja oblika koji odgovara polovini cilindra. Ako bi ipak željeli izraditi puni cilindar, tada bi trebalo u donjoj polovini cilindra, ispod cilindra postavljati materijal koji će cilindar držati u svom položaju kako se ne bi prevrnuo. Ovaj dodatni materijal se zove „materijal nosač“ (*carrier material*) i neophodan je pri izradi prototipa. Materijal nosač može biti ili materijal drugačijeg sastava od osnovnog materijala, koji se naknadno odstrani, ili čak ako se izrada prototipa temelji na prašini koja se međusobno povezuje (solidificira), nepovezane čestice prašine stvaraju podršku ovim ukrućenim (solidificiranim) česticama.



Slika 13.: Princip građenja prototipa polovine cilindra

Prototip se u računarima definiše na način da se prvo standardnim CAD programima kreira virtualna geometrija tijela, koja se onda šalje na perifernu jedinicu gdje se sloj po sloj gradi prototip.

Pri tom je standardni format komuniciranja između CAD paketa i softvera koji upravlja izradom prototipa STL (Stereolitography) format. Tehnologije brze izrade prototipova su:

- lasersko sinterovanje,
- modeliranje odlaganjem tekućine,
- stereolitografija,
- izrada laminiranih modela,
- topljenje elektronskom zrakom,
- 3D štampanje

3. CAD / CAM TEHNOLOGIJA U USLUŽNIM DJELATNOSTIMA - STOMATOLOGIJI

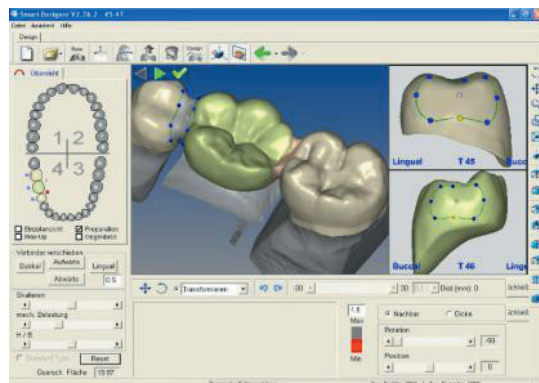
Godine 1985., pomoću trouglastih kamera, izvršeno je višedimenzionalno mjerenje, omogućavajući prenos informacija o mjerenju na ekran računara. Pomoću računara, softvera za obradu slika i povezivanja sa CNC glodalicom, dobija se prva restauracija silikatnih injekcija na Univerzitetu u Cirihu. Potom je gotovo nezamisliva tehnologija i praktično kreiranje novog koncepta u stomatologiji. U Nemačkoj, CAD/CAM tehnologija je uvedena u stomatološku praksu 1988. godine (Ritter, A. V.2002). Savremeni softver pruža takvu mogućnost da je minimalna debljina restauracije manja od preporučene, upozorava zubara na postojeći problem. Takođe, na virtuelnom modelu su označene i jasno prepoznatljive kritične oblasti koje se mogu ispraviti ponuđenim alatima. (www.sirona.com).

Razvoj tehnologije je otišao od kopiranja mašine do potpuno kompjuterski kontrolisanog sistema, sa velikom bazom oblika zuba, što je omogućilo automatsku proizvodnju krunica i mostova. Danas postoji nekoliko ovih sistema (Cerec, Cercon Celaia, Lava, Everest) i smatra se da će oni u budućnosti imati mnogo veću upotrebu u proizvodnji fiksne restauracije. Slika 14. prikazuje fiksnu restauraciju proizvedenu pomoću kompjutera kontrolisanog sistema.



Slika 14.: Proizvodnja fiksne restauracije pomoću računarskog sistema

Zahvaljujući CAD/CAM tehnologiji i brojnim studijama, to je rezultiralo formulom za izuzetno vijernu restauraciju, koja ne posjeduje samo izuzetne estetske karakteristike, već i izuzetno biokompatibilnu. To je nemetalna keramika. U zavisnosti od defekta u zubima, ovi materijali se mogu koristiti za izradu krunica i mostova, zubnih furnira, ali i za specijalne nadopune (slika 15.).



Slika 15.: Inovativna CAD/CAM tehnologija

Sve ove restauracije proizvedene su u laboratorijama za zubnu tehnologiju, opremljene CAD/CAM tehnologijom (kompjuterom), što garantuje izuzetnu preciznost i estetiku. Formiranjem 3D slike zuba i desni na ekranu, on dozvoljava stomatologu da po kursoru formira vrlo precizan odgovarajući anatomski dizajn nedostajuće zubne supstance. Dobijeni 3D modeli pružaju idealne osnove za restauraciju. Prilikom dizajniranja je na vrlo jednostavan način uzet u obzir odnos sa susjednim zubima, zubi u suprotnoj vilici koja uspostavljaju odgovarajuće kontakte, ali i odnos između restauracija i mekog tkiva i desni.

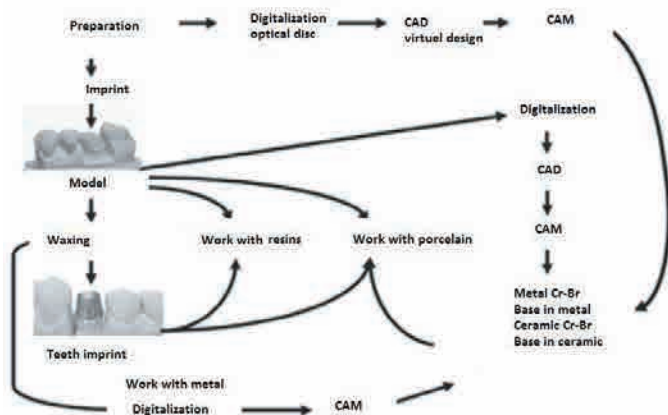
CAD/CAM mašina kroz dalje mljevenje završenih keramičkih blokova proizvodi obnovu zuba što je tačno replika 3D crteža, tj. dizajn restauracije, koji obavlja zubar preko CAD/CAM softvera. Fabrički keramički blokovi koji se obrađuju procesom glodanja, izrađeni su u više različitih nijansi, tako da boja odgovara potrebama pacijenata, kao i parametrima koji određuju visok nivo estetike.

4. PROCES PROIZVODNJE KERAMIČNIH RESTORACIJA CAD-CAM TEHNOLOGIJOM

Proces proizvodnje keramičkih restauracija pomoću CAD/CAM tehnologije je precizniji od konvencionalnog procesa proizvodnje metalno-keramičkih krunica i mostova. Slika 16. prikazuje pregled CAD/CAM sistema u procesu proizvodnje krunskih mostova.

Primjenom modernih mašina tipa MC KSL za brušenje gotovih keramičkih i cirkonijih blokova, fiksna protetska obnova može se danas izraditi samo u roku od 2-3 sata u kancelariji.

Prednosti ove mašine su višestruke. Preciznost mljevenja se kreće u rasponu od +/- 25 mikrona, dok vrijeme potrebno za brušenje kružnog mosta ne prelazi 6 minuta. Zahvaljujući rezoluciji od 7,5 mikrona, protetske površine za restauraciju koje se proizvode na ovaj način sigurno se lijepe, u poređenju sa konvencionalnim radovima (www.kalmar.hr/usluge/cadcam).



Slika 16. Prikaz eksternog CAD/CAM sistema u procesu proizvodnje krunskih mostova (M. Takashi, H. Iasuhiro, K. Jun, K. Soichi, T. Iukimichi, 2009).

Protetička obnova se vrši u nekoliko faza, koje se odvijaju sledećim redosledom (Joda, T. Buser, D.2016): a) *Pregled i istorija* Na osnovu indikacija i statusa zuba, dentist dijagnosticira i preporučuje nekoliko opcija, objašnjavajući prednosti i nedostatke, u zavisnosti od indikacije; b) *Priprema zuba za postavljanje protetskih restauracija*. Proces počinje brušenjem zuba i njegovom supresijom, koji obavlja zubar u zavisnosti od vrste keramike koja se koristi za određeni klinički slučaj, tj. da se stvori protetička restauracija; c) *Uzimanje otiska zuba*. Zubar vrši otisak zuba (jedan ili više, u zavisnosti od kojih protetskih radova radi), na kome će vršiti dalju konstrukciju i livenje protetske restauracije; d) *Lijevanje modela*. Na osnovu otiska zuba, izrađen je gipsani model, na kojem se vrši dalji rad, na osnovu otiska zuba; e) *3D skeniranje modela*. 3D oralna kamera snima zube, nakon čega se slika prenosi na računar i obrađuje pomoću softvera. Ove kamere omogućavaju visok stepen preciznosti i efikasnosti i posebno su pogodne za restauraciju pojedinačne krune; f) *Modeliranje*. CAD/CAM softver koji modeluje zube na osnovu unijetih zahtjeva; g) *3D zubno štampanje*. Prije nego što počnete sa štampanjem zuba, potrebno je da montirate keramičke blokove u frezanje. Keramički blok je fiksiran na točku koji omogućava blokiranje. Most se proizvodi procesom glodanja na osnovu 3D modela iz bloka postavljenog u CAD/CAM uređaju. Freza razvija željeni oblik u skladu sa uputstvima računara. Keramički blok se obrađuje okretanjem svoje ose, diamond disk se rotira, kreće se gore i dole oko keramičkog bloka i obrađuje ga. Kretanje dijamantskog diska omogućeno je pomoću električne šine; h) *Cementacija*. Protetske restauracije su cementirane posebnim estetskim cementom za keramiku bez metala. Postoje dva tipa cementiranja - privremeno i definitivno. Privremeno cementiranje restauracije vrši se u periodu prilagođavanja protetske restauracije do čeljusti, dok se definitivno cementiranje vrši nakon što se obezbijedi prihvatanje protetskih restauracija.

Prednosti keramike bez metala u poređenju sa metalokeramičkim radovima: Kompletna biokompatibilnost materijala; Odsustvo alergije na ovaj materijal (pate od velikog broja pacijenata sa metalnim mostovima alergijske reakcije zbog velike količine nikla u leguri metala); Odsustvo bimetalizma kod radova bez metala (stvaranje niskona-

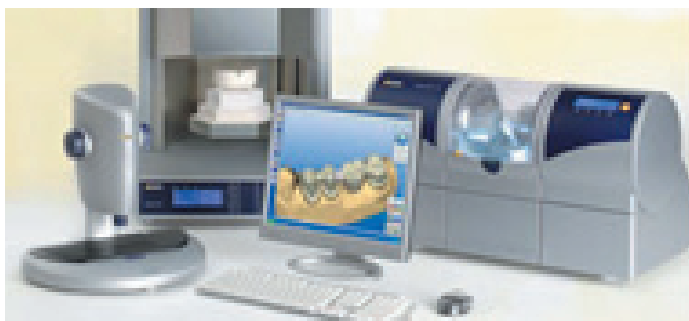
ponskih nivoa između dva metala, npr. između metalno-keramičkih krunica); Čvrstina radova je 4 puta veća od metala koji se koristi za metalokeramike radove; Perzistentnost i ne mjenjajući svoje fizičke i hemijske osobine čak i nakon dugih godina provedenih u ustima; Estetska superiornost u poređenju sa metalokeramicnim radovima; Korisni efekti na desni, tj. „gingiva” sa kojom dolazi u kontakt; Odsustvo tamne promjene boje „gingive” na spoju krune i desni.

Nedostaci keramike bez metala u poređenju sa metal-keramičkim radovima: Cijena. Zbog skupog i dugogodišnjeg razvoja ove tehnologije, skupe CAD/CAM mašine i skupi proces proizvodnje, krunice bez metala su skuplje od metal-keramičkih radova. Međutim, uzimajući u obzir odnos između cijene i kvaliteta, može se reći da je odnos na strani keramike bez metala.

5. OPTIČKE METODE PROSTORNE DIGITALIZACIJE

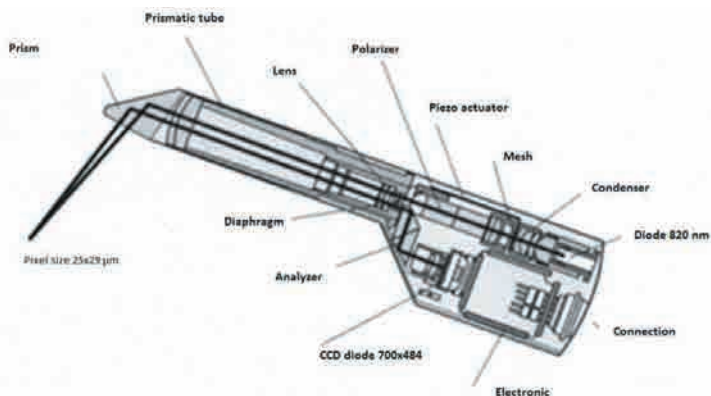
Optičke metode prostorne digitalizacije, kao što su mehaničke, na osnovu kriterijuma prostora gdje se vrši skeniranje, dijele se kao: a) intraoralni, b) ekstraoralne metode.

Što se tiče veličine područja skeniranja, one se klasifikuju na tačkastu i prugastu površinu. Intraoralno skeniranje podrazumijeva rad u stomatološkoj ordinaciji, dok su ekstraoralne metode uglavnom povezane sa laboratorijskim radom. Obe metode su razvijene jedna pored druge, ali danas u praktičnoj primjeni pristoji samo jedna intraoralna (dva su u izjavi) i veliki broj ekstraoralnih sistema. Zahtjevi postavljeni za njih su različiti. Iz ergonomskih razloga, intraoralni skener ne treba fiksirati na preostale zube. Ovo utiče na zahtjev svog oblika, veličine, težine i sposobnosti održavanja higijene, ali prije svega brzine skeniranja. Empirijski je dokazano da obučeni korisnik može držati glavu glave skenera nepokretnim i još uvijek u odnosu na skenirani zub, uglavnom na 0, 5 sekunde. Podaci o brzini prikupljanja mjerenja podataka, pored rezolucije, jedan su od najvažnijih u izboru sistema i njegovoj širokoj primjenljivosti. Veličina polja skeniranja je minimalno 14x14mm, a optimalno 25x14mm. Opseg dubine skeniranja treba da bude najmanje 10 mm, ali ne bi trebalo da bude veći od 14 mm. Rezolucija skenera treba biti najmanje $\pm 25\mu\text{m}$ (Pfeiffer J Dental 1998). Najpoznatiji predstavnik intraoralne optičke metode je Cerecov sistem (Sirona Dental Systems GmbH, www. Sirona. de) prikazan na slici 17. (Schneider, V.2000).



Slika 17.: Sirona, 3M Dental CAD / CAM system

Ova tehnika koristi više svjetlosnih zraka, u obliku linija, predviđenih na pripremi (područje koje je izrezalo liniju). Zraci u brzim oscilacijama se kreću preko objekta, tako da se u kratkom vremenskom periodu dobija trodimenzionalni oblik pripreme. Slično konvencionalnoj fotografiji, kamera u vrijeme snimanja treba da bude što dalje je moguće. Fiksiranje kamere naspram objekta na ovom sistemu nije neophodno, jer vrijeme potrebno za obradu podataka od svih 340.000 piksela je manje od 0,5 sekundi (Slika 18). Tokom 2005. godine prikazani su još dva intraoralna skenera Evolution 4D i HintEls.



Slika 18.: Šema Cerec 2 glave skenera

Skeniranje ekstraoralnih sistema vrši se na modelu, i iz tog razloga postoji potreba za stomatološkom tehničkom laboratorijom. U ovim sistemima to nije kritično brzo prikupljanje podataka, jer su glava skenera i predmet koji se skenira nepokretni, već širina skeniranja i preciznost mjerenja.

Drugo rešenje, za postizanje treće dimenzije korišćenjem CCD čipova, daje postupak laserskog triangiranja, poslije Lelandais i Clainchardina (1984). Ako fokusirate laserski dotok vazduha sa oscilujućim ogledalom za CCD kameru, postaje jasno ograničena laserska linija. Velika prednost ovog sistema je mogućnost skeniranja podrivnih površina. Ovaj mod je za sada jedino moguć kao ekstraoralne metode.

Predstavnik skenera ekstraoralnih tačaka je Cerec Scan (Slika 19.) i Cerec inLab (Slika 20.). Skener je fiksiran na jedan od motora za glodanje i predmet skeniranja je pokretan. Rezolucija skenera je slična intraoralnom skeneru, ali vrijeme skeniranja jednog zuba je mnogo duže. Za „čtetvoročlani” most potrebno je 2-3 minuta. Ove godine fabrika je razvila novi skener sa visokom rezolucijom, u kojoj se ovaj put svodi na oko 40 sekundi (Cerec INEOS) (Monkmeier, U. R. i sar.2005).



Slika 19. Cerec Scan – integrirani laserski skener, za skener u lijevom motoru



Slika 20.: Cerec inLab sistem - s lijeva na desno: inEos ekstra-oral Cerec u laboratoriji sa ugrađenim tačnim skenerom, PC računar sa 3

6. ISTRAŽIVANJE ZADOVOLJSTVA PACIJENTA U KORIŠĆENJU CAD/CAM TEHNOLOGIJE U BOSNI I HERCEGOVINI

Uopšteno govoreći, imajući u vidu da su za pružanje usluga stomatologa, pacijenti od suštinskog značaja, jer ako nema pacijenata za pružanjem usluge nema potrebe, a ključno je kontinuirano sprovoditi istraživanje i analizu povratnih informacija od pacijenata. Kada se analiziraju mišljenja, osjećanja i iskustva pacijenata, potrebno je uzeti u obzir sve faktore koji na bilo koji način dodiruju pacijenta. To su prije svega: brzina pružanja usluga, bol koji se (ne) osjeća kada se pružaju usluge, estetske efekte i cijenu usluga kao jedan od najvažnijih elemenata, s obzirom na ekonomsku krizu i turbulentno tržišno kretanje u našoj zemlji i u regionalnu.

Shodno tome, formulisano je deset pitanja koja su formirana u upitniku za procjenu nivoa zadovoljstva pacijenata nakon izrade zubnih implantata koristeći CAD/CAM tehnologiju. Poslije liječenja pacijenta, dok se još nalazi na stomatološkoj stolici, zamolite pacijenta da izdvoji nekoliko minuta da popuni upitnik, izražavajući svoja mišljenja i osjećanja o iskustvu sa zubnim restauracijama.

Da bi se ispitao nivo zadovoljstva pacijenta, pregledano je 200 pacijenata i postavljeno 10 pitanja po pacijentu, uz mogućnost davanja pet odgovora na pitanje u posljednjih 6 meseci (Tabela 1.).

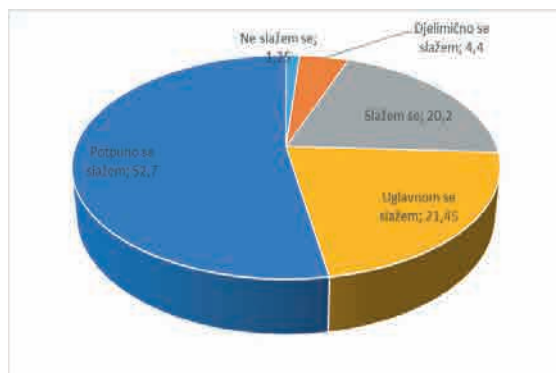
Takođe, pored gore navedenih pitanja, na koje pacijent odgovara, ukazujući na nivo saglasnosti sa gore navedenim nalazima, pacijent može da verbalno i pismeno izloži svoje sugestije koje bi doprinele daljem poboljšanju i unaprijeđenju pružanja ove usluge.

Tabela 1: Struktura pitanja za pacijente sa pet predloženih odgovora na temu zadovoljstva pruženim uslugama stomatologa koristeći CAD/CAM tehnologije (Autor 2018)

PITANJA	Ne slažem se	Delimično se slažem	Slažem se	Uglavnom se slažem	Potpuno se slažem	Ukupno:
1. Proces priprema za protetiku, restauracija je prijatna i ne traje dugo.	0	20	26	56	98	200
2. Nije neophodno više puta da dodete do stomatolog, kako bi završio pripremu proces.	0	0	76	84	40	200
3. Izrada presađivanja donosi iznenađujuće kratak rok.	0	0	10	45	145	200
4. Tokom proizvodnje restauracije, ona je uključena iznenađujuće profesionalno osoblje	25	30	25	36	84	200
5. Instaliranje restauracije je potpuno bezbolno.	0	25	65	48	62	200
6. Restoracije se ne razlikuju od entiteta prirodni zubi izgledaju potpuno prirodno.	0	0	25	40	135	200
7. Kada se restauracija postavi, potreban je određeni period prilagodavanja.	0	8	60	45	87	200
8. Stomatološke restauracije daju potpuno prirodno osećanja, nema potrebe za određenim ograničenjima hrana.	0	0	0	0	200	200
9. Preporučite prijateljima proces usluga.	0	5	95	50	50	200
10. Cijena je pristupačna.	0	0	22	25	153	200
Ukupno:	25	88	404	429	1054	2000
Učešće u %.	1, 25	4, 40	20, 20	21, 45	52, 70	100

Rezultati istraživanja pokazuju da su pacijenti izuzetno zadovoljni proizvodnjom proteza pomoću CAD/CAM tehnologije. Pošto su pitanja formulisana uglavnom da se prva kolona (ne slažem se) odražava na najniži nivo zadovoljstva pacijenta (1, 25%), dok poslednje dvije kolone (ja se uglavnom slažem i slažem se) odražavaju najviši stepen zadovoljstva pacijenta (74, 15%).

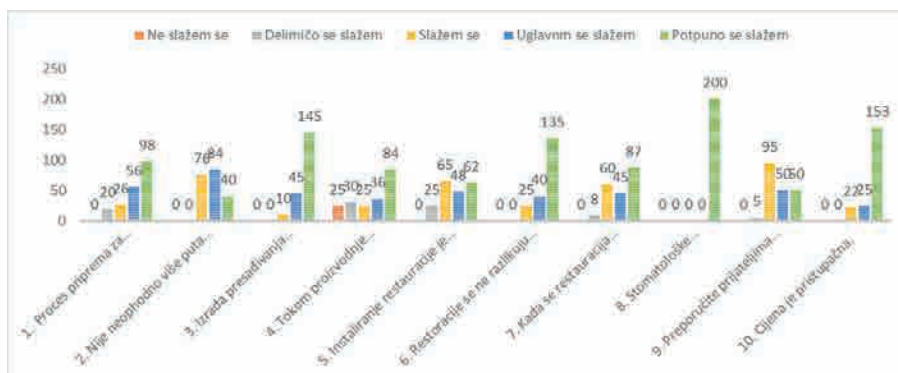
Rezultati istraživanja i odgovori u zavisnosti od zadovoljstva pacijenata prikazani su na sledećoj slici 21. (grafikon):



Slika 21.: Struktura odgovora na upitnik o zadovoljstvu pacijenta (Autor 2018.)

Sa slike 21. može se konstatovati da najznačajnije učešće u strukturi odgovora donosi konačne odgovore na niz od 10 pitanja: potpuno se slažem i uglavnom se slažem, odnosno najviši nivo zadovoljstva pacijenata u iznosu od 74, 15%. Minimalno učešće u setu od 10 pitanja odgovara: ne slažem se, to je najniži nivo zadovoljstva pacijenata od 1, 25%. Uvođenje novih tehnologija u Bosni i Hercegovini dovodi do poboljšanja usluga u oblasti stomatologije, što potvrđuje zadovoljstvo pacijenata (94, 35%). Cijene pristupačnosti za pacijente su zadovoljavajuće (89%). Na pitanje „Izrada presađivanja donosi iznenađujuće kratak rok“, zadovoljstvo pacijenata je 95%. Na pitanje da li stomatološka restauracija daje prirodno osećanje, zadovoljstvo pacijenta je 100%.

Odgovarajući pojedinačno na svako postavljeno pitanje iz upitnika za datu strukturu, odgovori su sledeći: (Slika 22.)



Slika 22.: Struktura odgovora iz upitnika na pitanja zadovoljstva pacijenta (Autor 2018)

ZAKLJUČCI

Kompjuterski podržana proizvodnja je ono što CAM predstavlja i koristi se za programiranje CNC mašina. CAM softver ima mogućnost da pojednostavi proces mašin-

ske obrade, omogućavajući korisnicima da podese posao u „Job Tree“ - tako da mogu organizovati svoj tok posla, postaviti Toolpaths i pokrenuti simulacije svojih dijelova koji se prekidaju za dijagnostiku. CAM će takođe stvoriti g-kod za svoju CNC mašinu koja će se pratiti u toku izvršenja operacija. Generalno, CAM počinje sa ciklusom Roughinga da bi se uklonio materijal iz materijala. Kako se ciklus približava završetku, polu-završnoj obradi i završi Toolpaths precizira dio u nešto što je spremno za rukovanje ili distribuciju.

Kompjuterska proizvodnja (CAM) je upotreba softvera za kontrolu alatnih mašina i srodnih u proizvodnji proizvoda. CAM se takođe može odnositi na korišćenje računara za pomoć u svim operacijama proizvodnog postrojenja, uključujući planiranje, upravljanje, transport i skladištenje. Njegova osnovna svrha je stvaranje bržeg proizvodnog procesa i komponenti i alata sa preciznijim dimenzijama i konzistentnošću materijala, koja u nekim slučajevima koristi samo potrebnu količinu sirovina (time minimizira otpad), uz istovremeno smanjenje potrošnje energije.

CAM je naknadni računarski proces pomoću računarskog dizajna (CAD), a ponekad i pomoću računarskog inženjeringa (CAE), jer model koji se generiše u CAD-u i potvrđuje u CAE-u može se unositi u CAM softver, koji zatim upravlja mašinskim alatom. CAM se koristi u mnogim školama uz pomoć računarskog dizajna (CAD) za stvaranje objekata.

CAD/CAM tehnologiju u uslužnim djelatnostima - estetskim fiksnim restauracijama koristi se u razvoju inleja, onleja, krunica i mostova. Upotreba ove tehnologije pruža visok kvalitet, profesionalnost, profit, ali i stalan rast „novih“ i zadovoljnih pacijenata.

Primjena novih tehnologija ima značajan uticaj na industrijski razvoj, razvoj uslužnih djelatnosti, kvalitet proizvoda i usluga, a sve navedeno dovodi do zapošljavanja, veće potrošnje i kvaliteta života uopšte.

Bilo koji napredak u oblasti informacionih i komunikacionih tehnologija istovremeno se primjenjuje u svim oblastima djelatnosti uključujući industriju, medicinu-stomatologiju, i druge djelatnosti. Ovaj rad predstavlja dodatni dokaz neophodnosti primjene novih (informacionih) tehnologija u industrijskoj proizvodnji i uslužnim djelatnostima. Širenje informacionih i komunikacionih tehnologija će u budućnosti doprinijeti još većem utjecaju u industriji na projektovanju i dizajniranju novih proizvoda, izradi prototipova, izradi novih proizvoda, a u uslužnoj djelatnosti na pravovremenim dijagnozama, blagovremenim i adekvatnim tretmanima, nadgledanjima terapijskih efekata, ali i postizanju visokog nivoa estetike u grani medicine-stomatologiji.

„Idealni CAD/CAM sistem“ već dugi niz godina je san mnogih istraživača. Pošto je preciznost CAD/CAM tehnologijom u funkciji svih pojedinačnih grešaka u procedurama i opremi, a to skeniranje je početni izvor mogućih netačnosti, skener sa višom rezolucijom će najviše doprinijeti kvalitetu čitavog sistema.

Istraživanje je pokazalo da uvedene nove tehnologije u oblasti medicine-stomatološke usluge u Bosni i Hercegovini je dovelo do poboljšanja usluga, a što potvrđuje zadovoljstvo pacijenata (94, 35%). Cijene pristupačnosti za pacijente su vrlo zadovoljavajuće (89%). Na pitanje da li je proizvodnja restauracije kratka, zadovoljstvo pacijenata iznosilo je 95%. Na pitanje da li zubne restoracije daju prirodno osjećanje? Zadovoljstvo pacijenta je 100%. Upotreba CAD/CAM tehnologije značajno skraćuje vrijeme stvaranja protetičkog rada, a CAD/CAM sistemi su jednostavniji za korišćenje.

LITERATURA

- Casanova, A, Marshall, W. (1986). Computer applications in large group practices. *DentClinic of North America*, 30, 673-81.
- Chasteen, J. A. (1992). Computer database approach for dental practice. *J Am Dent Assoc*, 123: 26 -33.
- Gilboe, D.B., Scott, D.A. (1991). Computer system for dental practice management. *J Can Dent Assoc*, 57:782-6.
- Joda, T. Buser, D. (2016). *Digital implant dentistry — a workflow in five steps*, URL: <http://www.dental-tribune.com/htdocs/uploads/printarchive/editions16-20.pdf>.
- Kindersley, London.
- Konz, S., Johnson, S. (2003). Occupational Ergonomics With CD / Edition 6.
- Marmaras, N. Poulakakis, G. Papakostopoulos, V. (1999). Ergonomics design in ancient Greece. *Applied Ergonomics*, 30, 361-368.
- Monkmeyer, U.R. et al. (2005). The prefabricated anatomical polychrome CAD/CAM crown for the inLab system. *Int J Comp Dent*, 16-78.
- Pfeiffer, J. Dental (1998). CAD/CAM technologies: the optical impression (I). *Int J Comp Dent* 29-33.
- Rekow, D. (1987). Computer aided design and manufacturing in dentistry: A review of the state of art. *J Prosthet Dent*, 58, 512-516.
- Ritter, A. V. (2002). Chairside CAD/CAM in Dentistry, *JERD*, 15(2).
- Schneider, W. (2000). Cerec 3. *Int J Comp Dent*. 33-46 [www. Sirona.de](http://www.sirona.de)
- Takashi, M., Yasuhiro, H., Jun, K. Soichi, K., Yukimichi, T. (2009). A review of dental CAD/CAM:current status and future perspectives from 20 years of experience. *Dental Materials Journal*.
- Tambini, M.(1999). *The look of the century - Design icons of the 20th centry*. Dorling
- The Ergonomic Research Society - <http://www.ergonomics.org.uk/>
- Todorović, A. (2005). *The application of CAD/CAM technology in dental prosthetics*. Belgrade: Copyright edition.
- Ulrich, K., Eppinger, D. (2008). Product Desing and Development, fourth edition, Mc Graw- Hill, International edition.
- Veljača, T. (2008). *Kreiranje CAD i numeričkog modela iz 3D skeniranog objekta uz evaluaciju modela termovizijskom analizom naprežanja*. Završni rad. Split: FESB.
- www.nextengine.com

SPORT, OBUKA I BORILAČKE VJEŠTINE

STRUKTURA MORFOLOŠKIH KARAKTERISTIKA STUDENATA FAKULTETA BEZBJEDNOSNIH NAUKA

Originalni naučni rad

DOI: 10.7251/DEFSR1841005P	COBISS.RS-ID 7745560	UDK 316.344-057.875:316.647.8
----------------------------	----------------------	-------------------------------

doc. dr Darko Paspalj¹

Fakultet bezbjednosnih nauka, Univerzitet u Banjoj Luci

doc. dr Milan Gužvica

Fakultet bezbjednosnih nauka, Univerzitet u Banjoj Luci

mr Lazar Vulin

Osnovna škola Kozice, Oštra Luka

Apstrakt:

Na uzorku od 84 studenta prve godine Fakulteta bezbjednosnih nauka Univerziteta u Banjoj Luci primijenjen je skup od 17 morfoloških mjera sa ciljem utvrđivanja latentne strukture morfoloških karakteristika. Faktorskom analizom izdvojena su tri faktora koji su interpretirani kao: faktor volumena i mase tijela, faktor longitudinalne i transferzalne dimenzionalnosti tijela i faktor fizičkog tjelesnog sastava procijenjen na osnovu debljine potkožnog masnog tkiva. Ovaj rad je pokušaj da se pokaže da je izdvojena latentna hijerarhijska struktura morfoloških faktora od izuzetne teorijske i paraktične vrijednosti, pri čemu bi pomenuti faktori trebali predstavljati odrednicu za predikciju antropometrijskih karakteristika i programiranje trenažnih operatora u nastavi Specijalnog fizičkog obrazovanja.

Ključne riječi: *morfološke karakteristike, Fakultet bezbjednosnih nauka, Specijalno fizičko obrazovanje*

UVOD

Kao i u svim sportskim aktivnostima i vještinama, tako i u borilačkim sportovima u ovom slučaju u Specijalnom fizičkom obrazovanju (SFO), uspješnost u učenju i

¹ Autor za korespondenciju: doc dr. Darko Paspalj, Fakultet bezbjednosnih nauka, Univerzitetu Banjoj Luci, Bulevar Vojvode Živojina Mišića 10 A, 78 000 Banjaluka. E mail: dpaspalj@yahoo.com.

praktičnoj primjeni predviđenih borilačkih tehnika i njihovih veza, u mnogome zavisi od antropoloških karakteristika i njihove usklađenosti sa odgovarajućim sportom - vještinom. Longitudinalna dimenzionalnost, volumen i masa tijela, potkožno masno tkivo, te transversalna dimenzionalnost (faktori koji determinišu morfološki prostor), odavno su predmet istraživanja mnogih autora. U tom smislu vršena su istraživanja na populaciji studenata: Kurelić (1957), Viskić, (1972), Stojanović, i saradnici (1975), Stojanović, i saradnici (1975), Szirovica, i saradnici (1980), Hošek i Jeričević (1982), Momirović, i saradnici (1987), Božić (1994) i Mudrić i Jovanović (2000), koja ukazuju na postojanje četiri latentne morfološke dimenzije koje se smatraju odgovornim za objašnjenje individualnih promjena registrovanih u domenu manifestnih morfoloških pokazatelja identifikovanih kao: faktor longitudinalnih dimenzionalnosti, faktor transferzalnih dimenzionalnosti, faktor voluminoznosti tijela i faktor fizičkog tjelesnog sastava.

Opšte poznatu činjenicu da uspješnost pojedinca u sportu zavisi od kompatibilnosti njegovih antropoloških karakteristika sa određenom sportskom aktivnošću, potvrđuju i istraživanja provedena u karate sportu (Giampietro i saradnici (2003), te Pieter i saradnici (2009), Abdel-Baser (2010), Sterkowicz i Przybycien (2010), zatim boksu Blažević (2007) i judou Marchocka (1988), Sertić (1993) i Sertić, Segedi i Žvan (2007). Dakle, na osnovu iskustava i istraživanja koja se odnose na motoričko učenje, usavršavanje i efikasnost primjene motoričkih obrazaca, sa pravom se vjeruje da svaki od ovih faktora može biti od velike pomoći prilikom planiranja nastavnih programa u SFO-u. Naime, praktična iskustva i istraživanja ukazuju na prednosti, ali i nedostatke određenih morfoloških karakteristika koje mogu da utiču na učenje, usavršavanje i realizaciju specifičnih motoričkih programa. Istraživanja koja su proveli Milošević i saradnici (1985), Milošević i saradnici (1987), Božić (1989) i Blagojević (1996) ukazuju na pozitivne veze longitudinalne dimenzionalnosti i mehanizamaza strukturiranje i reprogramiranje motoričkog algoritma, transferzalne dimenzionalnosti i volumena tijela sa istim mehanizmima, ali i na negativnu vezu potkožnog masnog tkiva i mehanizma za reprogramiranje motoričkog algoritma i mehanizma za selektivnu kontrolu i regulaciju facilitacije i inhibicije eferentnih motoričkih puteva. S obzirom na to da saznanje o smjeru i intenzitetu djelovanja na transformaciju psihosomatskog statusa studenata omogućuje adekvatno i optimalno programiranje nastavnih sadržaja SFO-a, a daje na osnovu dosad objavljenih istraživanja, utvrđeno da morfološke karakteristike u velikoj mjeri utiču na efikasnost usvajanja i primjenu programskih sadržaja SFO-a, Blagojević, (1996), kao i činjenicu da nastava SFO-a značajno utiče na transformaciju morfoloških karakteristika studenata Blagojević, (2002) i Janković (2009), ovo istraživanje je imalo za cilj utvrđivanje morfološke hijerarhijske strukture kod studenata Fakulteta bezbjednosnih nauka u Banjoj Luci, radi klasifikiranja studenata na osnovu morfoloških karakteristika u što homogenije grupe zbog bolje efikasnosti izvođenja nastave iz predmeta SFO. Na osnovu ovako definisanog cilja istraživanja pretpostavka je da studenti Fakulteta bezbjednosnih nauka imaju odgovarajuću strukturu morfoloških karakteristika, te da će algoritam faktorske analize transformisati skup manifestnih morfoloških varijabli u predviđen broj relevantnih morfoloških faktora.

METODE ISTRAŽIVANJA

Uzorak ispitanika

Uzorak ispitanika sačinjavala su 84 studenta muškog pola, prve godine Fakulteta bezbjednosnih nauka iz Banjaluke, starosne dobi $19 \pm 0, 6$ godina. Svi entiteti koji su sačinjavali uzorak bili su klinički zdravi i bez vidljivih morfoloških nedostataka.

Uzorak varijabli

Za procjenu morfološke građe tijela primijenjeno je 17 varijabli, odabranih tako da pokriju četvorodimenzionalni prostor definisan kao: longitudinalna dimenzionalnost skeleta, transferzalna dimenzionalnost skeleta, potkožno masno tkivo i volumen i masa tijela. Na ispitanicima je bio primijenjen sljedeći sistem antropometrijskih varijabli: Visina tijela (AVISTJ), Dužina noge (ADUZNO), Dužina ruke (ADUZRU), Širina ramena (ASIRAM), Širina karlice (ASIKAR), Dijametar lakta (ADIJLA), Dijametar koljena (ADIJKO), Dijametar ručnog zgloba (ADIJRZ), Dijametar skočnog zgloba (ADIJSZ), Težina tijela (ATEZTJ), Obim nadlaktice (AOBNAD), Obim podlaktice (AOBPOD), Obim natkoljenice (AOBNAT), Obim potkoljenice (AOBPOT), Kožni nabor na nadlaktici (AKNNAD), Kožni nabor na trbuhu (AKNTRB) i Kožni nabor na potkoljenici (AKNPOT). S obzirom na to da su sve varijable mjere ne prema metodi internacionalnog biološkog programa (IBP), rezultati ovog istraživanja mogu se komparirati sa većinom rezultata sličnih istraživanja u zemlji i okruženju. Ispitanike je mjerila ekipa uvježbana za ovakva mjerenja, sastavljena od tri nastavnika Specijalnog fizičkog obrazovanja kao mjериoca i jednog zapisničara, svi muškog pola. Za uzimanje navedenih mjera upotrijebljen je sljedeći instrumentarij: decimalna vaga, antropometar, kaliper tipa „John Bull“, centimetarska pantljička, pelvimetar, kefalometar i klizni šestar. Tačnost očitavanja rezultata bila je na kaliperu 0,1 mm, na vagi 0,1 kg, a na ostalim instrumentima 0,1 cm. Sve mjere su uzimane po tri puta a u obzir se uzimala srednja vrijednost izmjerenih rezultata.

METODE OBRADE PODATAKA

Statistička obrada podataka urađena je na PC računaru Pentijum 4, uz upotrebu aplikacionog statističkog programa SPSS (verzija 20, 00). Osnovne mjere centralne tendencije i mjere disperzije rezultata definisane su pomoću: aritmetičke sredine (Mean) i standardne devijacije (Std. Deviation). U cilju testiranja pravilnosti distribucije podataka korišćen je Kolmogorov-Smirnov test, dok je u skladu sa ciljem ovog empirijskog istraživanja, testiranje alternativne hipoteze izvršeno primjenom multivarijantnog modela faktorske analize. Da bi se utvrdile stvarne relacije među izdvojenim dimenzijama koristila se Direkt Oblimin rotacija, nakon čega je dobijena matrica strukture i matrica sklopa.

REZULTATI

Tabela 1 Osnovni deskriptivni parametri distribucija antropometrijskih varijabli

	N	Mean	Std. Deviation	KS p
AVISTJ	84	181.85	6.13	.932
ADUZNO	84	94.97	4.40	.516
ADUZRU	84	78.03	3.37	.160
ASIRAM	84	40.61	2.05	.033
ASIKAR	84	27.32	1.56	.105
ADIJLA	84	6.57	.47	.000
ADIJRZ	84	5.34	.41	.000
ADIJKO	84	8.93	.72	.000
ADIJSZ	84	7.04	.53	.000
ATEZTJ	84	78.25	9.19	.745
AOBNAD	84	29.53	3.00	.722
AOBPOD	84	26.41	1.81	.381
OABNAT	84	56.77	4.32	.528
OABPOT	84	37.13	2.39	.612
AKNNAD	84	7.64	2.71	.000
AKNTRB	84	11.10	4.72	.007
AKNPOT	84	9.68	2.91	.159
Valid N	84			

Legenda: N – broj ispitanika; Min – najmanji postignuti rezultat; Max – najveći postignuti rezultat; Mean – aritmetička sredina; Std. Deviation – standardna devijacija; Skewness – mjera asimetrije; Kurtosis – mjera izduženosti; KS p – vrijednost vjerovatnoće Kolmogorov- Smirnov testa; AVISTJ - visina tijela; ADUZNO - dužina noge; ADUZRU - dužina ruke; ASIRAM - širina ramena; ASIKAR - širina karlice; ADIJLA - diameter lakta; ADIJKO - diameter koljena; ADIJRZ - diameter ručnog zgloba; ADIJSZ - diameter skočnog zgloba; ATEZTJ - težina tijela; AOBNAD - obim nadlaktice; AOBPOD - obim podlaktice; AOBNAT - obim natkoljenice; AOBPOT - obim potkoljenice; AKNNAD - kožni nabor na nadlaktici; AKNTRB - kožni nabor na trbuhu i AKNPOT - kožni nabor na potkoljenici.

U tabeli 1. prikazani su deskriptivni parametri svih izmjerenih antropometrijskih mjera. Povećane vrijednosti standardne devijacije mjera longitudinalne dimenzionalnosti skeleta i volumena tijela upućuju na veliku varijabilnost rezultata oko aritmetičkih sredina ali uzimajući u obzir veličinu uzorka ovu pojavu možemo smatrati normalnom. Rezultati Kolmogorov – Smirnov testa za analizu normalnosti rasporeda pokazuju da normalan raspored opisuju varijable za procjenu longitudinalne dimenzionalnosti skeleta: visina tijela (AVISTJ), dužina noge (ADUZNO) i dužina ruke (ADUZRU), varijable za procjenu cirkularne dimenzionalnosti skeleta i mase tijela: obim nadlaktice (AOBNAD), obim podlaktice (AOBPOD), obim natkoljenice (AOBNAT), obim potkoljenice (AOBPOT) i

težina tijela (ATEZTJ) kao i varijable širina karlice (ASIKAR) i kožni nabor potkoljenice (AKNPOT), dok su vrijednosti manje od 0, 05 zabilježene kod varijabli: kožni nabor na nadlaktici (AKNNAD), kožni nabor na trbuhu (AKNTRB), širina ramena (ASIRAM) i kod skoro svih varijabli za procjenu transferzalne dijagonalnosti skeleta: dijametar lakta (ADIJLA), dijametar koljena (ADIJKO), dijametar ručnog zgloba (ADIJRZ) i dijametar skočnog zgloba (ADIJSZ). Poređenjem rezultata ovog istraživanja sa rezultatima istraživanja koje su proveli Mudrić, i Jovanović, (1997) godine na populaciji studenata Više škole unutrašnjih poslova iz Zemuna, ne uočavaju se bitne razlike kod varijabli kojima su mjerene longitudinalna dimenzionalnost skeleta i varijabli kojima su mjereni volumen i masa tijela ali su primjetne razlike kod varijabli kojima su mjerene transferzalna dimenzionalnost tijela i potkožno masno tkivo. Pokazalo se da studenti Više škole iz Zemuna imaju nešto veće vrijednosti tjelesne težine, dijametra lakta, dijametra koljena, dijametra skočnog zgloba, dijametra ručnog zgloba, obima nadlaktice, obima podlaktice, obima potkoljenice, kožnog nabora na nadlaktici i kožnog nabora na trbuhu, dok je kod studenata Fakulteta bezbjednosnih nauka iz Banjaluke zabilježena veća vrijednost tjelesne visine, obima natkoljenice i kožnog nabora na potkoljenici, iz čega možemo zaključiti da su studenti Fakulteta bezbjednosnih nauka iz Banjaluke nešto viši i sa manjim postotkom tjelesne mase od studenata Više škole iz Zemuna.

Tabela 2 Matrica interkorelacije morfoloških karakteristika

	AVISTJ	ADUZNO	ADUZRU	ASIRAM	ASIKAR	ADIJLA	ADIJRZ	ADIJKO	ADIJSZ	ATEZTJ	AOBNAD	AOBPOD	AOBNAT	AOBPOT	AKNNAD	AKNTRB	AKNPOT
AVISTJ	1.00																
ADUZNO	.834	1.00															
ADUZRU	.807	.833	1.00														
ASIRAM	.493	.464	.417	1.00													
ASIKAR	.288	.283	.265	.097	1.00												
ADIJLA	.342	.305	.318	.367	.147	1.00											
ADIJRZ	.401	.408	.394	.445	.154	.432	1.00										
ADIJKO	.386	.383	.402	.360	.007	.308	.291	1.00									
ADIJSZ	.445	.434	.425	.485	.201	.318	.340	.580	1.00								
ATEZTJ	.586	.548	.510	.587	.267	.382	.393	.412	.474	1.00							
AOBNAD	.199	.199	.090	.391	.027	.251	.361	.201	.179	.680	1.00						
AOBPOD	.273	.253	.167	.392	.078	.378	.323	.289	.331	.645	.732	1.00					
AOBNAT	.236	.268	.147	.386	.100	.292	.268	.289	.338	.754	.604	.674	1.00				
AOBPOT	.344	.292	.215	.400	.185	.255	.155	.325	.504	.749	.527	.596	.733	1.00			
AKNNAD	.125	.115	.111	.219	.115	.139	.113	.045	.098	.573	.458	.370	.603	.484	1.00		
AKNTRB	.317	.241	.252	.369	.184	.221	.217	.144	.282	.674	.521	.399	.528	.518	.796	1.00	
AKNPOT	.375	.211	.320	.392	.159	.237	.238	.207	.305	.641	.399	.413	.521	.519	.676	.751	1.00

Legenda: AVISTJ - visina tijela; ADUZNO - dužina noge; ADUZRU - dužina ruke; ASIRAM - širina ramena; ASIKAR - širina karlice; ADIJLA - dijametar lakta; ADIJKO - dijametar koljena; ADIJRZ - dijametar ručnog zgloba; ADIJSZ - dijametar skočnog zgloba; ATEZTJ - težina tijela; AOBNAD - obim nadlaktice; AOBPOD - obim podlaktice; AOBNAT - obim natkoljenice; AOBPOT - obim potkoljenice; AKNNAD - kožni nabor na nadlaktici; AKNTRB - kožni nabor na trbuhu i AKNPOT - kožni nabor na potkoljenici.

Tabela 3 Matrica karakterističnih korjenova i objašnjeni dijelovi zajedničke varijanse

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings ^a
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	7.129	41.933	41.933	6.721	39.535	39.535	5.292
2	2.589	15.228	57.161	2.288	13.457	52.992	4.677
3	1.373	8.077	65.238	.979	5.760	58.752	3.716
4	.999	5.878	71.116				
5	.907	5.334	76.450				
6	.812	4.776	81.225				
7	.617	3.628	84.854				
8	.540	3.177	88.031				
9	.408	2.398	90.428				
10	.378	2.221	92.649				
11	.320	1.883	94.532				
12	.270	1.591	96.122				
13	.185	1.087	97.210				
14	.161	.949	98.158				
15	.114	.669	98.828				
16	.112	.658	99.486				
17	.087	.514	100.000				

Extraction Method: Maximum Likelihood.

Rotation Method: Oblimin with Kaiser Normalization.

Tabela 4 Faktorska analiza morfoloških karakteristika – direktna oblimin rotacija

Matrica strukture				Matrica sklopa			
Pattern Matrix ^a				Structure Matrix			
	Factor				Factor		
	1	2	3		1	2	3
AOBNAT	.809	-.106	-.221	AOBNAT	.857	.276	-.539
AOBPOD	.796			ATEZTJ	.847	.637	-.619
AOBPOT	.713		-.191	AOBPOT	.800	.354	-.491
AOBNAD	.707	-.121	-.220	AOBPOD	.788	.293	-.350
ATEZTJ	.572	.337	-.318	AOBNAD	.748	.218	-.492
ADIJLA	.292	.266		ADIJLA	.393	.384	-.146

ADUZRU	-.179	.970	ADUZRU	.254	.906	-.163	
ADUZNO		.911	ADUZNO	.370	.905	-.123	
AVISTJ		.908	AVISTJ	.375	.905	-.205	
ADIJSZ	.331	.391	ASIRAM	.531	.541	-.274	
ASIRAM	.345	.385	ADIJSZ	.474	.521	-.158	
ADIJRZ	.235	.371	ADIJKO	.419	.466		
ADIJKO	.334	.354	.154	ADIJRZ	.377	.464	-.132
ASIKAR		.309	-.124	ASIKAR	.130	.311	-.160
AKNTRB		.116	-.848	AKNTRB	.489	.311	-.906
AKNNAD	.141		-.828	AKNNAD	.452	.133	-.871
AKNPOT	.128	.169	-.694	AKNPOT	.489	.352	-.779

Legenda: AVISTJ -visinatijela; ADUZNO - dužinanoge; ADUZRU - dužinaruke; ASIRAM - širinaramena; ASIKAR - širinakarlice; ADIJLA - dijametarlakta; ADIJKO - dijametarkoljena; ADIJRZ - dijametarručnogzgloba; ADIJSZ - dijametarskočnogzgloba; ATEZTJ - težinatijela; AOBNAD - obimnadlaktice; AOBPOD - obimpodlaktice; AOBNAT - obimnatkoljenice; AOBPOT - obimpotkoljenice; AKNNAD - kožninabornanadlaktici; AKNTRB - kožninabornatrbuhuiAKNPOT - kožninabornapotkoljenici.

Tabela 5 Matrica interkorelacija izolovanih latentnih dimenzija

	F1	F2 F3
F1	1.000	.421 -.417
F2	.421	1.000 -.186
F3	-.417	-.186 1.000

DISKUSIJA

Analizom matrice interkorelacija varijabli za procjenu morfoloških karakteristika (Tabela 2) može se uočiti da su veze među primjenjenim varijablama uglavnom pozitivne te da manji broj koeficijenata primijenjenih varijabli ima visoke i značajne veze, dok veći dio njih pokazuje osrednju i beznačajnu povezanost. Kao i u većini ranijih istraživanja najveća povezanost dobijena je unutar bloka varijabli za procjenu longitudinalne dimenzionalnosti skeleta, bloka varijabli za procjenu mjera potkožnog masnog tkiva i bloka varijabli za procjenu cirkularne dimenzionalnosti skeleta. Varijable za procjenu tranferzalne dimenzionalnosti skeleta ostvarile su nešto niže koeficijente međusobne povezanosti ali su ipak homogenizovane u okviru svog bloka. Iz matrice interkorelacija se može vidjeti da su mjere potkožnog masnog tkiva u visokim korelacionim vezama sa mjerama volumena i težine tijela, dok su mjere longitudinalne dimenzionalnosti značajniju povezanost ostvarile sa tjelesnom težinom, širinom ramena dijametrom

ručnog zgloba i dijametrom skočnog zgloba, dok su sa ostalim varijablama ostvarile nešto slabiju povezanost. Takođe, može se vidjeti da je tjelesna težina u značajnoj korelaciji sa skoro svim primijenjenim varijablama, te da je ona linearna kombinacija gotovo svih morfoloških karakteristika.

Na osnovu vrijednosti Kajzer-Mejer-Oklinovog pokazatelja i statističke značajnosti Bartletovog testa sferičnosti komponentnim modelom faktorske analize utvrđena je latentna struktura morfoloških karakteristika studenata Fakulteta bezbjednosnih nauka u Banjoj Luci. Analizom glavnih komponenata (Tabela 3) uz primjenu Guttman - Kaizerovog kriterijuma vidljivo je da su dobijene tri glavne komponente koje objašnjavaju ukupno 65, 2% zajedničke varijanse manifestnih varijabli, pri čemu njihov pojedinačni doprinos iznosi za prvu glavnu komponentu 41, 9%, za drugu 15, 2% i za treću 8, 1% zajedničke varijanse.

Na osnovu matrice strukture i matrice sklopa antropometrijskih dimenzija (Tabela 4) vidljivo je da prvi izolovani faktor zasićen mjerama volumena i mase tijela, pri čemu na njega najveće projekcije ostvaruju sljedeće varijable: obim natkoljenice (AOBNAT), težina tijela (ATEZTJ), obim potkoljenice (AOBPOT), obim podlaktice (AOBPOD), obim nadlaktice (AOBNAD) i dijametar lakta (ADIJLA), tako da ovaj faktor možemo definisati kao faktor volumena i mase tijela. Ipak, sklop ovog faktora se djelimično razlikuje od sklopa faktora koji je jednako interpretiran a dobijen je u ranijim istraživanjima, pri čemu je dominantnu ulogu u njegovom definisanju imala masa tijela određena tjelesnom težinom. Ovdje je, međutim dominantno definisan obimom natkoljenice i uz tjelesnu težinu, obimom potkoljenice, obimom podlaktice i dijametrom lakta. Zanimljivo je uplitanje dijametara lakta u ovaj faktor koji i pored visoke projekcije ima malu korelaciju sa ovim faktorom, dok ostale mjere tranferzalne dimenzionalnosti tijela iako imaju značajniju korelaciju od dijametara lakta nisu ostvarile značajniju projekciju na ovaj faktor. S obzirom na to da se širina zglobova na ekstremitetima smatra preduslovom za razvoj mišićnih pripoja, te da su sve antropometrijske mjere važne za određivanje mase i volumena tijela, pretpostavlja se da dijametar lakta kod studenata Fakulteta bezbjednosnih nauka, diferencira poseban morfološki tip kod kojeg su masa i cirkularne dimenzije tijela definisane pretežno mišićnom masom i koji se razlikuje od morfološkog tipa koji nema masu tijela definisanu onom strukturom antropometrijskih dimenzija koje sugerišu da se radi pretežno o atletskoj fizičkoj konstituciji.

Drugi izolovani faktor određen je varijablama koje su indikatori dužinskih i transferzalnih mjera skeleta jer na njega najveće projekcije ostvaruju sljedeće varijable: dužina ruke (ADUZRU), dužina noge (ADUZNO), visina tijela (AVISTJ), širina ramena (ASIRAM), dijametar skočnog zgloba (ADIJSZ), dijametar koljena (ADIJKO), dijametar ručnog zgloba (ADIJRZ) i širina karlice (ASIKAR), na osnovu čega ovaj faktor možemo definisati kao mješoviti faktor longitudinalne i transferzalne dimenzionalnosti skeleta. „Objašnjenje za „uplitanje“ nekih transferzalnih mjera u definiciju longitudinalne dimenzionalnosti skeleta može ponovo oživjeti već zastupanu hipotezu da širina karlice i širina ramena, ne samo anatomski, već i konstitucionalno, ne predstavljaju striktnu mjeru rasta kostiju u širinu, već bolje aproksimiraju dužinu ilijašne kosti i dužinu klavikule” (Popović, 2007). Uvažavanjem ove konstatacije možemo smatrati da pod tim vidom ima opravdanja u zajedničkom učešću ovih mjera pri formiranju strukture ovog faktora.

Treći izolovani faktor sačinjavaju varijable: kožni nabor na trbuhu (AKNTRB), kožni nabor na nadlaktici (AKNNAD) i kožni nabor na potkoljenici (AKNPOT), tako da

bi ovaj faktor bi mogli definisati kao faktor potkožnog masnog tkiva. Imajući u vidu da varijable koje određuju ovaj faktor predstavljaju mjere adipoznosti tijela za čiji varijabilitet je odgovoran generator fizičkog sastava tijela procijenjenog na osnovu debljine potkožnog masnog tkiva, ovaj faktor možemo smatrati i faktorom fizičkog tjelesnog sastava procijenjenog na osnovu debljine potkožnog masnog tkiva.

Analizirajući matricu interkorelacija izlovanih glavnih komponenti (Tabela 5) može se vidjeti da postoji statistički značajna korelacija između faktora koji je interpretiran kao faktor volumena i mase tijela i faktora koji je interpretiran kao faktor longitudinalne i transferzalne dimenzionalnosti tijela. Treba napomenuti da postoji značajna ali negativna korelacija između faktora koji definiše volumen i masu tijela i faktora potkožnog masnog tkiva i da postoji slaba ali negativna korelacija između faktora longitudinalne i transferzalne dimenzionalnosti tijela i faktora potkožnog masnog tkiva. I u ranije objavljenim istraživanjima su utvrđene visoke i značajne veze između faktora koji definišu volumen i masu tijela sa faktorima koji definišu longitudinalnu i transferzalnu dimenzionalnost tijela kao i slabije veze ovih faktora sa faktorom potkožnog masnog tkiva.

Rezultati ovog istraživanja se podudaraju sa rezultatima istraživanja koje su proveli Stojanović, Momirović, Vukosavljević i Solarić, (1975) na uzorku od 737 ispitanika muškog pola, starih između 19 i 27 godina, sa ciljem utvrđivanja strukture latentnih antropometrijskih dimenzija iz populacije u kojoj je rast završen a proces deteriorijacije morfološke strukture još nije započeo, pri čemu je utvrđena egzistencija latentnih dimenzija odgovornih za volumen i masu tijela, longitudinalnu dimenzionalnost i potkožno masno tkivo, dok je ostala upitna egzistencija latentne dimenzije odgovorne za transferzalnu dimenzionalnost tijela (što oni pripisuju postupku određivanja koordinatnih osovina u prostoru reskaliranom na antiimage metriku).

Ukoliko uporedimo rezultate ovog istraživanja sa rezultatima istraživanja koje su proveli Mudrić, i Jovanović, (2000), na uzorku od 102 studenta petog semestra Više škole unutrašnjih poslova u Zemunu, vidimo da su dobijeni identični faktori sa različitim uticajem u objašnjenju ukupnog varijabiliteta (zbog primjene različitih metoda faktorske analize). Naime, Mudrić i Jovanović su metodom glavnih komponenti, kosom varimax solucijom izdvojili četiri faktora od kojih su tri uspjeli definisati kao: generalni faktor tjelesnog sastava koji je bio zasićen debljinama kožnih nabora natkoljnice, potkoljenice, nadlaktice, podlaktice, grudi i trbuha kao i mjerama koje su određivale kompoziciju tjelesnog sastava uz definisan procenat masti i procenat mišića, faktor longitudinalne i transferzalne dimenzionalnosti tijela koji je definisan tjelesnom visinom i dijametrima ručnog zgloba, koljena i skočnog zgloba i faktor volumena i mase tijela koji je bio definisan tjelesnom težinom i obimima nadlaktice, podlaktice, natkoljenice i potkoljenice.

Slične rezultate je dobio i Božić, (1994), koji je iz uzorka od 250 studenata muškog pola Više škole unutrašnjih poslova u Zemunu formirao uzorak od 104 ispitanika starih 19 do 25 godina, na kojima je uz upotrebu ortogonalne Oblimin ikose Varimax solucije takođe izdvojio tri faktora koji obuhvataju prostor morfoloških karakteristika, a koje je definisao kao: faktor morfološkog razvoja koji je bio određen dužinom noge, tjelesnom visinom, dužinom ruke, širinom karlice, dijametrom lakta i tjelesnom težinom, faktor fizičkog tjelesnog sastava koji je bio određen kožnim naborima: nadlaktice, potkoljenice, trbuha i leđa i faktor volumena tijela koji je bio određen obimima: podlaktice, nadlaktice, grudnog koša, potkoljenice i dijametrom ručnog zgloba. Analizom istraživanja na sličnoj populaciji ispitanika vidljivo je da su dobijeni skoro identični rezultati, na

osnovu čega možemo donijeti zaključak da su rezultati dobijeni ovim istraživanjem validni i upotrebljivi, jer definišu strukturu morfoloških karakteristika studenata Fakulteta bezbjednosnih nauka.

ZAKLJUČAK

Istraživanje je sprovedeno s ciljem da se utvrdi morfološka struktura studenata Fakulteta bezbjednosnih nauka iz Banjaluke. Da bi se udovoljilo postavljenom problemu, na uzorku od 84 studenta prve godine Fakulteta bezbjednosnih nauka, primijenjena je baterija od 17 varijabli za procjenu morfoloških karakteristika, koje hipotetski pokrivaju longitudinalnu i transferzalnu dimenzionalnost skeleta, volumen i masu tijela i faktor potkožnog masnog tkiva. Dobijeni podaci obrađeni su na PC računaru Pentijum 4, pomoću programa za faktorsku analizu uz upotrebu aplikacionog statističkog programa SPSS (verzija 20, 00). Nakon primijenjenih statističkih procedura izdvojena su tri faktora koji objašnjavaju oko 65, 2% varijabiliteta ovog prostora i koje je bilo moguće definisati kao: faktor volumena i mase tijela, faktor longitudinalne i transferzalne dimenzionalnosti tijela i faktor tjelesnog sastava procijenjen na osnovu debljine potkožnog masnog tkiva. Ukoliko se uporede rezultati ovog istraživanja, sa rezultatima većeg broja istraživanja koja su provedena na sličnoj populaciji ispitanika, lako je zaključiti da između njih nema značajnijih razlika. Vjeruje se da bi posmatrane i izolovane morfološke karakteristike mogle biti putokaz u procesu programiranja i provođenja nastavnih i trenažnih operatora, što bi omogućilo svakom pojedincu da prema svojim individualnim karakteristikama i sposobnostima, lakše i brže usvoje nastavno gradivo iz predmeta SFO-e. Imajući u vidu činjenicu da morfološke karakteristike imaju znatan uticaj na ispoljavanje sile i snage, i da neadekvatan nivo morfoloških karakteristika može biti limitirajući faktor u nastavi kod primjene programskih sadržaja iz prostora SFO-a, poželjno je da budući kandidati za upis na Fakultet bezbjednosnih nauka imaju odgovarajuće sposobnosti i karakteristike. S obzirom na to da budući radnici bezbjednosnih poslova mogu da obavljaju veoma opasne i složene poslove, veoma je važno da imaju i optimalne sposobnosti i karakteristike koje bi mogle doprinijeti uspješnom obavljanju profesionalnih zadataka. Zato je potrebno da se u procesu nastave pokloni određena pažnja, pored učenja i savladavanja osnovnih elemenata tehnike i njihovih veza predviđenih nastavnim sadržajem iz programa SFO-a, utiče i na izbor i formiranje modelskih karakteristika svakog pojedinca, kako bi budući radnik bezbjednosnih poslova bio uspješan u svojoj profesiji. Naravno, da bi se došlo do preciznijih i potpunijih informacija o modelskim karakteristikama studenata Fakulteta bezbjednosnih nauka, potrebna su dalja istraživanja iz ove oblasti. Vjeruje se da bi dobijene informacije mogle doprinijeti kvalitetnijem izboru kandidata, pa samim tim i kvalitetnijem kadru u oblasti bezbjednosnih poslova.

LITERATURA

- Abdel-Baser, E. A. (2010). Using the Length and Weight of the Body and Some Dynamic Parameters to Perform Ura Mawshi Geri Skill to Predict Kumite Players' Performance. *World*, (3), 127 – 131.
- Blagojević, M. (1996). *Uticaj morfoloških i motoričkih karakteristika policajaca na efikasnost učenja džudo tehnika*. Beograd: Policijska akademija.
- Blagojević, M. (2002). *Uticaj nastave specijalnog fizičkog obrazovanja na promene morfoloških i motoričkih karakteristika studenata Policijske akademije*. Beograd: Energograf.
- Blažević, S. (2007). Relacije morfoloških i specifičnih motoričkih dimenzija kod boksača, *Acta Kinesiologica*, (1), 20 – 25.
- Božić, S. (1989). *Uticaj antropometrijskih dimenzija i sposobnost brzog usvajanja novih složenih motoričkih zadataka na efikasnost izvođenja tehnika bacanja (nage waza) kod studenata Više škole unutrašnjih poslova*. Beograd: Fakultet za fizičko vaspitanje. Magistarski rad.
- Božić, S. (1994). Struktura morfoloških i motoričkih dimenzija kod studenata Više škole unutrašnjih poslova. *Zbornik radova prvog savjetovanja iz Specijalnog fizičkog obrazovanja, Policijske akademije u Beogradu*, 159 – 166.
- Giampietro, M., Pujia, A., & Bertini, I. (2003). Anthropometric feature and body composition of young athletes practicing karate at high and medium competitive level. *Acta Diabetol*, (40), 145 – 148.
- Janković, R. (2009). *Promene osnovnih morfoloških karakteristika i motoričkih sposobnosti studenata Kriminalističko-policijske akademije pod uticajem novog nastavnog plana i programa Specijalnog fizičkog obrazovanja*. Beograd: Fakultet sporta i fizičkog vaspitanja. Magistarski rad.
- Kurelić, N. (1957). Prilog proučavanju problema uticaja sistematskog tjelesnog vježbanja na neke fizičke sposobnosti i fizički razvitak sportista/studenata VŠFV. *Fizička kultura*, (3-4), 5 – 6.
- Marchocka, M. (1988). Body build and preferred techniques of judo fight. *Sport wyczynowy*, (9), 25 – 31.
- Milošević, M., Zulić, M., Božić, S., & Kovačević, Z. (1985). *Razvoj morfoloških dimenzija kod majstora u karate sportu*. Beograd: Jugoslovenski simpozijum o karate sportu.
- Milošević, M., Ivančević, V., Gavrilović, P., & Zulić, M. (1987). *Informaciona podrška modela upravljanja specijalnog fizičkog obrazovanja*. Zemun. Naučno stručno savjetovanje informatika i bezbjednost.
- Momirović, K., Mraković, M., Hošek, A., & Metikoš, D. (1987). Prilog poznavanju morfoloških obilježja studenata fizičke kulture. *Kineziologija*, 19(1), 19 – 22.
- Mudrić, R., & Jovanović, S. (2000). Model morfoloških karakteristika studenata VŠUP, *Bezbjednost* 42, (2), 219 – 225.
- Pieter, W., Bercades, L. T., & Center, O., (2009). Somatotypes of national elite combative sport athletes. *Brazilian Journal of Biomotricity*, (3), 21–30.
- Popović, D. (2007). *Borenja 1 (džudo i samoodbrana)*. Priština: Fakultet za Fizičku kulturu.

- Sertić, H. (1993). Utjecaj longitudinalne dimenzionalnosti tijela na uspjeh u izvođenju nekih bacanja u judu. *Hrvatski športskomedicinski vjesnik*, (1), 10–16.
- Sertić, H., Segedi, I., & Žvan, M. (2007). Relations of certain anthropometric variables with the performance quality of throwing techniques in judo. *Kinesiologia Slovenica*, 13(1), 48–60.
- Sterkowicz-Przybycień, K. L. (2010). Body composition and somatotype of the top Polish male karate contestants. *Biol Sport*, (27), 195–201.
- Stojanović, M., Momirović, K., Vukosavljević, R., & Solarević, S. (1975). Struktura antropometrijskih dimenzija. *Kineziologija*, 5(1-2), 193–206.
- Stojanović, M., Vukosavljević, R., Hošek, A. & Momirović, K. (1975). Image analiza strukture antropometrijskih dimenzija. *Kineziologija*, 5(12), 207–228. Zagreb.
- Szirovica, L., Momirović, K., Hošek, A., & Gredelj, M. (1980). Latentne morfološke dimenzije određene na temelju faktorskog i taksonomskog modela u standardiziranom image prostoru. *Kineziologija*, 10(3), 15–20.
- Viskić – Štalec, N. (1972). Faktorska struktura tjelesne težine. *Kineziologija*, 2(2), 45–49.

RAZLIKE U KVALITETU ODBRANA OD RAZLIČITIH VRSTA NAPADA VRŠENIH IZ MIROVANJA I U USLOVIMA FIZIOLOŠKOG STRESA

Originalni naučni rad

DOI: 10.7251/DEFSR1841006G	COBISS.RS-ID 7745816	UDK 613.86:[331.45:159.944.4.072
----------------------------	----------------------	----------------------------------

doc. dr Milan Gužvica

Fakultet bezbjednosnih nauka, Banja Luka

doc. dr Darko Paspalj

Fakultet bezbjednosnih nauka, Banja Luka

mr Lazar Vulin

Osnovna škola Kozice, Oštra Luka

Apstrakt:

Savremeni civilizacijski tokovi i urgentnost situacija posao radnika bezbjednosnih poslova čini veoma stresnim, rizičnim i složenim, i od njega traži potpunu mentalnu i tjelesnu spremnost. Shodno tome, potrebno je i nastavni proces iz predmeta Specijalno fizičko obrazovanje uskladiti, osavremeniti, racionalizovati i što je moguće više približiti realnim životnim uslovima, kako bi radnik bezbjednosnih poslova bio sposoban da u veoma složenim i opasnim situacijama donese relevantne sudove i odluke. U tom smislu, nas je u ovome radu interesovala efikasnost odbrane od različitih vrsta napada u uslovima mirovanja i u uslovima fiziološkog stresa. Istraživanje je provedeno na uzorku od 25 ispitanika, kojeg su činili studenti četvrte godine Fakulteta bezbjednosnih nauka iz Banjaluke, starosti između 23 i 24 godine (22 ispitanika muškog i 3 ispitanika ženskog pola). Istraživanje je provedeno nakon apsolviranog programa iz predmeta Specijalno fizičko obrazovanje, koje je izučavano kroz četiri semestra. Poslije sprovedenog testiranja, na osnovu deskriptivne analize srčanih frekvencija mjerenih u jutarnjim satima (prije dnevnih aktivnosti), i vrijednosti izmjerenih neposredno prije aktivnosti, moguće je utvrditi da su one porasle za više od 55%. Daljom analizom, analizom razlika, djelomično se potvrdilo postojanje statistički značajnih razlika u srčanim kontrakcijama i odbranama od varijabilnog napada, dok se postojanje statistički značajnih razlika između drugih posmatranih varijabli nije potvrdilo.

Ključne riječi: *srčana frekvencija, fiziološki stres, odbrana.*

UVOD

Posao radnika bezbjednosnih poslova spada u veoma složen i rizičan posao, stalno je pod pritiskom događaja, izložen je i najtežim oblicima agresije koji mogu biti opasni i po život. Razne situacije u kojima se radnik može naći, često zahtjevaju prekomjerno fizičko i emocionalno opterećenje, što može da uzrokuje niz štetnih fizioloških i psiholoških reakcija, koje izlaze iz okvira normalne ili uobičajene svakodnevice, a označene su kao stresne reakcije organizma. U takvim situacijama često dolazi do smanjenja sposobnosti, koncentracije, mišljenja i pamćenja (uslovi u kojima je otežano rješavanje situacionih problema), te do neprilagođenog i neadekvatnog ponašanja u datom trenutku. Takve situacije izazivaju određenu reakciju organizma na spoljašnje i unutrašnje podražaje, uzrokuju poremećaj dinamičke ravnoteže tijela, i pokreću vrlo složen mehanizam hormona i gena. Povećava se srčana frekvencija, mišići koji učestvuju u pokretu i kretanju se pune krvlju, dok drugi organi koji u tom trenutku nisu prioritet dobijaju manje krvi. Ovo je situacija kada je čovjek, već prema mogućnosti mobilizacije imunog sistema, psihofizičke otpornosti, rezonovanja i kontrole situacije, spreman za borbu ili bijeg. Mnogi istraživači koji se bave problematikom stresa, među kojima Lazarus i Folkman (1984), tvrde da postoje individualne razlike u reagovanju napsihološki stres koje objašnjavaju različitom kognitivnom procjenom ugrožavajuće ili stresne situacije, odnosno kognitivnom procjenom prijetnje koja je sadržana u takvoj situaciji. Oni tvrde da su kognitivni procesi uvijek prisutni i angažovani u situaciji stresa, te da su oni intervenišući konstrukti između percepcije stresa i reakcije na njega. Isti autori tvrde da su kognitivni procesi centralni u određivanju da li je situacija opasna ili prijeteća, tako da kognicija određuje da li će se stres javiti ili ne i kakve će biti emocionalne reakcije. Takođe (ibid), tvrde da su kognicija, emocije i ponašanje nerazdvojni u svakodnevnom životu. Zajonc (1984) tvrdi da se emocionalne reakcije karakteristične za stres javljaju prije kognitivnih i da postojanje svijesti ne treba nazivati kognicijom. Seli (1956) stres definiše kao nespecifičan biološki odgovor (fizički i psihički) na svaki neuobičajeni zahtjev koji nadilazi adaptivne sposobnosti organizma. On kaže da je stres individualna reakcija na stresor, i da je to rezultanta interakcija okoline i njenih zahtjeva te osobe s njenim vlastitim sposobnostima, mogućnostima i ograničenjima. Prema Vlajkoviću (1992), H. Seli (1977), za stres kaže da je to reakcija, odgovor organizma na ugrožavajuće dejstvo-stimulusa (stresora) iz spoljašnje ili unutrašnje sredine, i da je njegova funkcija, prije svega, odbrambena. Šupe i sar. (2011) kažu da stres započinje već u mislima i emocijama, tako da organizam vrši pripremu i adaptaciju (odgovor organizma na stresor), koji se manifestuje uniformnim fiziološkim odgovorom kojem je cilj trenutna reakcija na prijeteću opasnost. Nadalje, McEwen BS., (1998) i Surtees PG, i sar. (2007) stresnim reakcijama nazivaju sve fiziološke i psihološke promjene (biološki odgovor), te promjene u ponašanju (biheviornalni odgovor) koje se zbivaju u organizmu nakon izlaganja stresu. Dakle, stresna reakcija ima funkciju očuvanja psihofizičkog integriteta čovjeka, odnosno ponovnog uspostavljanja homeostaze organizma. Reakcija se ogleda u pojačavanju ili smirivanju pojedinih vitalnih funkcija tj. prilagođavanju novonastalim uslovima preko odgovarajućih fizioloških i biheviornalnih procesa. Mogućnost postizanja stabilnosti putem stalnih promjena (alostaza) je od izuzetne važnosti za svakog čovjeka, a

posebno za one koji se profesionalno bave bezbjednosnim poslovima. Brzo prilagođavanje promjenama, „uključivanje“ i „isključivanje“, sinhronizovanje najboljih odgovora prema zahtjevima okoline je veoma bitno za radnike bezbjednosnih poslova. U suprotnom, nemogućnost adaptacije organizma na fiziološko i emocionalno uzbuđenje, posebno ako je ono ekstremno, radnika čini neefikasnim i nekompetentnim za obavljanje profesionalnih zadataka. Zato radnik mora biti sposoban da sintetiše mentalnu i tjelesnu aktivnost, kako bi zadatak obavio u skladu sa zakonskim normativima i na najbolji mogući način. To znači da pored motoričkih znanja i vještina, radnik bezbjednosti treba da ima i optimalne kognitivne i konativne sposobnosti, koje bi mu omogućile da opasne i stresne situacije uspješno prevaziđe. Individualne karakteristike i sposobnosti kao što su samopouzdanje, otpornost na stres, sposobnost unutrašnjeg mjesta kontrole (lokusa), razvijenost raspoloživih strategija prevladavanja, sposobnost subjektivne procjene stresora, odnosno procjene njegovog ugrožavajućeg dejstva, te sposobnost procjene sopstvenih snaga imogućnosti da se izbori sa stresorom su veoma značajni za efikasnost u obavljanju profesionalnih dužnosti i obaveza. Naravno, pri tome ne treba zaboraviti da jačina i intenzitet stresora značajno utiču na to da li će pojedinac moći na adekvatan i optimalan način (pojačavanjem ili smirivanjem vitalnih funkcija organizma) da odgovori na datu opasnost. Novonastale i iznenadne, opasne situacije zahtjevaju odgovarajuće-nervno-psihičko i fizičko naprezanje (one za nekoga mogu biti krajnje nestimulativne, a za nekog drugog prvorazredni stimulator) i otežavaju kognitivnu analizu. Zato je potrebno da budući radnik bezbjednosnih poslova već u svojoj edukaciji kroz program iz predmeta Specijalno fizičko obrazovanje (SFO), u potpunosti bude pripremljen na nove izazove. Potrebno je da se kroz nastavni proces prilagodi različitim i nepredviđenim promjenama, koje između ostalih, zahtjevaju sposobnost brze reakcije i oslobađanje dodatne energije za suočavanje s opasnošću. Naravno, to nije uvijek moguće, posebno ne u slučajevima snažnog i dugotrajnog stresa kojem je radnik u toku svoje profesionalne karijere izložen. Vjeruje se da su sposobnost kontrole stresa i brzina donošenja odluke, pored drugih poznatih sposobnosti među koje se ubraja i visoki nivo tehnike, od najvećeg značaja za efikasnost odbrane i uspostavljanja potpune kontrole nad napadačem. Zbog već izrečene činjenice, koja se odnosi na rizičnost i složenost poslova koje budući radnik bezbjednosti očekuju, potrebna je kontinuirana evaluacija, neprekidno tražanje i usklađivanje nastave sa realnim životnim situacijama. U tom smislu i **problem** ovog istraživanja jeste efikasnost odbrane od različitih vrsta napada. **Predmet** istraživanja odnosi se na kvalitet odbrane u uslovima mirovanja i u uslovima fiziološkog stresa. **Cilj** je da se preko specifičnih testova utvrdi razlika između odbrana od različitih vrsta napada iz mirovanja i u uslovima fiziološkog stresa. Nas je dakle, interesovalo da li postoji statistički značajna razlika u srednjim vrijednostima rezultata dobijenih prilikom procjenjivanja kvaliteta odbrana od udaraca rukom, nogom i odbrana od nepoznatog napada (varijabilnost = 50%), i to između odbrana iz mirovanja i odbrana u stresnim uslovima izazvanih fizičkim opterećenjem. Naša pretpostavka je da će se kvalitet između odbrana od poznatih i nepoznatih napada, izvedenih iz mirovanja i u uslovima fiziološkog stresa, statistički značajno razlikovati, kao i da će maksimalni puls negativno uticati na kvalitet odbrana izvedenih u stresnim uslovima.

METODOLOGIJA ISTRAŽIVANJA

Uzorak ispitanika

Istraživanje je provedeno na uzorku od 25 studenata četvrte godine Fakulteta bezbjednosnih nauka iz Banjaluke, muškog (22 ispitanika) i ženskog pola (3 ispitanika) starosti između 23 i 24 godine, i to nakon apsolviranog programa iz predmeta Specijalno fizičko obrazovanje. Nastavna građa je izučavana kroz sve četiri godine (na svakoj studijskoj godini po jedan semester, ukupno četiri semestra), pri čemu je važno napomenuti da su studenti između svakog slijedećeg semestra imali pauzu od tri mjeseca.

Uzorak varijabli

Uzorak varijabli podijeljen je na dva subuzorka: varijable za kvalitativnu procjenu i varijable za kvantitativnu procjenu. Prvu grupu su činile varijable koje se odnose na kvalitet odbrane (odbrane su završavale fiksacijom i pripremom za vezivanje), u uslovima mirovanja i u uslovima fiziološkog stresa, dok su drugu grupu varijabli činile srčane frekvencije prije dnevnih aktivnosti i neposredno pred zadatu aktivnost (odbrane). Provjeravan je kvalitet slijedećih odbrana: OUR – odbrana od udarca rukom iz stanja mirovanja; OURS - odbrana od udarca rukom u uslovima fiziološkog stresa; OUN - odbrana od udarca nogom parvo iz stanja mirovanja; OUNS - odbrana od udarca nogom pravo u uslovima fiziološkog stresa; OVN – odbrana iz stanja mirovanja od varijabilnog napada i OVNS - odbrana od varijabilnog napada u uslovima fiziološkog stresa. Sve nabrojane varijable kojima je procjenjivan kvalitet odbrana, procjenjivane su po modelu prikazanom u Tabeli 1.

Tabela 1 Model za procjenu kvaliteta izvođenja odbrana i uspostavljanja kontrole

Ocjena	Racionalnost i logičnost	Ravnoteža	Brzina	Čvrstina	Ritam	Kontrola	Preciznost
10	+	+	+	+	+	+	+
9	+	+	+	+	+	+	-
8	+	+	+	+	+	-	-
7	+	+	+	+	-	-	-
6	+	+	+	-	-	-	-
5	-	-	-	-	-	-	-

Opis eksperimenta i procjena kvaliteta izvođenja odbrane

Testovi su provedeni u poslijepodnevnom satima u sali prekrivenoj tatamijem. Ispitanici su bili u propisanoj sportskoj opremi, na udaljenosti oko 2 metra jedan od drugoga i bočno okrenuti prema snimatelju (kameri). Napad rukom ili nogom, kao i nepoznat napad je izvođen iz borbenog stava i garda, dok se odbrana vršila iz pripremnog stava. Od napadača je zahtjevano da napad izvodi maksimalnom brzinom i snagom, a od branioca

da odbrane budu logične, optimalno moguće, biomehanički opravdane, precizne, brze, snažne, u optimalnom ritmu i sa neophodnom kontrolom agresivnosti. Napadi i odbrane koje su se izvodile iz mirovanja nisu izazivale zamor kod ispitanika, što je ispitanicima omogućavalo da i napad i odbranu izvode maksimalnom brzinom i snagom i uz potpunu koncentraciju. U uslovima maksimalne srčane frekvencije (stresnim uslovima), napadi i odbrane su se izvodili sukcesivno. Prije nego što je napad izvođen, ispitanik koji se branio morao je da izvede kompleks vježbi, koje su bile u funkciji dostizanja maksimalne srčane frekvencije. Kompleks vježbi se sastojao iz: 1. Početni položaj – stojeći uspravni stav i 10 vezanih skokova sa visoko podignutim koljenima ka grudima; 2. Početni položaj - ležanje na stomaku - max. brzo zauzimanje borbenog stava i garda i vezano izvođenje 2 udarca rukom u fokuser; 3. Početni položaj - ležanje na leđima - max. brzo zauzimanje borbenog stava i garda i izvođenje 2 udarca nogom u fokuser; 4. Početni položaj - ležanje na desnom boku - max. brzo zauzimanje borbenog stava i garda i izvođenje 2 naizmjenična udarca rukom i nogom u fokuser; 5. Početni položaj - ležanje na lijevom, a zatim i na desnom boku - max. brzo zauzimanje borbenog stava i garda i naizmjenično izvođenje 2 udarca rukom i nogom u fokuser; 6. Početni položaj – stojeći uspravni stav - okret za 360° i izvođenje po 2 udarca rukom i nogom pravo u fokuser, 7. Početni položaj – stojeći stav - kolut naprijed, kolut nazad i 3 udarca rukom u fokuser. Odmor između prethodnog izvođenja kompleksa vježbi i odbrane i slijedećeg kompleksa vježbi i odbrane, trajao je onoliko koliko je ispitanicima trebalo da se laganim kretanjem vrata na početne pozicije. Ovakav režim rada je kod nekih ispitanika izazivao i određeni zamor (u početku se rad izvodio u anaerobnom režimu, a zatim je prelazio u mješoviti režim). Procjena kvaliteta i efikasnost odbrana vršila se nakon izvođenja odbrana i uspostavljanja kontrole iz mirovanja, a zatim i pri maksimalnoj srčanoj frekvenciji. U poznatim uslovima odbrana je procjenjivana nakon napada iskorakom naprijed i udarcem istoimenom rukom pravo, te udarcem nogom pravo. Nepoznati napad se vršio jednim od zadatih udaraca, rukom ili nogom. Napad se izvodio iz borbenog stava i garda, a odbrana iz pripremnog borbenog stava i garda sa udaljenosti oko 2 metra.

REZULTATI I DISKUSIJA

U Tabeli 2 prikazani su rezultati deskriptivne analize srčanih frekvencija mjerenih u jutarnjim satima, prije redovnih aktivnosti i vrijednosti izmjerene neposredno pred odbranu, zatim ekspertskih ocjena za odbrane od udaraca rukom i nogom, te odbrane od varijabilnog napada koje su izvođene u uslovima mirovanja i u uslovima fiziološkog stresa. Iz tabele je vidljivo da se vrijednosti srčane frekvencije, izmjerene prije redovnih aktivnosti, kreću u rasponu od 57 otkucaja pa sve do 96 otkucaja ($M = 73$), dok se vrijednosti srčanih kontrakcija izmjerenih neposredno pred izvođenje odbrana kreću u rasponu od 108 do 163 ($M=132, 8$) u minuti. Objasnjenje velikog raspona srčanih frekvencija izmjerenih u jutarnjim satima (prije dnevnih aktivnosti), moguće je objasniti, polnim razlikama ispitanika, kao i njihovom kondicionom pripremljenošću. Naime, dimenzije srca kod pripadnica ženskog pola u odnosu na muškarce su nešto manje. Kod odraslih osoba, srčana zapremina kod muškaraca iznosi oko 785 ml, kod žena oko 580 ml, a udarni volumen, vjerovatno zbog manje tjelesne težine, kod žena je za 25% manji nego kod muškaraca.

Nadalje, iako su vrijednosti minutnog volumena srca (MVS), misli se prije svega na dinamične aktivnosti tipa izdržljivosti, slične kod treniranih i netreniranih osoba, ipak je zbog udarnog volumena (UV), koji je kod treniranih osoba veći nego kod netreniranih, frekvencija srca u mirovanju niža, (Nikolić, 1995). Što se kondicione pripremljenosti tiče, moguće je pretpostaviti da je određeni broj ispitanika fizičku aktivnost praktikovao samo na časovima specijalnog fizičkog obrazovanja, dok je ostali broj ispitanika imao dodatno fizičko opterećenje, vjerovatno tipa izdržljivosti. U tom smislu, važno je pomenuti da predviđeni programski sadržaji obuhvaćeni predmetom Specijalno fizičko obrazovanje nisu zahtjevali visoki intenzitet opterećenja, (nivo opterećenja koji bi eventualno uticao na razvoj funkcionalnih sposobnosti organizma uglavnom je bio ispod praga nadražaja, tako da energetski faktor nije u dovoljnoj mjeri bio zastupljen), pa samim tim ni ispitanici koji su bili orijentisani samo na proces usvajanja i usavršavanja osnovnih elemenata tehnike i njihovih veza, nisu mogli da kardiorespiratorne sposobnosti podignu na veći nivo. Suprotno tome, ispitanici koji su slobodno vrijeme koristili za dodatne fizičke aktivnosti, u kojima je enrgetski faktor u dovoljnoj mjeri bio zastupljen, u tome su u većoj mjeri i uspjeli. Uporište za ovu pretpostavku se može naći u opšte poznatoj činjenici, a to je da se pod uticajem fizičkog opterećenja usporava srčana frekvencija, smanjuje arterijski pritisak i povećava mišićna masa srca, što sve skupa obezbjeđuje efikasniji rada srca i bolji protok krvi (perfuzija) kroz srce u bilo kom stresu. Posmatra li se frekvencija srca u mirovanju, neposredno prije odbrane, može se konstatovati da su rezultati očekujući, već zbog toga što se neposredno pred očekujuću aktivnost vrše odgovarajući psihički procesi. Naime, impulsi iz kore velikog mozga direktno dolaze i stimulišu kardioakceleratorni centar, tako da se frekvencija srca poveća i za 50% do 80% od ukupnog povećanja frekvencije srca u toku aktivnosti (Nikolić, 1995). U našem slučaju prosječna frekvencija srca neposredno prije odbrane, u odnosu na prosječnu frekvenciju srca prije dnevnih aktivnosti, porasla je za nešto više od 55%, što ukazuje da naši ispitanici ipak, nisu bili na visokom nivou utreniranosti. Na ovaj zaključak nas (po Nikoliću, 1995) obavezuju istraživanja koja su pokazala da je predstartno povećanje frekvencije srca veće kod treniranih nego kod netreniranih osoba (kod naših ispitanika to je bilo na donjoj granici prosjeka). Kada su pak, u pitanju odbrane, iz tabele je vidljivo da je za odbranu od udaraca rukom iz mirovanja dobijena srednja ocjena 7, 94, a za odbranu u uslovima fiziološkog stresa 7, 88. Kvalitet odbrana od udarca nogom pravo iz mirovanja, ocjenjen je prosječnom ocjenom 7, 58, a u uslovima fiziološkog stresa srednjom ocjenom 7, 48. Kada je u pitanju odbrana od nepoznatog napada iz mirovanja, dobijena je srednja vrijednost 7, 80, dok je u stresnim uslovima kvalitet odbrane od varijabilnog napada ocjenjen prosječnom ocjenom 7, 44. Apsolutno odstupanje (SD) za odbranu od udarca rukom iz mirovanja iznosi 0, 99, u stresnim uslovima standardna devijacija iznosi 1, 02 (potvrđuje raniju pretpostavku o razlikama u kondicionoj pripremljenosti ispitanika), a standardna greška aritmetičke sredine (SR) za odbranu od udraca rukom iz mirovanja iznosi 0, 19, dok je za odbranu od udarca rukom u stresnim uslovima izračunata vrijednost (SR = 0, 20). Vrijednosti skjunisa ne prelaze 1.00, pa je moguće konstatovati da nema značajnih odstupanja od normalne distribucije. Negativne vrijednosti skjunisa ukazuju na negativnu (hipokurtičnu) asimetriju, odnosno na veći broj slabijih rezultata, kod četiri posmatrane varijable, dok odbrane izvođene u složenijim (stresnim) uslovima (odbrana od udaraca nogom i odbrana od varijabilnog napada) predstavljaju iznenađenje jer su dobijene pozitivne vrijednosti, tj. postignut je veći broj boljih rezultata. Ipak, prisjetimo se, isti stres za nekoga može biti sti-

mulativan, dok za drugoga koji je ranjiv i predisponiran na stres, to predstavlja veliku prepreku. Nadalje, dobijeni rezultati kurtozisa ukazuju na ekstremne vrijednosti, kreću se ispod normalne vrijednosti distribucije (od 0.029 do -1.110), što distribuciju čini platikurtičnom ili rasplinutom. Dakle, posmatrajući dobijene rezultate, već na prvi pogled je vidljivo da su rezultati približnih vrijednosti, da je prosječan kvalitet odbrana iz mirovanja ipak, izvođen na nešto većem nivou, ali i da postoji vidljiva razlika u kvalitetu odbrana između ispitanika. S obzirom na to da je kvalitet odbrana procjenjivan u „laboratorijskim“ uslovima, ostala je sumnja koliko bi pokazane odbrane u realnim životnim, stresnim situacijama bile efikasne. Činjenica je da su se ispitanici međusobno dobro poznavali, da su se uzajamno repektovali, i da nisu imali bojazan od mogućeg povređivanja i bola, zbog čega je vjerovatno, izostao emocionalni stress, kao faktor koji bi značajno uticao na moć rasuđivanja i najbolje odgovore. Pored ovoga, sumnja je opravdana i zbog toga što su odbrana i napad vidno odudarali od približno realne životne situacije, a znamo da su oni međusobno zavisni, jer je odbrana uslovljena kvalitetom napada. Iako je od napadača zahtjevano da napade izvode maksimalnom snagom, brzinom i preciznošću, oni to ipak nisu činili. Napadi su bili spori, neprecizni i „mlaki”, i najčešće su izvođeni neprecizno i usmjeravani pored cilja. Nešto slabiji prosječni rezultati odbrana vršenih u fiziološkom stresu, u odnosu na prosječne rezultate odbrana iz mirovanja, objašnjavaju se i time što je kod nekih ispitanika, u stresnim uslovima, primjećeno narušavanje ravnotežnog položaja, tako da je to uzrokovalo veći broj grešaka koje se ogledaju u nepreciznosti kod blokiranja, „kasnih” i nedovoljno snažnih kontraudaraca, zatim u nepreciznosti oslonaca neophodnih za izvođenje poluga, te nemogućnosti pravovremenog obaranja protivnika i njegove fiksacije.

Tabela 2 Deskriptivna statistika odbrana od udaraca rukom i nogom pravo, te od varijabilnog napada sa vjerovatnoćom od 50%.

	N	Minimum	Maximum	Mean		Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error	Statistic	Std. Error	
PUM	25	57.00	96.00	73.3200	2.27649	11.38244	.511	.464	-.405	.902
PO	25	108.00	163.00	132.8000	3.00832	15.04161	.124	.464	-.792	.902
KOOUR	25	6.00	10.00	7.9400	.19858	.99289	-.202	.464	-.241	.902
KOOURS	25	6.00	9.50	7.8800	.20469	1.02347	-.345	.464	-.913	.902
KOOUN	25	5.00	9.00	7.5800	.20952	1.04762	-.703	.464	.087	.902
KOOUNS	25	6.00	10.00	7.4800	.20913	1.04563	.325	.464	.029	.902
KOOVN	25	6.00	9.50	7.8000	.20616	1.03078	-.186	.464	-1.110	.902
KOOVNS	25	5.50	9.50	7.4400	.21664	1.08321	.167	.464	-.788	.902

Legenda: PUM – Puls u stanju mirovanja; PO – puls neposredno pred početak odbrane; KOOUR - Kvalitet odbrane od udarca rukom; KOOURS - Kvalitet odbrane od udarca rukom nakon fizičkog opterećenja; KOOUN - Kvalitet odbrane od udarca nogom; KOOUNS - Kvalitet odbrane od udarca nogom u stresnim uslovima; KOOVN - Kvalitet odbrane od varijabilnog napada; KOOVNS - Kvalitet odbrane od varijabilnog napada u stresnim uslovima

U tabeli 3 prikazani su rezultati koji se odnose na razlike u frekvenciji srca prije redovnih dnevnih aktivnosti i frekvencije srca neposredno pred odbranu od napada, a zatim i u kvalitetu odbrana i uspostavljanja potpune kontrole nad napadačem u uslovima mirovanja i u uslovima fiziološkog stresa. Iz tabele je vidljivo da su statistički značajne

razlike dobijene samo između mjerenih frekvencija srca i odbrana od varijabilnog napada. Kada je u pitanju frekvencija srca, onda je to i očekivano (u gornjim redovima je objašnjeno, a odnosi se na razliku između polova, treniranih i netreniranih...), međutim, kada su u pitanju odbrane onda to donekle, predstavlja iznenađenje, jer udarci rukom i nogom ipak, predstavljaju određenu opasnost po inegritet napadnutog. Pojavom opasnosti, u organizmu dolazi do poremećaja dinamičke ravnoteže (organizam nastoji da se prilagodi novonastalim uslovima), što može negativno da utiče na pravovremenu reakciju, odnosno efikasnost. Novonastala situacija zahtjeva proces prilagođavanja organizma, prilikom čega se uključuje autonomni nervni i endokrini sistem, pokreće se mehanizam za uspješno prevladavanje stresa i mobilise imuni sistem. Aktiviranjem ovih sistema rapidno se povećava protok krvi do miškulature koja učestvuje u pokretu i kretanju, dok drugi organi koji u tom trenutku nisu prioritet dobijaju manje krvi, što može negativno da utiče na moć rasuđivanja i reagovanja, pa samim tim i na efikasnost odbrane. Zato, dobijeni rezultati djeluju zbnjujuće, jer su zahtjevi za izvođenje kompleksa vježbi i izvođenje odbrana bili takvi da se izvode najbrže što je moguće. Kompleks vježbi, njihov intenzitet i trajanje zajedno sa izvođenjem odbrana su uzrokovale povećanje frekvencije srca, gotovo do maksimuma (u ovakvoj situaciji je nervni sistem, u smislu dotoka kiseonika i krvi zapostavljen), pa je realno očekivati da odbrana, u takvim uslovima, bude nešto lošija u odnosu na odbrane koje se izvode uz punu koncentraciju i iz mirovanja. Međutim, sudeći po dobijenim rezultatima, to se stvarno i u potpunosti ipak, nije desilo. Naime, imuni sistem koji se, vjerovatno, u određenoj mjeri razvio u toku obuke, stečeno iskustvo i izostanak emocionalnog stresa, nesumnjivo su uticali na uspješnost odbrana. Prisjetimo se, kognitivni procesi su uvijek prisutni i angažovani u situaciji stresa, presudni su u određivanju stepena opasnosti i određuju emocionalne reakcije. Ipak, zbog međusobno dobrog poznavanja, međusobnog povjerenja, ispitanici su unaprijed znali koji stepen opasnosti im prijeti, zatim, sigurnosti da neće biti povređeni, niti da će trpjeti bol, strah i druge emocionalne reakcije karakteristične za stres, ovi vrlo značajni stresori, ovom prilikom su najvjerovatnije izostali, pa je to, moguće, razlog relativnoj uspješnosti u odbrani. Ovome u prilog ide i zapažanje koje se odnosi na izvođenje kompleksa vježbi. Naime u početku, primjećeno je, vježbesu izvođene u skladu sa postavljenim zahtjevima, ali i to da je njihovom učestalošću i trajanjem, dolazilo do njihovog pada. Zahtjev je bio da se vježbe izvode najbrže što je moguće (u anaerobnom režimu uz dominaciju brzih mišićnih vlakana), tako da je nakon kratkog vremena dolazilo do brzog praznjenja energije prelaska u mješoviti režim rada, pri čemu su dominaciju preuzela spora mišićna vlakna. Zbog ovoga, i vjerovatno zbog slabije nervne provodljivosti, primijećena je slabija kontraktilnost mišića, slabije ispoljavanje sile, lošija koordinacija i manja preciznost prilikom izvođenja tehnika. Ova zapažanja i pretpostavka su očekujuća i u skladu su sa radom Bokai Jukića (2013), koji u svom radu govore o udjelu aerobnog metabolizma pri pojedinačnom ponavljanju sprinteva za koji kažu da je vrlo malen (oko 3-8%), a nakon desetog sprinta taj udio iznosi i do 40%. Udio metabolizma anaerobne glikolize je relativno velik pri pojedinačnom sprintu (oko 32-40%), dok se njegov udio smanjuje pri ponavljanju sprinteva, tako da u desetom sprintu u trajanju od 6 sec. iznosi svega 9%. Dakle, navedenim razlozima, djelomično potvrđene pretpostavke o statistički značajnim razlikama, pored izostanka emocionalnog stresora, moguće je dodati i zapažanje da ispitanici nisu u dovoljnoj mjeri ovladali specifičnom kondicijom, kao ni tehnikom koja bi im omogućila racionalnost u izvođenju kompleksnih aktivnosti.

Tabela 3 Značajnost razlika između posmatranih varijabli: KOOUR – KOOURS; KOOUN – KOOUNS; KOOVN – KOOVNS.

		PAIRED DIFFERENCES				t	df	Sig. (2-tailed)	
		M	Std. D.	Std. E. M.	95% Confidence Interval of the Difference				
					Lower				Upper
Pair 1	PUM - PO	-.59.48	14.2423	2.84846	-.65.35894	-.53.60106	-20.88	24	.000
Pair 2	KOOUR - KOOURS	.06000	.65064	.13013	-.20857	.32857	.461	24	.649
Pair 3	KOOUN - KOOUNS	.10000	.97895	.19579	-.30409	.50409	.511	24	.614
Pair 4	KOOVN - KOOVNS	.36000	.87226	.17445	-.00005	.72005	2.064	24	.050

ZAKLJUČAK

U radu je istraživana kvalitativna razlika u odbrani iz uslova mirovanja i uslova fiziološkog stresa i to od napada rukom, nogom, te nepoznatog napada čija varijabilnost je bila 50%. Istraživanje je organizovano na uzorku od 25 ispitanika (studenti 4. godine Fakulteta bezbjednosnih nauka iz Banjaluke), od čega je 22 ispitanika bilo muškog pola i svega 3 ispitanika ženskog pola. Uzrasna dob ispitanika kretala se između 23 i 24 godine. Svi ispitanici su bili klinički zdravi, bez vidljivih tjelesnih nedostataka ili morfoloških aberacija. Nastavna građa je izučavana kroz sve četiri godine (na svakoj studijskoj godini po jedan semester, ukupno četiri semestra), pri čemu je važno napomenuti da su studenti između svakog slijedećeg semestra imali pauzu od tri mjeseca. Matematičko procesiranje dobijenih podataka vršeno je na PC računaru, uz upotrebu aplikacionog statističkog programa SPSS-20. Svi podaci dobijeni ovim istraživanjem obrađeni su deskriptivnom i komparativnom statističkom procedurom. Testiranje značajnosti razlika aritmetičkih sredina dobijenih na provedenim testovima urađeno je pomoću T-testa uparenih uzoraka, pri čemu su dobijene statistički značajne razlike samo između srčanih frekvencija i odbrana od nepoznatog napada, dok između odbrana od napada rukom i napada nogom, nisu dobijene statistički značajne razlike, čime je postavljena hipoteza djelomično potvrđena. Statistički značajne razlike između frekvencija srca prije dnevnih aktivnosti i frekvencija srca neposredno pred odbranu, objašnjavaju se polnim razlikama, morfološkim karakteristikama ispitanika, njihovom kondicionom pripremljenošću, te psihološkim procesima koji se odvijaju pred samu aktivnost. Kada su u pitanju odbrane od napada, naša očekivanja su se obistinila samo kod nepoznatog napada, dok kod napada rukom i napada nogom, to nije slučaj. Dobijene rezultate je moguće objasniti činjenicom da su se ispitanici međusobno dobro poznavali, da su imali veliko međusobno povjerenje i unaprijed su znali da neće pretrpjeti nikakvu bol ili povredu. Pored ovoga, napadi su bili neprecizni (nisu pogadali cilj), spori i bez neophodnog minimuma ispoljenosti snage. Zbog svega ovoga izostao je emocionalni (psihički) stresor, tako da nije došlo do adiranja sa fiziološkim stresom, koji je izazvan fizičkim opterećenjem. Ovo je, čini se, razumljivo s obzirom na to da je u pitanju ipak, samo obrazovni proces. Zato se predlaže da se u procesu edukacije kadrova za bezbjednosne poslove, nastavni programi dodatno usklade sa realnim životnim situacijama, posebno u njenoj završnoj fazi. Vjeruje se da bi promjena zastupljenosti časova (teoretskog, praktičnog predavanja i vježbi) doprinijela stvaranju engrama motorič-

kih programa, čime bi se postigla veća efikasnost u njihovoj realizaciji u složenijim situacionim uslovima. Naime, potrebno je da se u nastavnom planu i programu Specijalnog fizičkog obrazovanja promjeni odnos između praktičnog predavanja i vježbi, i to u korist vježbi. Na taj način bi studenti mogli da povećaju intenzitet i broj ponavljanja određenih motoričkih programa, naravno prilagođenih optimalnim mogućnostima i preferenciji svakog pojedinca, čime bi se stvorili za brže dostizanje visokog nivoa usvojenosti, odnosno do automatizacije tehnika i mogućnosti njihove praktične primjene. Vjeruje se da bi ovakav pristup mogao da inicira dalja istraživanja ove problematike i tako doprinio efikasnijoj edukaciji pomenutih kadrova.

LITERATURA:

- Bok, D., Jukić, I. (2013), Sposobnost ponavljanja sprintova: Ograničavajući čimbenici i trenažne strategije. *Kondicijska priprema sportaša, str.54*, Zagreb Zbornik radova.
- Nikolić, Z., (1995), *Fiziologija fizičke aktivnosti*, Univerzitet u Beogradu.
- Lazarus, R:S., i Folkman (1984), *Stress, appraisal, and coping*. New York, Springer
- Zajonc, R:B., (1984), On the primacy of affect, *American Psychologist, 39, 117 -123*.
- Sely, H., (1956), *The stress of life*, New York, McGraw-Hill.
- S. Šupe, Z. Poljaković, Lj. Kondić1, L. Unušić, D. Alvir, (2011), Neurološke osnove stresa i rizik razvoja moždanog udara, *Neurol. Croat. Vol.60, 1*.
- McEwen BS. (1998), Stress, adaptation, and disease. Allostasis and allostatic load. *Ann N Y Acad Sci 840: 33-44*.
- Surtees PG, Wainwright NW, Luben RL i sar. (2007), Adaptation to social adversity is associated with stroke incidence: evidence from the EPIC-Norfolk prospective cohort study. *Stroke; 38: 1447-53*.
- Vlajković, J. V. (1992). *Životne krize i njihovo prevazilaženje*. Beograd: Nolit.

UPUTSTVO AUTORIMA

Teorijsko - stručni časopis Defendologija objavljuje naučne (originalan naučni rad, pregledni rad, kratko ili predhodno saopštenje, naučna kritika – odnosno polemika) i stručne članke (stručni rad, informativni prilog, prikazi), na srpskom i engleskom jeziku.

Da bi se obezbijedio što veći stepen naučnosti, redakcija časopisa Defendologije svaki rad šalje na anonimnu recenziju. Redakcija se obavezuje da će jedan primjerak recenziranog rada sa primjedbama recenzenata blagovremeno poslati autorima na ispravke. Dva anonimna recenzenta pregledaće svaki rad koji pristigne u redakciju, a rad će biti štampan ukoliko se oba recenzenta usaglase da zadovoljava visoke naučne kriterijume.

Priprema rukopisa za štampu je veoma važna, zato molimo autore da se pridržavaju sljedećih uputstava prilikom pisanja tekstova za časopis Defendologija.

Rad koji redakcija razmatra za objavljivanje mora sadržavati sljedeće elemente:

- **Obim rada:** minimum šest (6), maksimum 16 strana, treba biti lektorski obrađen;
- **Tip slova:** Times New Roman, prored 1, poravnata lijeva i desna ivica;
- **Naučno zvanje, ime i prezime autora** (boldovano), instituciju u kojoj je zaposlen i mjesto odakle dolazi u gornjem lijevom uglu, veličine (11 pt);
- **GLAVNI NASLOV** (boldovano) piše se velikim blok slovima, veličine (11 pt);
- **Naslovi drugog reda** (boldovano) pišu se malim slovima (11 pt);
- *Ostali podnaslovi* – malim kurzivnim slovima (11 pt);
- **Apstrakt:** (boldovano), tekst u nastavku 150–250 riječi na srpskom jeziku;
- **Ključne riječi:** (boldovano), obim tri do deset (3–10) riječi;
- **Glavni tekst rada** piše se malim blok slovima, ravnomjerno ravnanje (11 pt);
- **Tabele i slike:** Nazivi tabela i slika moraju biti numerisani i ispisani običnim fontom iznad tabele ili slike, lijevo ravnanje. Veće tabele i slike moguće je prikazati vertikalno na posebnoj strani. Izvor podataka za tabelu ili sliku piše se ispod tabele ili slike, lijevo ravnanje. Veličinu tabela ili slika obavezno prilagoditi veličini strane.

Tabela 1. Naziv tabele

Naziv kolone	Naziv kolone
Naziv reda	x
Naziv reda	x
Naziv reda	x

Izvor podataka:

- **Literatura** (boldovano), centrirano ravnanje. Reference se navode azbučnim redom;
- **Citiranje:** U označavanju referenci i navođenju literature, časopis Defendologija koristi **APA (APA) standard citiranja**. Primjere APA standarda citiranja možete pronaći na sajtu Defendologija centra. www.defendologija.com;
- Rad predati u dva jednaka originalna primjerka, na srpskom i engleskom jeziku, kao i u elektronskom obliku. Jedan primjerak sa svim gore navedim elementima, a drugi bez navođenja imena i prezimena autora, te institucije zaposlenja; Takođe, potrebno je navesti autorovu e-mail adresu, odnosno e-mail adresu korespodenta ukoliko se radi o koautorskom radu;
- Redakcija časopisa ima pravo izbora radova i priloga, a u obzir dolaze samo oni tekstovi koji dotad nigdje nisu bili objavljeni;
- Rad donijeti lično ili slati poštom na adresu Defendologija centra: Srpska 63, 78000 Banja Luka, Republika Srpska, BiH.



DEFENDOLOGY

Scholarly journal for protection, security, defense,
education and training issues

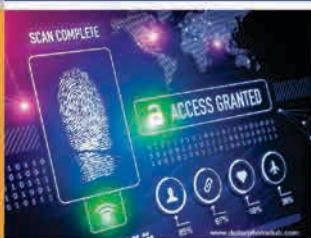
Year XXI

No 41-42

Banja Luka 2018



- ***Security and Society***
- ***New Technologies***
- ***Sport, Training and Martial Arts***



ISSN 1450-6157



9 771450 615007

DEFENDOLOGY

**SCHOLARLY JOURNAL FOR PROTECTION, SECURITY, DEFENSE,
EDUCATION AND TRAINING ISSUES
YEAR XXI, NO: 41-42, 2018**

**BANJA LUKA
2018**

Publisher

EUROPEAN DEFENDOLOGY CENTER

for Scientific, Political, Economic, Social, Security, Sociological and Criminological Research, Banja Luka

For Publisher

Dr Duško Vejnović

Editor-in-Chief

Dr Duško Vejnović

Editor

Dr Velibor Lalić

Editorial Office

Dr Duško Vejnović, Dr Neven Brandt (Slovenia), Dr Miodrag Simović, Dr Dragan Koković (Serbia), Dr Nenad Vunjak (Serbia), Dr Nedžad Bašić, Dr Mile Rakić (Serbia), Dr Velibor Lalić, Dr Želimir Kešetović (Serbia), Dr Dilip Das (USA), Dr Laurence Armand French (USA), Dr Zoran Govedar.

Advisory Board

Academician Dr Dragoljub Mirjanić, Chairman, Dr Nenad Suzić, Academician Dr Drago Branković, Ranko Preradović, Dr Braco Kovačević, Academician Dr Vitomir Popović, Dr Ostoja Đukić, Dr Vaso Bojanić Dr Ivan Šijaković, Dr Petar Kunić, Dr Boro Tramošljanin, Dr Miodrag Romić, Dr Mile Šikman Dr Zoran Govedar, Dr Tatjana Duronjić, Dr Nevzet Veladžić, Dr Darko Matijašević, Slavko Milić, M.A. (Nikšić – Montenegro), Miodrag Serdar, Professor, (München), Dr Mile Rakić (Beograd), Dr Armin Kržalić (Sarajevo), Dr Stevan Dakić (Banja Luka), Dr Goran Maksimović (Banja Luka), Dr Milan Gužvica, Dr Predrag Obrenović, Dr Nenad Radović, Dr Mihajlo Mijanović, Lidija Nikolić-Novaković, M.A. (Serbia), Dr Stevo Ivetić, Dr Gojko Pavlović, Dr Nikolina Grbić Pavlović, Dr Mile Dmičić, Dr Mile Rakić (Belgrade – Serbia), Dr Dragan Radišić (Banja Luka), Dr Ostoja Barašin, Dr Slobodan Simić, Dr Nedžad Bašić, Dr Zoran Đurđević (Belgrade – Serbia), Nenad Radović (Belgrade – Serbia), Dr Ljubiša Mitrović (Nis – Serbia), Dr Zoran Milošević (Belgrade – Serbia), M.A. Haris Pešto, Dr Vladimir Stojanović (Belgrade – Serbia), Dr Tatjana Duronjić, Dr Nevzet Veladžić, Dr Slobodan Simović, Dr Radoja Radić, Dr Gordana Ilić, Dr Dragiša Jurišić, Dr Goran Maksimović, Dr Saše Gerasimoski.

Press

Grafopapir, Banja Luka

For Press

Petar Vukelić

Editorial Staff and Administration

Srpska ulica 63, 78 000 Banja Luka, Republic of Srpska – Bosnia and Herzegovina

Telephone/Fax: 051/309-470

Website: www.defendologija.com, www.defendologija-banjaluka.comE-mail: defendo@blic.net

Account: 562 099 0000236689

Language editor

Tatjana Ponorac, professor

Press-reader

Tin Vejnović

Translation

Tatjana Ponorac, professor

Circulation

500 copies

Annual subscription

Legal entities 200 KM

Physical entities 100 KM

By the decision of the Ministry of Information of the Republic of Srpska, No. 01-439/97 from 25th December, the public organ scholarly journal «Defendology» was registered in the Public Media Register under the number 249.

UDK 355/359
ISSN 1450-6157

EDITORIAL

TOWARD THE STABLE SOCIETY AND STATE THROUGH SECURITY CULTURE

Before you lie the 41st issue of the *Defendologija* journal. The *Defendologija* has always been devoted to the multidisciplinary program orientation. This issue is characterized by a variety of topics, such as: security culture in sociological discourse; the role of security providers in the control of hate crimes at the national level; the importance of new technologies and their impact on industrial development, service activities and unemployment; the structure of morphological characteristics of students of the faculty of security sciences; differences between the quality of defenses against different types of attacks carried out in the state of inactivity and in the conditions of physiological stress. Security culture, the patterns and styles of behavior of all entities in society and a state are an important determinant for the protection and defense of social and state values guaranteed by the constitution. Contribution to the safety represents an effective control of hate crimes by the national security providers, particularly in ethnically diverse societies. Hate speech, poverty, social inequalities are a threat to transitional societies, which might endanger national security, such as a military threat, unemployment, the failure of the rule of law, and failure to comply with democratic procedures in a decision-making process, as well as the irresponsibility of the public officials. New technologies, patents and new discoveries substantially contribute to the development of society and a state and may help to solve unemployment in general. Social changes and development have not been adequately studied, which are crucial to understanding social progress. Post-communist transition of political and economic institutions and cultural patterns are faced with a number of aspects of classical problems of interaction, culture in general, including security and political structure. As a result, social deviance in transitional societies is increasing regarding all aspects, including some aspects of security and defense. The processes of globalization have imposed distribution of risks, instead of previous intra social processes which took place within the framework of distribution of resources among the actors in the work process. Solutions for countries and societies in transition lie in strengthening the capacity of a safe, secure, and welfare state, in moral revival of all entities, so they could be capable to resolve numerous problems in society in the sphere of everyday life and social services, instead of increasing these limitations which cause resistance of citizens and their support of right wing political options. The more sustainable balance of conflict and consensus in transitional societies should be established.

Editor and Editor-in-Chief

CONTENTS

EDITORIAL	3
-----------------	---

SECURITY AND SOCIETY

<i>Ostoja Barašin, PhD., Mićo Živojinović, PhD</i> SAFETY CULTURE IN SOCIOLOGICAL DISCOURSE	9
--	---

<i>Velibor Lalić, PhD</i> THE ROLE OF SECURITY PROVIDERS AT THE NATIONAL LEVEL IN THE CONTROL OF HATE CRIMES	21
--	----

NEW TECHNOLOGIES

<i>Ognjen Erić, PhD</i> GLOBAL ASPECTS OF FOREIGN INVESTMENTS FLOW	37
---	----

<i>Milan Šušić</i> THE IMPORTANCE OF NEW TECHNOLOGIES AND THEIR IMPACT ON INDUSTRIAL DEVELOPMENT, SERVICE ACTIVITIES AND UNEMPLOYMENT	49
---	----

SPORT, TRAINING AND MARTIAL ARTS

<i>Darko Paspalj, PhD, Milan Gužvica, PhD, Lazar Vulin, MSc</i> STRUCTURE OF MORPHOLOGICAL CHARACTERISTICS OF STUDENTS OF FACULTY OF SECURITY SCIENCES	73
--	----

<i>Milan Gužvica, PhD, Darko Paspalj, PhD, Lazar Vulin MSc</i> DIFFERENCES BETWEEN THE QUALITY OF DEFENSES AGAINST DIFFERENT TYPES OF ATTACKS PERFORMED FROM THE STATE OF MOTIONLESSNESS AND THOSE ONES PERFORMED IN THE CONDITIONS OF PHYSIOLOGICAL STRESS	85
---	----

INSTRUCTIONS FOR AUTHORS	97
--------------------------------	----

SECURITY AND SOCIETY

SAFETY CULTURE IN SOCIOLOGICAL DISCOURSE

Review article

DOI: 10.7251/DEFENG1841001B

COBISS.RS-ID 7749144

UDK 316.7:316.334.3

Ostoja Barašin, PhD

Independent University, Banja Luka

Mičo Živojinović, PhD

Doctor of Political Science

Abstract:

Contemporary globalization processes are directly related to various challenges and are linked to the many security threats that humanity today encounters. It puts life in the community of men a constant choice-conflict or cooperation. Globalization brings with it challenges and security threats, both at global, regional and local level. Increasing social inequality, poverty and unemployment, intergovernmental and inter-religious conflicts, terrorism, climate change and a number of other industrial risks and threats are increasingly affecting the stability of the planet and increasing security risks to unimaginable proportions. There is an expansion of education of incredible proportions and dynamics, and the number of scientific organizations and scientists grows geometrically. In this way, education escapes social control, and the possibility of misuse of knowledge also increases geometric progression. The military industry, genetic engineering and the production of genetically modified organisms, announcing the installation of chips into the body of people with data on each person introduces us to the speed of light in the twilight zone.

Key words: *Security, security culture, security challenges, risks, security threats*

1. SAFETY CULTURE-REMEMBERING THE CONCEPT

1.1. Security

Relationships between people are inevitable and can be based on mutual saranja and help, or in conflict and hostility. „People are predestined to be rivals and fight each other for rare material goods or, in turn, to unite energy in order to increase material pros-

perity and general good” (Kukić, 2004: 501). In further discussion, Kukić states that security of violence as a „style of life” is a desirable projection, but also the ambition of every society, because violence is, objectively, the greatest danger in the function of the disappearance of man and the human community. The dilemma about how to regulate a society based on the security of every individual and community as a whole is preoccupied with man since the prehistoric period, and with it every day he meets today.

Before any discussion of the security box, it is important to understand the concept of security that can be defined as a condition in which the balanced physical, spiritual, social and material existence of the individual and the community as a whole in relation to other individuals, social communities and nature is ensured.

„The social changes that have arisen in the last two decades of the 20th century carried on the wings of neo-liberalism have led to a turbulent situation in all spheres of human society, especially in security, politics, economics, law, etc. These changes have enabled the creation of networks of dangerous, continuous, ubiquitous and less visible challenges, threats, whose changing nature and multiplied variations make it difficult to define them. According to one of the classifications, current challenges and threats to global security are classified into: terrorist (national and transnational scale), proliferation of weapons for mass destruction; threats from unstable regimes; local and transnational networks of crime, human trafficking, weapons, narcotics and, which is the most common phenomenon, combined threats, in which transnational networks of ethno-religious fanatics combine several extreme elements of destructive power.” (Vejnović-Obrenović, 2017: 108).

The whole of mankind today is facing the issue of security, both in its understanding and in its function, and obsessed by searching for a model of its efficiency and continuous improvement. „There have never been more, more diverse and more effective human and material security capabilities, and society has never felt helpless and vulnerable to threatening phenomena, which are increasingly destructive. Frequently, the question arises: what is security? We are more often wondering whether to ask such questions at all because there are many things, in itself, clear. However, is that so?” (Mijalković-Keserović, 2010: 33).

The essence and philosophy of security have not changed through the history of human society, but nature and forms of security are subject to frequent changes. Knowing the concept of security indisputably confirms that there is no word such as safety, which is more commonly used in everyday life, and that the meaning that is determined is less clear and precise. This term is used by all categories of society, scientists dealing with this problem, representatives of state structures, political leaders, domestic and international organizations, business entities, health workers and this list can be indefinitely. So we can conclude that the definition of security is multifaceted and atypical.

„Security issues, because of their complexity and the fact that it represents the immanent need of the individual, the state and the entire international community, and as such must be considered comprehensively - by theoretical generalization and application in practice. In this sense, the first step is the theoretical definition of security and security system. Within the above definition, the need for finding the necessary constituents of security as a science is unavoidably imposed.

Furthermore, the comprehensive processing of the security system is focused first on the consideration of the most important types of security system: totalitarian,

democratic and supranational. After that, it was necessary, in a concise form, to show the most important characteristics of certain modern security systems.” (Đorđević, 2013: 6).

Today, in almost all languages and cultures, security is now used in a large number of very diverse social areas, such as politics, health, education, informatics, ecology, sports, psychology, economics and finance, architecture, etc. The fact that it is on the Internet is more represented than the word god, peace, war or politics is best illustrated by its extremely high significance and prevalence.¹

„The emergence and definition of safety as a scientific discipline was determined by the following factors:

- 1) the fact that in practice there is an increasing number of destructive forms that endanger security, not only the individual, but must also bear in mind that this is a threat to collective security;
- 2) internal and external security of states and of the whole international community is in many ways endangered, implying the need for a systematic study of the possibilities for safeguarding security, and this can be done using a reliable analysis of practice and using adequate scientific methods and procedures,
- 3) existing knowledge of sources and forms of security threats imposes the need to establish, in accordance with this, an effective integral security system, which can be greatly contributed by the application of theoretical and practical knowledge.

It is certainly justifiable to say that security belongs to the field of social sciences and that, as a scientific discipline in development. We arrive at this by determining the affiliation of certain security features to the complex of sciences (based on classifications of science). This does not mean that we separate our security from other sciences, but it is an attempt to accurately determine the area, object, goal, method and language of security as a scientific discipline” (Đorđević, 2013: 7).

For a thorough discussion of the concept of security, it is vital to define the term of security carefully, which implies two things: agreeing on the source of the meaning of the notion of security and the widest description of the term, with the answer to questions: security from whom, security for which values, What are the threats to security and security with which means?

The notion of safety is a complex and complex social phenomenon, which, etymologically, is derived from the Latin word *securitas-atis*, which means safety, absence of danger, certainty, self-confidence. In English there are two expressions of security and safety. The word security refers to national security - national security. The term safety means the ability to act, in order to avoid an unwanted security situation, or such opportunities that may cause safety implications. In French, the terms *securite* and *surete* are used in Russian security and mean the odiousness of material misery, in the Italian security, and in the German *sicherheit*. In the Serbian speaking field, utility is a security. The

¹ Filip Ajduk is well aware that the word security on the Internet is more represented than the word god, peace, war or politics. „Search was executed in English in the browser Google, October 3, 2011. Results on the number of occurrences of these words on the web are: security (2, 410 million times), god (about 289 million), peace (840 million), war (509 million) and politics (909 million).” (Filip Ajduk, *International Security : Theories, Sectors and Levels*, Official Gazette and Center for Security Policy, 2012: 25)

word is derived from the word safely, which in essence represents safety, security with the highest reliability, the quality of the one who is safe. Often, security, security and protection are interfered with. Security is a narrow term that primarily relates to personal security, which consists primarily of legal, political, economic and social security, while security is a concept that includes the broadest range, from personal to state to integrated security. Protection is a narrower notion of concepts of security and security and refers only to the passive component of security, while the modern concept of security also includes an active component.

„Security can be defined as a state of organization and security functions. Safety as a state is the protection of a good, the value and performance of the society. Security can be external and internal. External security refers to the independence, sovereignty and territorial integrity of the state, and the internal to the smooth functioning of a concrete constitutional order, that is, the socio-political, economic and legal system and the protection of goods, values, and other objects of protection. As a security mechanism, security has various forms of organizational forms. As a function, security is an inseparable attribute of the state, regardless of the character of the order, the political system and the form of power.” (Military Encyclopedia K-1, VIZ Belgrade, 1970: 597)

Mijalković and Keserović consider that security can be considered as a process, and above all, by the desired product of that process-state. To be safe means to be protected from the effects of adverse effects and to feel protected in a predictable and controlled environment. Security is the result of a relationship-balance between actual and potential vulnerability of reference values and interests and existing capacities (human, material, organizational and functional) that protect them. Absolute safety is an ideal category.

„The simple understanding of safety as a subjective category, or as a sense of security, is very problematic given that failure to perceive danger does not mean that there is no danger. On the other hand, excessive perception of danger can lead to a kind of paranoia that can again result in both physical and mental destruction of an individual, group, or society. Also, the concept of security solely as objective categories (for example, preserving the existing situation) can be misleading, or can be an excuse to avoid facing contemporary problems that surround man, the community, the state, and even the international community.” (Tatalovic, 2006: 65).

D. Simic believes that, apart from investigating the causes of the conflict and the violent conflicts between organized political communities, „the concept of security should include conditions that favor the abandonment of the use of force and establish relations of lasting peace and fruitful cooperation”, that is, „the science of security needs in the content of his case, to include both dimensions: negative (causes of war), but also positive (peace and cooperation, relation of democracy and peace, security and association, as well as the broadest, theory of stable and democratic peace). (Simić, 2002: 22)

In Serbian language, security means the absence of danger, safety, a situation in which no danger is felt. Secure is the one that is secured by danger, protected, reliable, secure, secured; so security would be the state of someone who is safe or secured. From the perspective of an individual, one could say that security means the absence of fear for oneself, your loved ones, and your own good, and from the perspective of a social group or a whole society - the absence of a threat to the survival of that group, that is, society and their values that are considered essential for sustainability and progress and which as such should be particularly protected against threats. By accepting the above paragraph,

in order to avoid certain uncertainties regarding the linguistic concept in this paper, we declare the term security.

Security in the modern world is defined as military-defense, political, economic and ecological security (environmental protection). The military-security aspect refers to the capacity of the state to lead an armed struggle. Political security refers to the organizational stability of the state, the system of government and ideology that gives them legitimacy as such. Economic security refers to the ability to access resources, finance and the market required to maintain an acceptable level of welfare of the state and its power. National security refers to sustainability within acceptable conditions for the development of language, culture and religion, national identity and customs. Environmental safety refers to the situation in the biosphere at the local and planetary level, as a basic system from which the entire human existence depends.

Theorists distinguish five forms of threats that correspond to security sectors:

- A military threat is a danger to all state structures
- Political threats aim to destroy internal organizational capacity, national identity and state institutions.
- Social threats are difficult to distinguish from political ones, but their characteristic is that they originate from the society itself
- The remaining two types of threats are economic and environmental threats that are difficult to understand in a security sense, because it is difficult to determine who is responsible for, for example, economic downturn or devastated environment.

What will be the general security policy of a state (external and internal), depends on a number of factors, and the following are particularly differentiated:

- Cultural and historical heritage,
- Geographical position

National security refers to the activity of the state by which it, in accordance with its overall capabilities in the present and the resources it builds for the future, protects its own integrity, sovereignty, identity, survival and other values and interests. The social possibilities in their widest understanding are also conditioned by cultural characteristics, such as tradition, values, beliefs, institutions, but also the way of life. When it comes to safety, it should be borne in mind that not only is the absence of someone or something that threatens us, but must live in a society based on justice, morality and culture, or a society that constantly improves its values.

1.2. Security culture.

A security culture can be considered as a security activity that expresses readiness for action and behavior in accordance with acquired knowledge and skills, as well as in accordance with accepted values. It looks at identifying hazards, responding to them by avoiding or eliminating hazards or by referring to those entities that will professionally react and preserve endangered values.

Security culture can be defined as a set of adopted attitudes, knowledge, skills and rules in the field of security, expressed as behavior and process, about the need, ways and means of protecting personal, social and international values from all sources, forms and holders of threats regardless of place or the time of their manifestation.

In the security system itself, security culture as part of the function of the security system itself can also be defined as a set of informal professional norms and values that function within a hierarchical security organizational structure and is in the function of performing security tasks.

„Understanding the concept of a security culture implies security activities and behaviors that arise from the responsibility and willingness of the action of all entities in a society, in accordance with the acquired knowledge and skills, as well as the accepted values and values orientations, beliefs and built attitudes based on the given culture and cultural heritage. It looks at the way in which the environment is widely understood, shows understanding of the dynamics of social relations (both individually and on a wider scale), recognizes the importance of absolute control over one's own goods (the principle of sovereignty), the way in which they are perceived and define the dangers, risks and threats, then determine interests and choose resources or instruments for action. Security culture can be considered through its internal and external manifestations. Internal relate to security considerations or the development of the idea of security, and external to security behavior, as well as the attitude or access to security that primarily relates to the willingness and ability to respond to risks and threats, either in material or spiritual terms”²

According to this definition of a security culture it is noticeable that it is determined in relation to threats, threats or threats, which are key determinants for establishing and developing such a concept. Of course, it can also be talked about some other, new dimensions that are oriented towards a richer system of motivation for action, such as, for example, better conditions for the development and improvement of relations between certain actors on the international scene or inside the state despite the threats and dangers present. Also, there is a dimension that integrates diverse social elements and their specific functions, as well as subcultures, and their different roles, performing certain fundamental functions in the process of humanization of man and his world.

Dramatic social changes that, in all spheres of human existence, both at global and local levels over the last few decades have led to a situation in which events that have significance for national security happen. The feeling of uncertainty that pressured man was never stronger, despite the fact that the security system was never stronger and more developed. The traditional understanding that the state is considered to be the exclusive carrier of security matters has simply vanished and on the scene we have a transformation towards a secure self-organized society. The state concentrates on organizing measures of response to stronger security challenges, and a less dangerous place is given to a self-organized society that needs to be protected from less dangerous occurrences. Such a concept implies coordinated and coherent action of all subjects, regardless of the importance of threats and degree of endangering society. Distancing part of the responsibility towards society does not mean self-acting, and therefore we are talking about a comprehensive security system with defined carriers. This creates a new culture of security that has a first-class preventative character and involves all the local community

² http://www.odbrana.mod.gov.rs/odbrana-stari/vojni_casopisi/arhiva/VD_2014-prolece/66-2014-1-06-Stanarevic.pdf

members. Security culture is primarily shaped at the national level and as such a security culture is the most effective.

„Security and culture are categories that are necessarily complementary and build a certain relationship of interdependence. If culture is defined as a set of universal values on the basis of which a person determines his position in society and the world, and security as the protection and protection of these values, their connection and conditionality are clear” (Mijalković-Keserović, 2010: 199-200).

It follows from the prevailing attitude that security culture is the behavior that creates security or contributes to its strengthening. Thus, a security culture can be understood as a set of adopted attitudes, knowledge, skills and rules from the domain of security expressed as a behavior and process on the need to protect and preserve personal, social and international values from all forms of endangerment regardless of the place, time and manner of its manifestation. Security culture contributes to defining the relationship between the subject of security, both the security service and other entities and social structures. If the function of culture is, in general, ordering society into society, then the security culture is certainly significant from the point of view of bringing order into the primary function of society's security. The security culture of national security protects the degree of awareness building about the benchmarks that the state and society protect all available resources.

„Thus, the essence of the security culture would be the awareness of the necessity of opposing the occurrences of endangering the national security: the removal of etiological factors, independent actions against the actors of endangering, if it does not jeopardize their own security or the safety of others; timely alarming of other security entities that will prevent the occurrence of a harmful effect, alleviate, eliminate or prevent the development of a harmful effect, and how to revitalize the attacked reference values more efficiently. Obviously, security culture is largely a consequence of social and historical heritage. At the same time, its innovative and creative relevance in resolving problems at all levels of security is indisputable.” (Mijalković-Keserović, 2010: 201-202).

2. SOURCES OF ENHANCING SAFETY

The modern system of safety of society is a form of organization of society in the protection of its vital values. In organizing the security system of a given society, in principle, it starts from at least two basic questions that need to be answered which are the forms and endangerers from which the society should be protected, and how the elements of the system should act in order to achieve the basic goal of its establishment. „People are violent. It can be argued that this inclination is violent part of our biology, but it is clear that violence becomes commonplace when people form a lasting community. Direct violence is usually considered deviation and crime, while collective violence, violence involving many individuals, can take several forms: behavior of a mass that attacks a particular target; revolutionary mass action in an attempt to overthrow the political regime; terrorism involving sporadic violence against government and civilian targets, designed to discourage the population and delegitimize the government” (Turner, 2009: 449).

Consent to the definition of the term endangering does not exist, because it is used differently because of the use of different terms with it and the different view of its

essence. In a criminal-legal sense, endangerment means a danger that, to a greater or lesser extent, represents the possibility of damaging or destroying a good or value. Sociologically, the threat to security is related to social conflicts and contradictions, as well as counterfeit behavior and can not be determined in advance. In addition to this, endangerment can be considered a process that can arise as a product of opposing interests that can not be accomplished at the same time, nor can a compromise be reached on how to eliminate conflict or contradiction. The threat exerts influence on all social processes, so it is practically impossible within the framework of a scientific discipline to establish theoretical and methodological attitudes about all possible aspects of threat. Carriers of different interests can be entities within the society itself or from the outside, as an external factor.

The already observed criminal-legal and sociologically certain threats to society do not determine the concept of endangerment as a whole, since the natural and technical factors of endangering society are neglected. These definitions do not provide an answer to the extent of the occurrence of some phenomena and how long it takes to be considered as a phenomenon or process of endangerment. Observed globally, we can conclude that we are living in the mind of risk and that a global society is based on many risks and contradictions that are not limited in time, space, or social. Sources of endangerment can not be placed solely on the space of social interaction, because processes in nature increasingly make man powerless against powerful natural catastrophes before which he becomes small and helpless. Faced with the myriad societal risks, there are tremendous efforts to resist the greatest number of risks through the risk management process. The risk management process has forced the institutions of the society to turn to the process of global cooperation with other societies and their institutions, where a high degree of synergy is achieved, and the result is a higher degree of effect. That, as Gidens sideways, must lead to a higher degree of social reflexivity, or else it must be critically thought up about the circumstances. In such a state, sociology as a critical science plays an important role and a task in the process of understanding all these phenomena and their influence on the development and functioning of society and society, viewed globally.

In general, security threats exist whenever there is a question, the existence, manifestation, and enjoyment of what is valuable and important to society, that is, when adverse changes occur or can cause unwanted changes or can not be enjoyed unhindered. So, the threat to security is the process, but also the condition that is its consequence.

„The geopolitical changes in the last decades of the past century have caused the change of many previous security strategies and policies and initiated new approaches in security aspects, both in theory and in practice. In the next period, geopolitical changes will inevitably create a new security environment, new security concepts and different consequences. It is a question that some factors will influence the shape, content, scope and consequences of new forms and risks.” (Kovačević, in Proceedings 2015: 15-16).

The process of globalization runs with all its features, positive and negative, which includes threats and security challenges of a global character, such as international terrorism. „Bearing in mind the announced process of globalization with it inevitably carries a determined resistance to this process, the United States has been committed to undermining and destabilizing the inside of „disobedient countries” . In this general process of destabilization, there are various militant, separatist, criminal, fundamentalist and other groups, such as the transmission of violence against legal authorities, for their purposes and interests. The contrast between the developed and the undeveloped countries is

growing and more pronounced, and this is particularly evident in the field of energy needs. Nowadays, the United States spends 25% of the world's oil production." (Kese- rović, 2012: 410).

The global war on terrorism that the United States led after September 11, including in peacekeeping operations in Afghanistan, Iraq, Libya, Syria, the Balkans, has provoked terrorist organizations' attacks to try to influence the policies of the US and other countries of the anti-terrorist coalition in various forms of terrorist actions in the region of the Middle and Middle East.

„In the opinion of experts from the prestigious international institute for strategic studies in London, the fight against terrorism that began with an anti-terrorist operation in Afghanistan, the invasion and occupation of Iraq, actions in Pakistan that led to the murder of the founder and leader of Al Qaeda, Osama bin Laden, in Libya, by threatening to intervene in Syria, Iran, and North Korea, has just opened a „pandora's box" because it has allowed recruitment of new terrorists for new ventures that take on the character of armed aggression, not on engagement agama, how many of the consequences that are caused by national security systems and their governments.

A clear example of this is the terrorist attack in Moscow, Madrid and London that testifies to the reorganization of Al Qaeda." (Kese rović, 2012: 410).

Globalization has made societies open, led to the rise of individualism and a growing interest in society's problems. This, in a certain way, leads to the passivity of the individual against the security problems. On the one hand, it is unquestionable and undivided interest in both the individual and society that the security system functions, while on the other hand the possibility of an individual to see, understand and respond adequately to threats is at least a questionable question. „The consequences of globalization are far reaching and reach virtually all aspects of the social world. Nevertheless, since globaliza- tion is an unfinished process that is contradictory in its internal nature, it produces conse- quences that are difficult to predict and control. We can think about this process in the risk category. Many of the changes brought about by globalization give rise to new forms of risk that differ greatly from those that existed in the past. Unlike the former risks that had identified the causes and known consequences, the risks of the modern age can not be determined by the origin or the effects can be seen." (Gidens, 2007: 71-72).

In the absence of a definitive answer about the causes and outcomes of various risks and threats, the individual is forced to make decisions on which risks he is willing to accept on his own, which can be very confusing. Even simple decisions, such as the decision on what to eat, are made in the general confusion of contradictory information about certain food products. A similar situation is with vaccines, as a means of preventive protection against severe illnesses that may have epidemic proportions.

„Under the influence of scientific and technological progress, new factors are emerging in the production and transport process, such as information, space and time. There is an expansion of education of incredible proportions and dynamics, and the number of scientific organizations and scientists grows geometrically. In this way, education escapes social control, and the possibility of misuse of knowledge also increases geomet- ric progression. The military industry, genetic engineering and the production of geneti- cally modified organisms, announcing the installation of chips into the body of people with data on each person introduces us to the speed of light in the twilight zone. Multina- tional companies conquer an absolute monopoly on knowledge and subordinate it to the

logic of profit and the rule of the human mind, and during that time the schools lost the race with the education that Lok said.” (Barashin, Zbornik 2015: 207).

The basic security of the security system is preventive, which by its existence and knowledge represents an instrument of deterring the hostile and other criminal activities of organizations, groups or individuals. If undesirable activity arises, the system must act vigorously and repressively, removing the causes of danger and eliminating their holders in a legally permissible manner.

3. HUMAN RIGHTS AND SECURITY.

Security is one of the basic human needs, such as an unquestionable guarantee of survival, prosperity and well-being, economic security, humanity and order; free life without fear and difficulty; the universal good that everyone has the right, but also the solemn promise of political leaders for whom human security is a first-rate obligation, the most important goal in internal and external politics; the willingness to establish a strong relationship between individuals and the world, the state and the citizen.

Creating a new national security policy is a prerequisite and framework for stability in the region and inclusion in world trends. The issue of creating a national security policy is particularly important because it is also part of the process of BiH's transition, as an indicator of the direction, pace and reach of the reforms of the entire society. On the other hand, the creation of a national security policy implies a balanced systemic approach, as required for the successful and effective elimination of the incidents of security threats, and the preservation and promotion of human rights and freedoms. Only in this way is it possible to maximally exclude abuses, such as the right to privacy of the lines and other achievements of the general civilization achievement. It is necessary to keep in mind that human rights represent the basic moral rights of all people and that they are necessary for a dignified life. Respect for human rights, as an ideal and imperative, from the end of the 20th and the beginning of the 21st century, has become naturally connected with international peace and security, which points to a new model of the concept of human security. For this reason, these rights are universal, inalienable, innate and indivisible. In order to achieve this, human rights must be identified and codified within the international, regional and national legal system. States and their executive authorities must have a legal obligation to respect them according to international, universal and regional standards, as well as under the national constitution and laws. The concept of human rights must be defended by independent courts through statutory procedures. In order to be effective, human rights must be incorporated into national laws, and legal elements of rights can not be ignored.

CONCLUSION:

The main feature of security at the beginning of the 21st century is a mixture of continuity and change, uncertainty, and interdependence. Dramatic changes in international relations, initiated by the demolition of the bloc's division of the world and the

collapse of the Warsaw Pact, have contributed to significant progress, as well as numerous contradictions. Security challenges in the polarized world are on the rise. The end of the „Cold War” brought about changes in international relations that had the most significant impact on security. New security approaches are aimed at expanding stability, co-operation and the security environment as the main means of achieving and preserving national and global security. In the latest ideas, in the so-called. cooperative security, national security is no longer the sole object of security attention, and the state is not the only entity. Care for protection and security equally focuses on the security of the individual, collective security and defense, as well as the expansion of cooperation in the field of security. In the preservation and strengthening of security, in addition to the state and its military power, international organizations, NGOs, individuals, as well as other subjects of international relations are increasingly influenced.

Finding new strategies and effective and implementable programs that will respond in a timely and effective manner to security challenges, risks and threats, as well as the training of all social structures for life in a world that is constantly changing the imperative of modern society.

LITERATURE:

- Ejodus, F. (2012). *Međunarodna bezbjednost: teorije, sektori i nivoi*. Službeni glasnik i Centar za bezbjednosnu politiku.
- Đorđević, M. (2013). *Sistem bezbednosti, praktikum*. Niš: Visoka škola strukovnih studija za kriminalistiku i bezbednost.
- Gidens, E. (2007). *Sociologija*. Beograd: Ekonomski fakultet.
- Keserović, D. (2012). *Sistem bezbjednosti Evropske Unije*. Banja Luka: Fakultet za bezbjednost i zaštitu.
- Kukić, S. (2004). *Sociologija, Teorije društvene strukture*. Sarajevo Publishing: Sarajevo.
- Mijalković, S., Keserović, D. (2010). *Osnovi bezbjednosti*. Banja Luka: Fakultet za bezbjednost i zaštitu.
- Simić, D. (2002). *Nauka o bezbednosti: savremeni pristup bezbednosti*. Beograd: Službeni list SRJ i Fakultet političkih nauka.
- Tarner, Dž. (2009). *Sociologija*. Novi Sad/Beograd: Mediteran Publishing.
- Tatalović, S. (2006). Koncepti sigurnosti na početku 21. stoljeća. *Međunarodne studije*, 6(1).
- Vejnović, D., Obrenović, P. (2017). *Defendološki izazovi u međunarodnim odnosima sa pogledom na BiH*. Banja Luka: Evropski defendologija centar.
- Vojna enciklopedija. (1970). K-1. Beograd: VIZ.

THE ROLE OF SECURITY PROVIDERS AT THE NATIONAL LEVEL IN THE CONTROL OF HATE CRIMES¹

Review article

DOI 10.7251/DEFENG1841002L

COBISS.RS-ID 7749400

UDK 004.738.5:343.6

Velibor Lalić, PhD²

*Faculty of Security Science
University of Banja Luka*

Abstract:

In this paper is analysed the role of security providers at the national level in the control of hate crimes. The special particular reference is given on the role of the police and prosecutor's office but also the other entities which have a social significance in the creation of the suitable environment for the prevention of these criminal offences. Those are primarily educational institutions, political elites and media. Efficient control of the hate crimes is a comprehensive process in which should actively be involved different entities in the society, not only the authorities of the formal social control. Integral approach to this problem can give positive results in the long run, whether it is about the repressive action or the prevention.

Keywords: *Hate crimes, police, prosecutor's office, educational institutions, media.*

INTRODUCTION

Although, it is about the phenomenon which is deeply rooted in the human history, hate crimes syntagm is of relatively recent date as well as the right solutions in which manner the individual countries treat this issue. In the sociological context the hate crimes are the consequence of the conflicts of the social groups which have different social iden-

¹ The paper was created as the part of the research in the framework of the preparation of the doctoral dissertations „Hate Crimes in Bosnia and Herzegovina” at the Faculty of Security Studies in Belgrade (Lalić, 2013).

² Correspondent: Velibor Lalić, Assistant Professor, Faculty of Security Sciences, University in Banja Luka, E-mail: lalicvelibor@gmail.com

tities. The individual as the object of attack is not important, his group affiliation is important. Such background of these criminal offences contains a great conflict potential and represents a security threat, particularly in the societies which have already confronted with the ethnical, racial or other forms of violence based on the identity differences. In the psychological sense, the hate crimes are committed due to prejudices towards the identity different social groups.

The control of the violence which is motivated by the hate and prejudices is a great challenge faced by the organizations at the supranational level. It is primarily about the United Nations, more precisely on the United Nations Committee for the Elimination of the Racial Discrimination (UNCERD), then the Council of Europe - European Commission against Racism and Intolerance (ECRI), European Union Agency for Fundamental Rights (FRA) and Organization for Security and Cooperation (OSCE) (Lalić & Matijašević, 2015).

However, besides the supranational level, it is of the crucial importance confronting this phenomenon at the national level. The subject matter of this paper is the consideration of the action of the security providers at the national level in the control of the hate crimes. First, it will be analysed the role of the police, then the prosecutor's office and then the rest of the entities which may contribute by their action to the efficient control of this type of violence. Those are primarily educational institutions, political elites and media.

1. THE ROLE OF THE POLICE IN THE PREVENTION AND SUPPRESSION OF HATE CRIMES

The police have a crucial role in the society regarding the prevention and suppression of hate crimes. Training and success of the police in shedding the light of these criminal offences, treatment of victims and relations with the community and media is certainly of special importance.

Organizational culture particularities³ of the police organizations are one of the factors that influence on reporting hate crimes (Nolan & Akiyama, 1999). Nolan and Akiyama state the following factors: stances in the organization regarding these issues, trust of the community in the police, resources, cultural conflicts caused by the differences between the dominant values of the culture of society in which the organization exists and cultural values of the endangered groups (Nolan & Akiyama, 1999:124). Reporting of hate crimes depends also from the police officers' individual characteristics, more accurately from the personal stances and values, responsibilities in implementation of organizational rules, support of heads and colleagues, personal belief in what measure the organization devotes the attention to this problem through training and awarded resources (Nolan & Akiyama, 1999:124) and the ability and readiness of the police officer to recognize that the certain criminal offence was committed out of hate (Saucier et al., 2006:891).

Willingness of the victims to report these criminal offences is of the crucial importance. One of the important reasons why it is a great dark number of these criminal

³ Organizational culture represents a set of stances, values, standards and behaviour patterns which are inherent to particular organization (Brown, 1995; Janjićijević, 1997).

offences is the fact that the victims do not report it due to the fear of secondary victimization by the environment or due to distrust towards the police (Perry, 2001, Cogan, 2002; Levin et al., 2007; McVeigh et al., 2003; Berrill, 1992; Herek, 1992). Distrust towards the police may be the consequence of the police subculture particularity characterized by group closure, insufficiency of sensibility towards the different social groups and their culture and life styles. Often there is also police brutality, racial and other prejudices, conservatism, machismo and cynicism, what may lead to forming of the radical, right-wing stances toward the racial, ethical and sexual minorities and persons who prefer more free unconventional life styles (Reiner, 1985; Skolnick, 1966). Immigrants often do not report these criminal offences due to cultural differences: traditional distrust in the police of the countries from which they come from and also due to language barriers and illegal status (Levin & Amster, 2007:331).

Hate crime research depends from the legal basis for actions of police officers when these criminal offences are in question. Organizational factors also have a great importance. It primarily relates on the existence of the special departments for suppression of hate crimes within police organizations. It is also important that all police officers are trained to recognize a certain event as the act of violence motivated by hate or prejudices for the purpose of initiating of the further investigation. Other conditions are also necessary, such as trust and good relations with the community, especially with the endangered, minority groups whose members are often the victims of hate crimes (Strobl et al., 2005:638). For the establishment of trust in the work of the police, it is also of great importance the presence of the minority groups in the police structure (Multilingual Orientation Service Association for Immigrant Communities [MOSAIC], 2003).

Efficient control of the hate crimes by the police is also possible in the very complex demographic and cultural environments. The example for it is the city of New York, USA, which is one of the cities with the most heterogeneous structure of the population in the world. Although the hate crimes were significantly expressed in the previous period after the adoption of the legal regulations that regulate this area and after the increased activity of the New York police from the mid 90 onward, there has been a downturn trend of these criminal offences. Positive results are visible despite the complex social environment caused by the intensive demographic, economic, technology and safety changes. The experiences of the New York police indicate that the increase of efficiency of the police work on suppression of hate crimes can be achieved by forming a specialized departments for suppression of hate crimes, with the establishment of the clear protocols for action, by training of the police, by efficient collection of data, contacts with the community, more severe penal policy, cooperation with the media and establishment of the multilingual service for victims (Levin & Amster, 2007:338).

The example of good practice is also the Baltimore County Police-BCPD USA which is one of the first police agencies in USA which has in 1981 introduced the programme for action regarding the incidents motivated by the religious, racial and ethnical hatred. Such practice is established due to frequent activities of Ku Klux Klan, especially by burning of crosses for the purpose of intimidation of the black population. A special attention is devoted to sensibility of the police actions towards the victims, their families and community - due to emotional traumas which they experienced. In accordance with the procedures, the police mark all events which have the elements of hate incident or

hate crime. The police officer is the first who receives the knowledge on the event, then the police officer notifies the investigators and after the collected evidence the investigators make a report which is submitted to the verification commission, which assesses if the certain event has the elements of the hate crime or not. From the Baltimore Police experiences derive the recommendations for the increase of police efficiency and those are primarily the existence of the clear procedures in the police organizations for action regarding hate crimes, then the police officers' training and the police work programmes in the community (Martin, 1999).

Positive experiences on control of the hate crimes and the increase of efficiency of police work come from Great Britain. Namely, it is about the experiences of one of the programmes of the Ministry of Internal Affairs focused on the hate crimes and family violence. The purpose of the programme is the transformation of the routine police records into the records of use for the practical policy, strategy and police practice. Besides the London's Police and criminologists, in the programme have taken part other researchers from the area of social sciences which do not have experience in the work with police organizations. In the project they have applied the combination of the quantitative and qualitative methods on the basis of which they obtained useful data on the hate crimes and the police work - on the basis of which can be identified and understood problems and thereby also improve the action of the police. These programmes represent a good example of the application of the scientific research in the practical purposes (Stanko, 2004).

From the professional papers which can be found in the reference on the action of the police on the suppression of hate crimes, there is a guide made by the Working group on Race and Diversity of the Association of Chief Police Officers ACPO] & The Home Office Police Standards Unit, 2005). The purpose of the guide is the review of the present practices of the police agencies and the development of the new approaches and action tactics. The guide was made on the basis of the verified experiences of the various police agencies across England, Wales and Northern Ireland. In the guide is stated the strategic importance of the police in the protection of the personal and property security of all citizens, as well as the vital civilization values of the demographic societies. The absence or inadequate reactions on these criminal offences affects the public confidence in the police, because the consequences of the hate crimes affect not only the victim but also on their family and the community which they belong. In the guide is given a meaningful display of instructions for the operational action and there are also the definitions of the term, legal regulations, methods of collecting of information, issues of the reporting of the criminal offences and statistical monitoring, procedure with the victims, instructions for the management of the investigations, cooperation with the other agencies and then are explained the specific emanations of the hate crimes, hate crimes and incidents within the police organizations, trainings of the police officers, relations with the media and eventually, evaluation of the working results.

Likewise, the International Association of Chiefs of Police has made concise instructions for the police officers regarding the research and the prevention of hate crimes (Turner, 2001). These instructions for the understanding of the nature of these criminal offences as well as the instructions to the police officers what they should do at the crime scene are useful.

Indicators that indicate on the existence of the hate crime⁴ are of particular importance and also the instructions on how to deal with the victims and the communities which the victims belong. It is significant to mention also the OSCE programme - ODIHR training for the police services for suppression of the hate crimes. The programme is consisted of four phases:

- 1) response, investigation, collection and exchange of information and cooperation with the prosecutors,
- 2) development of the strategies for the suppression of the hate crimes which are based on the proactive management of the police and the cooperation with the communities,
- 3) development of the efficient process of collecting and forwarding of the data of the hate crimes,
- 4) trainings of the prosecutors on how to use evidence for the purpose of proving the criminal offence.⁵

The programme is adapted to the particularities and needs of each country in particular.

On the whole, the role of the police in the prevention and suppression of the hate crimes is of the essential importance. The efficient approach primarily includes the competence of the police, organizational culture that respects diversities and relations with the citizens based on mutual trust, especially with the minority communities.

2. THE ROLE OF THE JUDICIAL AUTHORITIES IN THE PREVENTION AND SUPPRESSION OF HATE CRIMES

The efficient work of the authorities of the judicial system is also of great importance for the social control of hate crimes. Criminal prosecution and establishment of the criminal responsibility is a clear indicator of the social disapproval of these criminal offences. Establishment of the criminal responsibility of the executors of the criminal offences perpetrated out of the hatred does not have the significance in the sense of the special and general prevention, but it is also important from the aspect of creation of trust of the victim and the victim's community in the criminal justice system and social system in the whole. Otherwise, if the system is not capable to perform its control and guiding functions, crises⁶ are legally occurring, suitable social conditions are created for the emergence of the new racial, national, religious and other conflicts and deepening of

⁴ Perceptions of the victim and the witness regarding criminal offence, commentaries of the executors, gestures or written statements that indicate on the prejudices including graffiti or other symbols, each difference between the executors and the victim, whether real or assumed by the executors; similar incidents at the same locations or settlement that indicate on the same forms of behaviour; the victim was engaged on the activities of promotion of its group or community; the existence of coincidence of time of occurring the incident with the holiday or the date of the special importance; membership of the executor in the extreme groups or cooperation with their members; the absence of the other motive, such as material gain and similar (Turner, 2001).

⁵ Training Programme for Police Officers, http://www.osce.org/publications/odihr/2006/09/20673_676_sr.pdf. Website visited on 23 December 2009

⁶ Such state in the sociological theory is called dysfunction of the social system and in the political theory, the crises of the legitimacy of the government (Milašinović, 2008:70).

the existing, particularly in the social environment where those relations are traditionally disturbed.⁷

In the existing world literature, there is a very few scientific papers from this field that specifically or at least partially deal with the acting of the justice system and the responsibility of the executors of these criminal offences. One of the papers significant for this issue is *Hate Crime Offenders: An Expanded Typology* (McDevitt et al., 2002) where McDevitt and associates suggest that during the criminal prosecution and sentencing to the executor of the criminal offence committed out of hatred, if it is performed in a group, to be taken into consideration the degree of participation and responsibility of each participant, having in mind the role which they had during the incident. Regarding that, the authors distinguish four types of participants in the incident: leaders and accomplices, involuntary participants and heroes. For each of the four types of executors by the classification of these authors corresponds one of the mentioned roles - thereby also the degree of responsibility. According to them, leaders and accomplices bear the greatest responsibility, whether to encourage other on the execution of the offence or to actively participate in the execution. Unwilling participants do not actively participate in the incident or are trying to prevent the crime or to assist the victim. Heroes are trying to prevent other participants to perform the crime, warn the victims or report the group activity to the police (McDevitt et al., 2002:313).

Likewise, it should be mentioned also the academic article *The Prosecution of Hate Crimes The Limitations of the Hate Crime Typology* (Phillips, 2009), where it is criticized the typology of the executors of the hate crimes criminal offences made by McDevitt and associates, because it does not include the cases where the hatred is not the basic but the peripheral motive, which is of great importance in proving the criminal offence committed out of hatred and the sign to the legislator that it should foresee also such cases, because they often occur in the practice.

James Morsch in the quoted article *The Problem of Motive in Hate Crimes: The Argument against Presumptions of Racial Motivation* is concerned with the problem of proving of the hate crime motive, by analysing the arguments that the complex problem of proving the racial motive is solved in the manner that the burden of proving the motive is based on the defence and not on the prosecutor, that is, to be introduced assumption of the racial motive when the racial attacks of the white people on the minority groups in USA are concerned, because in that manner would be provided a larger number of convictions. In such a case, the defendant would have to prove that his act was not motivated by the racial hatred, but with some other motive (Morsch, 1991:674). Advocates of this approach state that in this manner is eliminated the possibility of arbitrary and illegal verdicts (Morsch, 1991:675) and its critics consider that it would not be in accordance with the USA Constitution, because the equality principle is violated before the law (Morsch, 1991:681). Morsch states that the state should adopt clear standards for proving the motive of the accused for the criminal offences committed out of hatred and the pros-

⁷ For example, on 17 and 18 May 1980 in Miami, USA occurred major racial riots and conflicts due to the verdict that liberated four white police officers of the criminal liability who, due to allegedly committed offence, beaten to death a black person McDuffie. In the riots was fifteen dead people and more than two hundred was injured. In Los Angeles riots broke out on 29 April 1992 due to liberating verdict of the four white officers who were charged for physical abuse of the young black person. In the riots were 47 dead and 2 328 injured people (De Fontet, 1999:104).

ecutors should prove that the behaviour of the defendant is dominantly guided by the racial hatred. Likewise, he considers that the states should establish the control mechanisms for the supervision over the work of the justice system authorities, because the decisions which they make may also be racially motivated (Morsch, 1991:689).

Beside a small number of scientific papers, there are a modest number of professional papers. In that segment it is important to mention the Guide for Prosecutors, American Prosecutors Research Institute⁸ (APRI, 2001). The guide contains basic explanations on what are hate crimes, the review of problems and law regulations, collaboration with the other agencies, instructions for the identification and research of the hate crimes, instructions for the preparation of the cases for criminal prosecution and at the end, the instruction for the prevention of these criminal offences.

Here we will mention the guide prepared by the Office for Democratic Institutions and Human Rights (ODIHR); Organization for Security and Co-operation in Europe OSCE *Hate Crimes Laws: A Practical Guide* (OSCE - ODIHR, 2009a) in which are explained the arguments for the existence of the law regulations on hate crimes and are stated the examples from practice in what manner different legislations have solved the problem. Likewise, in the guide are processed crucial issues which the legislator should take into consideration during the drafting of the regulations from this field.

Although this guide is primarily intended for legislators as an aid in drafting the regulations from this field, it certainly represents a useful reading to the public prosecutors and judges for the understanding of the legal nature of these criminal offences. Besides, it is also mentioned a valuable experiences from other legislations. Particularly useful in the guide is the part on the proving of the criminal offences committed out of hate (OSCE-ODIHR, 2009a:47-52) which speaks of proving of the motive of prejudice of hate, such as in the cases where the motive is obvious and also for the situations where beside the motive of prejudice or hate there are also other motives.

The work of the justice system regarding the criminal prosecution of the criminal offences committed out of hate depends of the multitude of factors. Basic factors are the adequate legal solutions, therefore, the legal basis for action of the Prosecutor's Office and courts. If there is a clear legal framework for the criminal prosecution of the executors of these criminal offences, the formal-legal conditions are created for the action of all authorities of the formal social control, from the police to the Public Prosecutor's Offices and courts. However, due to insufficiency of the experience from this field, inadequate legal solutions or doubt that it will not be proven the motive of the executor, judge and prosecutors often qualify a certain criminal offence where the motive of prejudice or hate is obvious - as some other criminal offence (Morsch, 1991:672). Additionally, the judges easily accept the acknowledgement of guilt of the executor as some other criminal offence, denying the motive of prejudice or hate (Burney & Rose, 2002:111). If the public prosecutors in their practice fail to prove this motive or the trials last exceptionally long, after which the court imposes a light sentences for the executors of these criminal offences by the court (Strobl et al., 2005:638), the entire concept of hate crime loses the social sense and criminal and legal significance. Implementation of the legal provisions on the hate crimes sends the message of support to the minority groups and the small number of convictions is the indicator which indicates on the failure of sending this message

⁸ *Hate Crimes: A local Prosecutor's Guide for Responding to Hate Crimes.*

(Morsch, 1991:673). For that reason, the efficient work of the authorities of the justice system should enable the certification of the validity of the hate crime as the special type of criminal offences - or that the entire concept is thoroughly investigated.

3. THE OTHER ENTITIES IN THE CONTROL OF HATE CRIMES

a) Educational institutions

Educational institutions have a crucial role in forming of the stances of the generations of young people. The society transfers on the young generations those values which sustained the trial of time and which showed by the experience as important for the maintenance of the certain social group. Observing it sociologically, not even one society is homogeneous, but heterogeneous by the various cultural, political, social and other bases. Social differences in favourable conditions create the paradigm of differences - ideological view of exclusivity of their own culture as valuable, with the simultaneous denying or disrespect of the values of other social groups. Stereotypes and prejudices are transferred from generation to generation in the form of tradition (Ueckert, Kakuska, & Nagorny, 1978:282). The question is raised if those unfounded stances may be considered cultural heritage and what consequences do they have on society and individual in the long term? Consequences are not harmless because they are expressed in the form of conflict between different social groups and the hate crimes are a violent form of manifestation of differences. Considering the negative social consequences of the stereotypes, prejudices, ethnocentrism and hate, which is their essential companion and essence, enculturation of such stances belongs more in the domain of the social pathology than in the domain of culture. Results of the social and psychological research tell us that the violent behaviour is learned (Bandura, 1977). In accordance with that theory can be set an opposite assertion: that the nonviolent behaviour is also learned. Certainly, the explanation of the violent behaviour is a very complex and it may not be *a priori* reduced on the educational process but this factor is significant in the explanation of the violent behaviour. If we accept the assumption that the education has a positive impact on the forming of the stances on social groups which rest on the different cultural values, we may speak on the significance and the role of education in the prevention of hate crimes.

Going forward, the prevention of hate crimes should include the education of the school children in the cultural differences by introducing the curricula and syllabi which will enable to the students to understand better the culture of differences and non-discrimination (Tilley, 2007:549). There is also the education of the young people through organization of the school seminars on xenophobia and visits to the commemorative centres of the Nazi crimes (Strobl et al., 2005:640). Such approaches are of special importance for the societies where there is a traditional hate and distrust between the antagonistic groups, whose painful historical remembrance is a part of the collective awareness.

The process of adoption of the cultural values of the dialogue and tolerance is not related only on the part of the population in the society that participates in the process

of formal education, but also on all citizens. Successful strategies for the prevention of the hate crimes must be focused on the strengthening of the democratic standards and values, what includes the series of activities of the citizens, institutions and media. For example it may be mentioned the experiences from Germany, where it is implemented the concept of positive general prevention which is consisted in raising awareness of the citizenship on the importance of standards in society. However, if the violation of standards is tolerated, in time the awareness on obligation of respect of these standards will weaken and then disappear. Just with the positive general prevention is performed reaffirmation of standards in society. (Strobl et al., 2005:635) It may be influenced on the citizenship in the educational manner by holding gatherings or concerts where is promoted tolerance and nonviolence. The adoption of the democratic standards does not depend from rejection of totalitarian and neo-Nazi ideology but in larger extent from accepting of the democratic lifestyle. These approaches have positive effects and in long term may effect on the reduction of the hate crimes (Strobl et al., 2005:636).

b) Political elites

Political elites often create socially favourable conditions for violence motivated by the national, racial, religious and other forms of hatred, providing the active or passive support to the stigmatisation, demonization or marginalisation of the traditionally oppressed social groups. In that way the state gives the legitimacy to the policy of violence and the policy of hegemony (Perry, 2001:179). Political elites have the responsibility to provide the equality of all citizens, the rule of laws and to develop a truly democratic political culture that promotes and does not judge the differences in the society. Hate crimes are the threat to the basic democratic values thereby the bearers of the political authority have the constitutional obligation to protect the rights of the citizens and to prevent the various forms of discrimination and violence in the society. There is an entire series of measures which may be implemented on this plan, such as the fulfilment of the international obligations which derive from the international conventions and other acts including also the establishment of cooperation with the international authorities that deal with this issue.

One of the essential questions is the legal protection of the minorities and their equal participation in the political, economic and cultural life. Supporting the initiatives by which is suggested the adequate legal solutions may be affected on the executive authority to enable an efficient implementation of the existing legal regulations from this field.

Political elites may support or at least enable an undisturbed work of the non-governmental organizations for the protection of the human rights, especially those which deal with the issues of racism, xenophobia, religion and other forms of discrimination and intolerance. It is of the special interest the role of the political elites in the post conflict societies, where are expressed the subjective consequences of the conflict in the form of the sentiment of hate toward the members of the other conflicting national, religious or other groups. Social psychologists consider that it may be influenced on the neutralization

of the hatred by directing the hatred on the participants in the war crime, then the legal measures, information, interaction and education (Milosavljević, 2004:395).

What is the role of the political elites in those social environments and what they can do on neutralising of the occurred consequences? Representatives of the political elites can direct and localize hatred on the participants in the war crime - organizers, ideologists and executors instead on the one nation or other group. By the localization of the hatred are identified the responsible for the crimes and in that way is prevented that the hatred is the exclusive and long term initiator of the relations between the antagonist social groups. On neutralizing of the hatred the political elite may influence in such a manner that they give a political support to the efficient action of the criminal justice system, whereby it is sent a clear message that such behaviour would be severely sanctioned. Likewise, in the public statements they may avoid violent communication and hate speech, where is evoked the sentiment of hatred. On the other hand by its moderate statements and political action they can promote the values of the political culture of dialogue, tolerance and nonviolence. If the action of the political elites is directed on the interaction and the dialogue with the antagonist groups as well as a defining of the common, possible targets, in the long run, this should contribute to the reduction of the existing tensions. And, in the end, the political elites can influence on the process of education of the young generations, in the manner that they will give a political support to the curriculum and activities by which are promoted democratic values.

c) Media

Media have a crucial role in forming of the public opinion, especially when it is about the delicate themes such as hate crimes. Media deal with the sale of news and the hate crime is always the news that evokes interest of the public. Media can have a double role; the first relates on objective information, the other on manipulation. In what manner the media will act is an ethical question.

Critics of the hate crimes concept criticise also the role of media, because they have created a large picture on the state of the hate crimes, frequently without the basis indicating on the alarming state (Jacobs & Potter, 1998:50-51). Green and associates state that the media had a significant role in the creation of the tide of xenophobic violence in Germany in 1990s (Green et al., 2001:496). It is important to mention also the fact that the development of the information technologies, especially the Internet enables a new ways of expansion of the various forms of hatred. Hatred on the Internet is a widespread phenomenon, because the extremists use them as the global mean of communication for the expansion of the hate ideology (Perry, 2001:174). The cooperation of the media and the police are also of the great importance when the hate crimes are concerned. Approaches in the cooperation may be proactive and reactive. Proactive approach is consisted of the activities by which is promoted nonviolence and avoided an insulting terminology during reporting. It is of significance that the media inform the public on the details related for the deprivation of liberty, indictments and verdicts for the hate crimes, because such an approach strengthens the trust of the public in the criminal justice system (ACPO & Home Office, 2005:95). In the reactive approach, it means that when a certain event happens, the cooperation of the police and media is the opportunity that the police demonstrate openness and responsibility towards the public (ACPO & Home Office, 2005:95).

CONCLUSION

In this paper is given a short display of the role of the security providers at the national level in the control of hate crimes. Each society in accordance with its institutional capacities, the policy of suppression of crime and the level of respect of democratic values reacts on these specific criminal offences. The consequences of the hate crimes exceed the immediate victim; they are beside the attack on the individual also the attack on the group which the victim belongs. This is its uniqueness by comparison with the other criminal offences. Hate crimes can represent a threat for peace and stability in the society. Thereby also the role of the entities which need to provide it is great. The significance of the police as the traditional security provider is unavoidable. The successful control of these criminal offences depends from the training and successfulness of the police in the clarifying of these criminal offences, treatment with the victims and relations with the community and media. The work of the judicial authorities, prosecutor's offices and courts has a clear goal and that is criminal prosecution and establishment of the responsibility of the perpetrators of these criminal offences. Only in this way, it is possible to create the trust of the victim and the community to which the victim belongs in the system of the criminal justice system and the society as a whole. However, besides the bodies of the formal social control a significant role in achieving this goal also have the other entities. The system of education has a significant role. In that system, young people are preparing for the future. Learning about the cultural differences and nonviolent communication should be the integral part of the educational process at all levels. The significance of respecting democratic standards is not related only on the process of formal education but also on all citizens. The successful strategies for the prevention of hate crimes include a set of activities of the citizens, institutions and media. Political elites bear a heavy responsibility when the control of these criminal offences is in question. They are the ones that create a social environment and the ones that can judge the practice of the discrimination, hate and violence, but also to encourage it. Neutral stance also contributes to the social environment of the violence because the message of condemnation is missing. Political elites are the initiators of changes and strengthening of the institutional capacities for the suppression of hate crimes. Media also have a great importance in this process. Biased and tendentious information leads to creation of the tide of intolerance of violence. It may be concluded that the prevention and suppression of the hate crime is a comprehensive process which demands active participation of the entities from various spheres of social life. Only such integral approach to this problem in the long run can give positive results.

LITERATURE:

- American Prosecutors Research Institute [APRI] (2001). *A local prosecutor's guide for responding to hate crimes*. Retrieved August 18, 2009, from http://www.ndaa.org/pdf/hate_crimes.pdf
- Association of Chief Police Officers [ACPO], & The Home Office Police Standards Unit. (2005). *Hate Crime: Delivering a Quality Service – Good Practice and Tactical*

Guidance. Retrieved October 15, 2009, <http://www.bedfordshire.police.uk/pdf/tacticalguidance.pdf>

- Bandura, A. (1977). *Social Learning Theory*. New Yerssy: Pretince Hall.
- Berrill, K. (1992). Anti-Gay Violence and Victimization in the United States: An Overview. In G. Herek & K. Berrill (Eds.), *Hate Crimes: Confronting Violence against Lesbians and Gay Men* (pp.19–45). K. Newbury Park, CA: Sage.
- Brown, A. (1995). *Organizational Culture*. London: Pitman.
- Burney, E., & Rose, G. (2002). *Racist Offences – How is the Law Working? Implementation of the Legislation on Racially Aggravated Offences in the Crime and Disorder Act 1998. Home Office Research Study 244*. London, United Kingdom: Home Office.
- Cogan, J. C. (2002). Hate Crime as a Crime Category worthy of Policy Attention. *American Behavioral Scientist*, 46(1), 173–185.
- De Fontet, F. (1999). *Расизам. Београд & Земун: Плато & XX век*.
- Green, D. P., McFalls, L. H., & Smith, J. K. (2001). Hate crime: An emergent research agenda. *Annual Review of Sociology*, 27, 479–504.
- Herek, G. (1992). Primary and Secondary Victimization in Anti-Gay Hate Crimes: Official Response and Public Policy. In G. Herek, & K. Berrill (Eds.), *Hate Crimes: Confronting Violence against Lesbians and Gay Men*. (pp.289–305). Newbury Park, CA: Sage.
- Jacobs, J. B., & Potter, K. A. (1998). *Hate crimes: criminal law & identity politics*. New York: Oxford University Press.
- Janjićijević, N. (1997). *Organizaciona kultura*. Novi Sad: Ulix.
- Lalić, V. (2013). *Zločini mržnje u Bosni i Hercegovini*. Doktorska disertacija. Fakultet bezbednosti. Univerzitet u Beogradu.
- Lalić, V., Matijašević, D. (2015). Suprotstavljanje rasizmu, ksenofobiji i zločinima mržnje u Evropi – supranacionalni, normativni i institucionalni aspekti. *Godišnjak Evropskog Defendologija centra*, br.4. Banja Luka: Evropski defendologija centar. str.100–111.
- Levin, B., & Amster, S. E. (2007). Making Hate History: Hate Crime and Policing in America's Most Diverse City. *American Behavioral Scientist*, 51(2), 319–348.
- Levin, J., Rabrenovic, G., Ferraro, V., Doran, T., & Methe, D. (2007). When a Crime Committed by a Teenager Becomes a Hate Crime Results From Two Studies. *American Behavioral Scientist*, 51(2), 246–257.
- Martin, S. E (1999). Police and the Production of Hate Crimes: Continuity and Change in One Jurisdiction. *Police Quarterly*, 2(4), 417–437.
- McDevitt, J., Levin, J., & Bennett, S. (2002). Hate crime offenders: An expanded typology. *Journal of Social Issues*, 58, 303–317.
- McVeigh, R., Welch, M. R., & Bjarnason, T. (2003). Hate Crime Reporting as a Successful Social Movement Outcome. *American Sociological Review*, 68(6), 843–867.
- Milašinović, S. (2008). Suština i uzroci društvenih konflikata. *Nauka, bezbednost, policija*, 13(1), 55–77.
- Milosavljević, B. (2004). *Socijalna patologija i društvo*. Banja Luka: Filozofski fakultet Univerziteta u Banjoj Luci.

- Morsch, J. (1991). The Problem of Motive in Hate Crimes: The Argument against Presumptions of Racial Motivation. *The Journal of Criminal Law and Criminology*, 82 (3), 659–689.
- Multilingual Orientation Service Association for Immigrant Communities [MOSAIC]. (2003). *Diverse Cultures, Responsive Policing: A Policy Framework*. Vancouver, BC, Canada: MOSAIC Settlement Services.
- Nolan, J. & Akiyama, Y. (1999). An Analysis of Factors that Affect Law Enforcement Participation in Hate Crime Reporting, *Journal of Contemporary Criminal Justice*, 15(1), 111–127.
- OSCE Office for Democratic Institution and Human Rights [OSCE – ODIHR]. (2009a). *Hate Crime Laws – A Practical Guide*. Warsaw: OSCE (ODIHR). Retrieved March 15, 2010, from <http://www.osce.org/odihhr/36426>
- Perry, B. (2001). In *the Name of Hate: Understanding Hate Crimes*. New York: Routledge.
- Phillips, N. D. (2009). The Prosecution of Hate Crimes: The Limitations of the Hate Crime Typology. *Journal of Interpersonal Violence*, 24(5), 883–905.
- Reiner, R. (1985). *The Politics of the Police*. Brighton: Wheatsheaf Books.
- Saucier, D. A., Brown, T. L., Mitchell, R. C., & Cawman, A. J. (2006). Effects of Victims' Characteristics on Attitudes toward Hate Crimes. *Journal of Interpersonal Violence*, 21(7), 890–909.
- Skolnick, J. (1966). *Justice Without Trial*. New York: Wiley.
- Stanko, E. A. (2004). Reviewing the evidence of hate – Lessons from a project under the Home Office Crime Reduction Programme. *Criminal Justice*, 4(3), 277–286.
- Strobl, R., Klemm, J., & Wurtz, S. (2005). Preventing Hate Crime: Experiences from two East-German Towns. *British Journal of Criminology*, 45, 634–646.
- Tilley, N. (2007). *Handbook of crime prevention and community safety*. Cullompton: Willan Publishing.
- Turner, N. (2001). Responding to Hate Crimes: A Police Officer's Guide to Investigation and Prevention. International Association of Chiefs of Police. Retrieved January 16, 2010, from <http://www.theiacp.org/PublicationsGuides/LawEnforcementIssues/Hatecrimes/RespondingtoHateCrimesPoliceOfficersGuide/tabid/221/Default.aspx>
- Ueckert, H., Kakuska, R., & Nagorny, J. (1979). *Психологија у служби човјека*. Загреб: Младост.

NEW TECHNOLOGIES

GLOBAL ASPECTS OF FOREIGN INVESTMENTS FLOW

Review article

DOI: 10.7251/DEFENG1841003K

COBISS.RS-ID 7751192

UDK 338.124.4:341.232.1

Ognjen Erić, PhD¹

Krajinapetrol a.d. Banja Luka

Abstract:

Foreign investment fund in the world has multiplied several times in the last two decades. However, growing trend of foreign investments flow has been broken by the recent financial crisis in the world. Lower inflow of foreign investments into the developing countries has made the funding of their current accounts difficult, because it became more difficult for them to get loans in the international capital market. Most net importers of capital are net debtors in the international capital market, which made them increase investment attractiveness for international investors. Thus they tried to decrease their exposure to the loan market. Although foreign investments are desirable source of funding the current account deficit, net inflow of these funds generates negative balance in the income account and puts pressure on the balance of payments of the country. World investment flows have returned to the upward trend in 2013.

This paper analyses foreign investments flow in the world, by groups of countries. The groups of countries, the subject analysis of this paper, are: Asia, Latin America, Africa, countries in transition and developed countries. The most significant countries that are net exporters of capital in the world are the European Union and USA, while the biggest importers are the growing Asian countries. Starting period for this analysis is 1990, and ending period is 2013. Therefore, time series of the analysis covers economic cycles, i.e. rise from the nineties of the last century, then the period of global financial and economical crisis that lasted all the way until the end of 2012.

Key words: *FDI, developed countries, developing countries, countries in transition, economic crisis*

¹ Korespondentni autor: Ognjen Eric, PhD; E-mail: ericognjen@yahoo.com

INTRODUCTORY CONSIDERATIONS: FOREIGN INVESTMENTS THEORY AND PRACTICE

Foreign direct investments are a global, current but also a controversial economic topic. In literature there prevails the view that foreign direct investments (FDI) stimulate economic growth, but opposing opinions can be ever more often read. Scientifically relevant researches in this field are used for new scientific knowledge and development of national economic policies. Favourable trends of FDI flows and stocks effect positive relation towards global mobility of investments. Although many factors affect them, certain authors relate the trends to developed markets of goods and capital, production method and technologies, liberal economic policies, as well as other factors: workforce, cultural and historical moments, etc. (Sethi, Guisinger, Phelan, & Berg, 2003). Accordingly, FDI are unavoidable development resource of all, and in particular, of countries in transition. Lipsi (2001) applied indicators of size and growth of a market to explain the inflow, outflow, net flows and balance of FDI. He used the following variables: nominal GDP and gross fixed investments. He concluded that the balance of incoming and outgoing FDI and their flows had a similar trend over time. If markets differ by size, trends of FDI flows differ as well. Attractiveness of a certain country for FDI investments depends on numerous conditions and factors.

Dunning (1993) considers attraction factors to be specific advantages in natural resources, technologies, available capital and workforce. Dunning has emphasised the importance of competitiveness. He believes that the appeal of a country in attracting foreign direct investments depends on competitiveness, macroeconomic climate and macroeconomic stability. The role of analysis of the competitiveness is very important in that context. Along with Dunning theory of development and investments, other investigations of stimulating dynamic development, FDI flows and the impact of a government on the increase in the overall competitiveness stand out (Buckley, & Castro, 1998). Dunning (2004) presented three prevailing determinants of the location of recipient country: the state policies of attracting foreign investments, economic determinants and incentives for development of businesses. Economic environment refers to resources and capacities of a country, while state policies, strategic objectives, macroeconomic and microeconomic determinants are the governmental measures.

When it comes to papers taking FDI as a factor of growth acceleration, competitiveness and investment into development, as well as better economic and production performances on microeconomic and macroeconomic level, the following studies stand out: Wie and Lui (2006) and Buckley, Clegg and Weng (2005). Campos and Kinoshita (2008) indicate that neither the market size, nor the low labour costs are significant determinants of FDI, compared to the quality of institutions.

Bevan and Estrin (2004) investigated determinants of direct foreign investments into the European transition economy by means of panel analysis of bilateral FDI flows between Western European and transition countries. They found that GDP of investing countries and capital recipient have positive effect on direct investment flows, as well as the accession procedure and integration into the European Union. Labour costs in host country, as well as the distance between the two countries, had negative effect, which is explained by the fact that enterprises decide for investments at locations where labour costs are lower and markets closer. Nakov (2004), applying panel method, analyses the impact of FDI on GDP in some twenty countries in transition, including the impact of FDI

on GDP in Hungary, using the co-integration analysis. Panel analysis indicates negative impact of FDI on GDP in transition economies. Co-integration analysis in the case of Hungary indicates the co-integration relation between foreign capital and industrial production. In this analysis, the elasticity of GDP to FDI change amounts to about 0,5. Granger test shows relevance of FDI in explaining the economic growth so it is concluded that FDI causes growth in terms of Granger, while growth does not cause FDI in terms of Granger.

Al-Iriani and Al-Shamsi (2007) use Pedroni co-integration analysis to test the relationship between FDI and economic growth in six countries of the Gulf for the period from 1970 to 2004. In the research, the obtained results indicate two-way causality between FDI and GDP in the Gulf countries.

Hisarciklilar, Kayam, Kayalica, and Ozkale (2006) investigate the relationship of the economic growth, FDI and international trade for selected Mediterranean countries for the period from 1970 to 2003. The relationship between the stated variables is tested by two-dimensioned co-integration analysis and by means of double Granger causality test. Insignificant relations were found for most of these countries.

Bogdan (2009) analyses the impact of FDI on the economic growth in European transition countries in the period 1990-2005. Panel analysis tests the hypothesis that the higher inflow of FDI stimulates economic growth in transition countries. The results have not justified the hypothesis because the impact of FDI on the growth proved to be negative, but not statistical significant, while macroeconomic stability and openness of economy have statistically significant role when it comes to growth. He also confirmed that FDI inflow stimulates macroeconomic stability and market size.

Analysing the situation in BiH, Domazet (2016) believes that FDI have contributed to restructuring of some public companies, improvement of investment climate and partly to the growth of employment. However, it is his opinion that these indicators are below FDI possibilities and potential. Overview of investigations indicate various investigations on the impact of FDI, effects of their growth and the role of foreign investments in accelerating positive economic development, first of all GDP growth. Having in mind ever higher significance in professional but also in the academic circle, global world flow of foreign investments shall be analysed, with the focus on the pre-crisis period and the period of crisis, with the aim of extrapolating their flows in the future.

CURRENT GLOBAL AND GEOPOLITICAL ASPECTS OF FOREIGN INVESTMENT FLOW

Current foreign investments flows are characterised by investment into transnational companies from developed countries to developing countries and countries in transition. Foreign investment growing trend was broken by emergence of the recent financial crisis in the world. Lower inflow of foreign investments into the developing countries has made the funding of their current accounts difficult, because it became more difficult for them to get loans in the international capital market. Most net importers of capital are net debtors in the international capital market, which made them increase investment attractiveness for international investors. Thus they tried to decrease their exposure to the loan market. Although foreign investments are desirable source of funding the current account deficit, net inflow of these funds generates negative balance in the income account and puts pressure on the balance of payments of the country.

World investment flows have returned to the upward trend in 2013. Foreign investments inflow increased by 9% to the amount of 1,45 billion dollars in 2013. Foreign investments inflow has increased in all major economic groups (in developed, developing and transition countries). Foreign investments stock increased by 9%, or 25.5 billion dollars. Foreign investments reached the amount of 1,6 billion dollars in 2014, 1,75 billion dollars in 2015, and 1,85 billion dollars in 2016. The growth has mainly been stimulated by investments in developed economies, as a result of the initiated recovery. The sensitivity of certain emerging markets, political risks as well as regional conflicts might threaten the expected growth of foreign investments flows. As a result of the expected growth of foreign investments in developed countries, regional distribution of investments could be formed according to the “traditional model” of greater participation of developed countries in the global inflow. However, investments flows in developing countries shall remain at a high level in the coming years too (UNCTAD, 2015).

Foreign investments inflow trends in developing countries amount to 778 billion dollars, which makes 54% of the global inflow. The inflow growth rate in this region has been slowed down to 7%, compared to the average growth rate of 17% in previous ten years. Asia continues to be the region with the highest investment inflow, significantly above Europe. Foreign investment inflow has been growing in other developing regions too, Africa (4%), Latin America and Caribbean (6%), excluding financial offshore centres). Foreign investments in developing economies have recorded recovery after a sharp fall occurred in 2012. However, they are still at historically low participation in the total global flows (39%) and 57% below the peak from 2007.

Table 1. *Inflows and outflows of foreign investments in the world, 1990-2013 (billion dollars)*

Foreign investment inflows									
Region/country	1990	2000	2007	2008	2009	2010	2011	2012	2013
Developed countries	173	1142	1323	1032	619	703	880	517	566
European Union	97	703	864	551	363	384	490	216	246
USA	48	314	216	306	144	198	224	161	188
Japan	2	8	23	24	12	-1	-2	2	2
Developing countries	35	267	591	669	533	648	725	729	778
China	3	41	84	108	95	115	124	121	124
Hong Kong, China	3	71	62	67	54	83	96	75	77
World	208	1415	2002	1819	1222	1422	1700	1330	1452
Foreign investment outflows									
Region/country	1990	2000	2007	2008	2009	2010	2011	2012	2013
Developed countries	230	1091	1889	1599	846	989	1216	853	857
European Union	131	809	1258	984	384	483	585	238	250
USA	31	143	394	308	288	278	387	367	338
Japan	51	32	74	128	75	56	108	123	136
Developing countries	11	147	327	338	277	421	423	440	454
China	1	1	27	56	57	69	75	88	101
Hong Kong, China	2	70	68	57	58	98	96	88	92
World	241	1241	2267	1999	1171	1468	1712	1347	1411

Source: UNCTAD (2015), [www.unctad.org/FDIstatistics; retrieved on: 9 March 2018]

Developing and transition countries make one half among the 20 first-ranked countries by foreign investments inflow. Mexico takes the tenth position. China has recorded the highest inflow ever, and remained the second largest recipient of investments in the world. Foreign investments referring to transnational corporations from developing countries amount to 454 billion dollars. Together with transition economies, they make 39% of the global investment outflow. This data was only 12% at the beginning of 2000s.

REGIONAL TRENDS OF FOREIGN INVESTMENTS IN THE WORLD

Asia. Total foreign investments inflow into Asia was 426 billion dollars in 2013, which makes almost 30% of global inflow of investments. Foreign investments inflow into East Asia increased by 2%, to the amount of 221 billion dollars. Stable performances of the sub-region stimulate foreign investments inflow into China, South Korea and Taiwan. Having the inflow of 124 billion dollars in 2013, China takes the second place in the world. In the meantime, investment outflow from China increased by 15%, to the amount of 101 billion dollars, stimulated by projects in developed countries. By the continuation of this trend, it is expected that capital outflow from the country will exceed the inflows within the period of 2 to 3 years. The increase of investment inflow to 77 billion dollars has been observed in Hong Kong. The inflow into Southeast Asia has increased by 7% and amounts to 125 billion dollars. Out of that, 50% goes to Singapore. Proactive efforts of the regional investment cooperation in the East and Southeast Asia, lasting for 15 years, have contributed to the growth of the total foreign investments, as well as to intra-regional investments. Intraregional investments into infrastructure and production bring development opportunities for low-income countries of this sub-region, such as Laos and Myanmar. Investments inflow in the South Asia increased by 10% to the amount of 36 billion dollars in 2013. The biggest recipient of foreign investments in the sub-region is India, with the increase of 17%, i.e. 28 billion dollars. Economic corridors have been established to connect the South, East and Southeast Asia (Bangladesh-China-India-Myanmar, as well as the Economic corridor China-Pakistan). This will improve the connection between the Asian sub-regions and ensure the possibility for regional economic cooperation. Foreign investment flows in the Western Asia decreased by 9% in 2013, to the amount of 44 billion dollars. Constant regional tensions and political uncertainty discourage investors' from investing, even though there are differences among the countries.

Latin America. Foreign investments in Latin America and Caribbean reached the amount of 292 billion dollars in 2013. However, the largest recipient of investments, Brazil, experienced slight fall by 2%, despite the increase of flows in primary sector. Foreign investments in Chile and Argentina have fallen by 29% and 25% respectively, i.e. to 20 billion dollars and 9 billion dollars. Foreign investments flows in Peru have decreased by 17%, to the amount of 10 billion dollars. On the other hand, investments inflow into Columbia has increased by 8%, to the amount of 17 billion dollars, mainly as a result of cross-border mergers and acquisitions in energy industry and banking. Inflows into Central America and Caribbean (excluding offshore financial centres) have increased by 64%, to the amount of 49 billion dollars, out of which the inflow into Mexico is 38 billion dollars. Inflows were also registered in Panama (61%), Costa Rica (14%), Guatemala and Nicara-

gua (5%). Outflow of investments from Latin America and Caribbean (excluding offshore financial centres) has fallen by 31%, and is 33 billion dollars, as a result of stagnancy of acquisitions abroad, as well as payment of loans to parent Brazilian and Chilean companies made by branch offices abroad. New possibilities for future foreign investments are being open in this region, particularly in the shale oil industry in Argentina. Also, sector reforms in Mexico might be a positive signal for significant foreign investments.

Africa. Foreign investments inflow into Africa increased by 4%, to the amount of 57 billion dollars in 2014. They refer to international market-seeking and infrastructure investments. Further growth is expected, and namely in attracting investments into consumer-oriented industries, including food, tourism, finances and retail sale. Total increase was led by the growth of investments in the Eastern and Southern African sub-region, while in other parts the fall of investments has been recorded. Flows have been almost doubled in South Africa, to the amount of 13 billion dollars, mainly due to the flows in South African Republic and Mozambique. In both of these countries, investments in the infrastructure prevail, but also into the gas sector. In the east of Africa, foreign investments inflow increased by 15%, or, 6,2 billion dollars. They refer to the increase of flows in Ethiopia and Kenya. Kenya has become an attractive business centre, not only for oil and gas research, but also for production and trade. Industrial strategy of Ethiopia provides potential to attract Asian capital, so that it can develop its production base in that way. Foreign investments flows in the sub-region of the North Africa have decreased by 7%, to the amount of 15 billion dollars. The fall of investments inflow has been recorded in Central and Western Africa by 8 and 14 billion dollars, respectively, mainly owing to political and safety risks. Intra-African investments are growing, and the leading countries of intra-African investments origin are South African Republic, Kenya and Nigeria. In the period between 2009 and 2013, the share of cross-border Greenfield investments, originating from Africa, has increased to 18%. Intra-African projects are concentrated around production and services. Only 3% of the value comes from intra-regional Greenfield projects, compared to 24% of extra-regional Greenfield projects (over the period 2009-2013).

Countries in transition. Foreign investments inflow into transition economies increased by 28%, and reached the amount of 108 billion dollars in 2013. In Southeast Europe, the inflows have increased from 2,6 billion dollars in 2012 to 3,7 billion dollars in 2013. The investments were stimulated by the process of privatisation of the remaining companies in the state ownership. When the Commonwealth of Independent States (CIS) is observed, 28% more investments inflow occurred in 2013, due to the inflow into the Russian Federation. The prospects for future investment inflows into countries in transition are uncertain, due to regional security and political instability in the relationships between Russia and the Countries of the North-Atlantic Alliance.

In the year 2013, investments from the region have increased by 84%, or 99 billion dollars. As happened in the previous years, Russian companies were investors in most of those investments. The value of cross-border mergers and acquisitions from the region increased by more than 6 times, while Greenfield investments increased by 87%, to the amount of 19 billion dollars. In the course of the past decade, transition countries have been the fastest growing region of inflow and outflow investments. The most important partners, both as investors and recipients, were EU countries. The Union has the biggest share in the foreign investment fund in the region, with the share higher than two

thirds of the total fund. In the former Soviet Union countries, most investments went to resource-oriented, consumer sectors. In the Southeast Europe, EU investments have been stimulated by privatisation, but also by low-cost production, and the possibility of EU membership. Outflow investments from transition economies into the EU countries mostly come from the Russian Federation. Investors invest into strategic equity on the European Union market, including downstream activities in energy industry, as well as higher-level processing production activities.

Developed countries. After a sharp fall in 2012, investments inflow in developed economies of the world recovered in 2013, to amount 566 billion dollars, which is an increase of 9%. Inflow into the European Union is 246 billion dollars (increase of 14%), which is less than 30% of the peak from 2007. Capital inflows into the North America were 250 billion dollars, whereas the United States of America has experienced an increase in the inflow by 17%, to the amount of 188 billion dollars, which makes the States the biggest recipient of investments. Outflow investments from developed countries amount to 857 billion dollars in 2013, almost unchanged in comparison to the previous year. The economic recovery in Europe in 2013 and continued spread of investments from Japan, resulted in reduced capital outflow from the North America. Outflow investments from Europe have increased by 10%, to the amount of 329 billion dollars. Switzerland has become the biggest European investor. Contrary to this trend, the fall of outflow investments has been recorded in France, Germany and Great Britain.

Outgoing investments from the North America have decreased by 10%, to the amount of 381 billion dollars, partly because the United States has withdrawn resources from their funds in Europe, to the local securities market. Capital outflow from Japan has been growing for the third year in a row, and amounts to 136 billion dollars in 2013.

Inflows and outflows of investments in developed countries are at the level of 45% from 2007. In terms of global share, the developed countries participate with 39% of the total inflow and 61% of the total outflow, which is historically low level. Although the share of transatlantic flow of investment decreased in the last several years, EU and the United States are important investment partners - more than is implied by the size of their economies or the scope of bilateral trade flows. Out of total foreign investment received in the United States, 62% comes from the European Union countries, while 50% of outflow investments from the United States are found in the EU. Seen from the angle of the European Union, one third of foreign investment flows are investments from the United States.

Table 2. *Inflow and outflow of foreign investment funds, by region/country, 1990-2013 (billion dollars)*

	Inflow fund								
Region/Country	1990	2000	2007	2008	2009	2010	2011	2012	2013
Developed countries	1.564	5.682	12.842	10.857	12.470	13.041	13.426	14.536	16.053
European Union	762	2.353	7.589	6.702	7.471	7.314	7.482	8.020	8.583
USA	540	2.783	3.551	2.486	2.995	3.422	3.510	3.924	4.935
Japan	10	50	133	203	200	215	226	205	171
Developing countries	514	1.771	4.660	4.424	5.364	6.597	6.943	7.945	8.483
China	21	193	327	378	473	588	712	833	957
Hong Kong, China	202	492	1.227	873	994	1.163	1.185	1.356	1.444
World	2.078	7.511	18.136	15.680	18.428	20.371	21.117	23.304	25.464

Outflow fund									
Region/country	1990	2000	2007	2008	2009	2010	2011	2012	2013
Developed countries	1.947	7.100	16.350	13.709	16.298	17.400	17.521	18.859	20.765
European Union	809	3.509	8.742	8.188	9.118	9.315	9.518	9.830	10.617
USA	732	2.694	5.275	3.102	4.322	4.810	4.514	5.250	6.350
Japan	201	278	543	680	741	831	963	1.055	993
Developing countries	141	888	2.604	2.579	2.958	3.486	3.983	4.601	4.993
China	4	28	118	184	246	317	425	513	614
Hong Kong, China	12	436	1.108	858	929	1.039	1.129	1.274	1.352
World	2.088	8.008	19.343	16.519	19.589	21.289	21.913	23.916	26.313

Source: UNCTAD (2015) [www.unctad.org/FDIstatistics ; retrieved on: 9 March 2018]

Incoming foreign investments balance in EU in 2013 increased by 11,26 times compared to the year 1990, in the USA by 9,14 times, Japan 17,1 times, developing countries 16,5 times, China 45 times, Hong Kong 7,14 times, and in the world 12,25 times. The average annual growth rate of inflow foreign investment fund in EU in the period of 1990 - 2013 amounted to 11,1% and was slightly lower than the average growth rate of the outflow investments fund of 11,84%. Financial crisis caused fall in the balance of the inflow foreign investments in EU in 2008 by 11,7% compared to the year 2007. Already in the following year, the balance increased by 11,47% to experience the fall by 2,1% again in the year 2010, so that the balance in the year 2010 was 3,6% lower than the peak in 2007. The European Union was responsible for 42,7% of the world inflow investments in the year 2008, which decreased to 40,54% in the year 2009, and to 35,9% in the year 2010, 35,4% in 2011, 34,4% in 2012 and finally to 33,7% of the total inflow investments. A similar trend is observed when it comes to outflow investments in EU.

The USA is the second largest exporter of foreign investments, where the outflow investments balance in the year 2013 was higher than the outflow investments for 1.450 billion dollars. Share of the USA in the world inflow investments in 2013 was 19,38% and in the outflow it was 24,13%.

When the balance of the foreign investments is observed in developing countries, it can be noticed that the fund of the inflow investments was growing at the average annual rate of 12,96% over the period 1990 - 2013, while the outflow investments fund was growing at the rate of 15,1%. Although the dynamic of the outflow investments growth was stronger than the dynamic of the inflow investments, developing countries are still net capital importers (inflow investments balance in 2013 was higher than outflow investments for 3.490 billion dollars, and it made 33,1% of the inflow foreign investments balance in the world).

Table 3. Net international mergers and acquisitions, 1990-2013 (billion dollars)

Net purchase - region/ country	1990	2000	2007	2008	2009	2010	2011	2012	2013
Developed countries	85	895	870	486	192	226	430	184	152
European Union	53	659	538	322	121	23	141	19	- 1
USA	12	111	184	- 26	24	86	137	72	59

Japan	13	3	30	50	17	31	62	38	55
Developing countries	9	60	146	116	78	102	105	128	129
China	1	- 0	2	36	23	31	37	38	50
Hong Kong, China	1	40	- 9	1	6	13	10	16	17
World	98	959	1 045	626	285	349	556	332	349
Net sale - region/ country	1990	2000	2007	2008	2009	2010	2011	2012	2013
Developed countries	89	869	916	480	237	260	439	269	240
European Union	39	491	533	261	119	118	185	129	121
USA	36	252	181	222	66	84	147	66	60
Japan	0	12	19	10	- 6	7	5	2	4
Developing countries	10	89	97	121	42	85	85	56	113
China	-	38	8	18	11	7	12	10	27
Hong Kong, China	0	2	8	9	3	13	2	3	0
World	98	959	1 045	626	285	349	556	332	349

Source: UNCTAD (2015), [www.unctad.org/FDIstatistics; retrieved on 10 March 2018]

Unlike the nineties of the last century, when mergers and acquisitions represented a dominant aspect of foreign investments inflow, after the year 2005 the situation changed in favour of Greenfield investments. This aspect of investing made about 24% of the total inflow of investments in the world in the year 2013. In developing countries, this type of investment made about 17%, in EU about 49%, and in the USA about 31,9% of the total investments. The trend of the Greenfield investments growth particularly stands out in emerging markets. Countries from this group make efforts to stimulate a higher inflow of these investments by economic policy measures, because they count on the overflow of technology into their country, and do not take loans on the capital market. The main sources of Greenfield investments in the year 2013, according to value, are the European Union, the Developing countries and the USA, while as the main destination there appear Developing countries, followed by EU and the USA.

CONCLUSION

In global economy, FDI represent the most important form of international business activities. They do not presume only the cross-border capital flow, but also the transfer of technology and knowledge, hence it is considered that they contribute to the increase in the overall production, competitiveness growth, employment and international trade.

Developing and transition countries make one half among the 20 first countries ranked according to foreign investments inflow. China has recorded the highest inflow ever, and remained the second largest recipient of investments in the world. In terms of global share, the developed countries participated with two-fifths of the total inflow and above a half of the total world outflow in the year 2012. Although the share of transatlantic investment flows decreased in the last several years, EU and the United States are important investment partners - more than is implied by the size of their economies, or the

scope of bilateral trade flows. Out of totally received foreign investments in the United States, the European Union countries participate with 62%, and 50% of the outflow investments from the United States is found in EU. Seen from the European Union angle, one third of the foreign investment flows are investments of the United States. The balance of inflow foreign investments in EU increased by 11,26 times in the year 2013, compared to the year 1990, in the USA by 9,14 times, Japan 17,1 times, China 45 times, and in the world 12,25 times. The average annual rate of growth of the inflow foreign investment fund in EU amounted to 11,1% in the period 1990 - 2013, and it was slightly lower than the average rate of growth of the outflow investments fund of 11,84%.

The growing trend of foreign investments was broken by the emergence of the recent financial crisis in the world. The decreased inflow of investments from abroad made the funding of current accounts of economies depending on the imported capital difficult, because at the same time they found it harder to get loans on the international capital market. Financial crisis caused the fall in the balance of inflow foreign investments by 11,7% in EU in 2008, compared to the year 2007. In the year 2008, the European Union was responsible for 42,7% of the world inflow investments, which decreased to 40,54% in the year 2009. This trend was continued in the following years, so that in the year 2013 the participation of the EU in the total world investments was at the level of 33,7% of the total world inflow investments. A similar trend is recorded when it comes to the EU outflow investments. The USA is the second largest world exporter of foreign investments, where the balance of the outflow investments in 2013 was higher than the inflow investments for 1.450 billion dollars. Share of the USA in the world inflow investments in 2013 was 19,38%, and in the outflow investments it was 24,13%.

The world investments flows have resumed the growing trend in 2013. The growth was mainly stimulated by investments into developed economies, as a result of the resumed recovery. Sensibility of certain emerging markets, political risks as well as regional conflicts, present a threat for future flows of foreign investments. As a result of the expected growth of foreign investments in developed countries, regional distribution of investments could be formed according to the pattern of higher participation of the developed countries in the global inflow. However, flows of investments in developing countries tend to remain at a high level in the following years as well.

REFERENCES

- Al-Iriani, M., & Al-Shamsi, F. (2007). Foreign Direct Investment and Economic Growth in the GCC Countries: A Causality Investigation Using Heterogeneous Panel Analysis?. *MEEA Annual Meeting*. January 4-7. Loyola University. Chicago. Retrieved from: <http://www.luc.edu>
- Bevan, A., & Estrin, S. (2004). The determinants of foreign direct investment into European transition economies, *Journal of Comparative Economics*, Vol. 32, pp. 775.-787. Retrieved from:
<http://emit-project.net/wp-content/uploads/2012/11/sug33.pdf>
- Bogdan, Ž. (2009). Utjecaj FDI-ja na gospodarski rast europskih tranzicijskih zemalja, *Serijski članak u nastajanju, Ekonomski fakultet Zagreb, 06. (Impact of FDI on the*

economic growth in the European transition countries, Series of emerging articles, Faculty of Economics, Zagreb, 06) Retrieved from:

- <http://web.efzg.hr/repec/pdf/Clanak%2009-06.pdf>
- Buckley, P.J., Clegg J., & Weng C.(2005). The impact of inward FDI on the performance of Chinese Manufacturing. *Journal of International Business Studies* 33 (3): 637-655. DOI: 10.1057/palgrave.jibs.8491037
- Buckley, P. J., & Castro, F.B., (1998). The investment development path: The case of Portugal. *Transnational Corporations*, vol. 7, no.1: pp 1-15. Retrieved from: <https://www.fep.up.pt/docentes/pcosme/Artigos/13-TC.pdf>
- Domazet, A. (2016). Foreign direct investment in Bosnia and Herzegovina: From The Delusions of Neoliberalism to drivers of Economic Growth. *Academy of Sciences and Arts of Bosnia and Herzegovina. Conference proceedings: The Dayton Peace Agreement and the future of Bosnia and Herzegovina, Vol. 7, pp.126-145*. Retrieved from: http://www.anubih.ba/images/publikacije/posebna_izdanja/ODN/07_posebna_izdanja_CLXVI%20_7/07_posebna_izdanja_CLXVI%20_7.pdf
- Dunning, J.H. (2004). Institutional Reform, FDI and European Transition Economies. *Henley Business School, University of Reading, Whiteknights Reading*. <http://www.henley.ac.uk/web/FILES/management/014.pdf>
- Dunning, J. H. (1993). *Multinational enterprises and the global economy*. Wokingham: Addison Wesley.
- Campos, N. F., & Kinoshita, Y. (2008). Foreign Direct Investment and Structural Reforms: Panel Evidence from Eastern Europe and Latin America. *IMF Working Papers, WP/07/190*. Preuzeto sa: <https://www.imf.org/external/np/seminars/eng/2008/strureform/pdf/foreign.pdf>
- Lipsey, R. E. (2001). Foreign Direct Investors in Three Financial Crises, *NBER Working Paper Series, No. 8084*. Retrieved from: <http://www.nber.org/papers/w8084.pdf>
- Nakov, A., (2004). Foreign Direct Investment and Growth in Transition: Panel Data and Time Series Evidence, 1991-2001, *Croatian International Relations Review*, (10), 34-35:7-16. Preuzeto sa: <http://hrcak.srce.hr/6674>
- Hisarciklilar, M., Kayam, S.S., Kayalica, M.O., & Ozkale, N.L. (2006). Foreign Direct Investmnet and Growth in Mediterranean Coutries, *Euro-Mediterranean observatory*, <http://emo.pspa.uoa.gr/data/papers/2-papers.pdf>
- Sethi, D., Guisinger S. E., Phelan, S. E., & Berg, D. M., (2003). Trends in foreign direct investment flows: A theoretical and empirical analyses. *Journal of International Business Studies* 34 (4): 315–326. DOI: 10.2307/3557177
- Wie Y., & Lui, X. (2006). Productivity spillovers from R&D, exports and FDI in China's manufacturing sector. *Journal of International Business Studies* 37 (7): 554-577. DOI: 10.1057/palgrave.jibs.8400209
- UNCTAD (2015). *World Investment Prospects Survey 2010-2015*. New York and Geneva: United Nations Conference on Trade and Development. Retrieved from: <http://www.unctad.org>

THE IMPORTANCE OF NEW TECHNOLOGIES AND THEIR IMPACT ON INDUSTRIAL DEVELOPMENT, SERVICE ACTIVITIES AND UNEMPLOYMENT

Review article

DOI: 10.7251/DEFENG1841004S

COBISS.RS-ID 7751704

UDK 658.5:004.384]:666.3/7

Milan Šušić¹

*University of Business Studies Banja Luka,
Faculty of Business and Financial Studies, Bosnia and Herzegovina*

Abstract:

New information and communication technologies have found their application in all fields of activity (manufacturing, construction, wholesale and retail, transport and storage, information and communication, education, health care and social care and other activities). CAD / CAM applications are used in the industry for design, prototyping, finished products and realization of production programs, and in service activities such as health care-dentistry is a process that achieves the final treatment of the teeth through fine grinding of finished ceramic blocks in order to achieve more efficient work. CAD / CAM technology essentially allows the creation of two-dimensional, three-dimensional, five-dimensional models and their materialization with numerically controlled machines. In order to function more efficiently, reduce costs, increase the efficiency of the processing industry and services, achieve customer satisfaction and ultimately make a profit, many companies and dental offices in the world have focused on the implementation of modern IT solutions in everyday practice. From dedicated ceramic blocks, a dentist can quickly provide a service (precise bridging and crown compensation) using CAD / CAM technology (computer assisted-designed / computer-assisted production). The advantages of this technology are presented in this paper. There are many systems like PoverMill, PoverShape, DeskProto 3D CAM, DeskProto V 7.0 in the industry as well as Cercon, Celai, Cerec, Lava, Everest, which represent the imperative of modern dentistry.

Key words: *design, new products, 3D scanning, prosthetics, ceramic blocks, bridges and crowns*

¹ Autor: Milan Šušić, PhD Student, e-mail: i.susic51@gmail.com

INTRODUCTION

CAD / CAM applications are used to design products and programs for production processes, specifically CNC processing. CAM software uses models and circuits created in the CAD software for generating toolbars that provide machine tools to convert design into physical parts. CAD / CAM software is used for the design and production of prototypes, finished parts and production programs.

CAMWorks with machine intelligence is the most advanced CAM programming software available for faster, more efficient and faster product search. CAMVorks is the latest generation of best-in-class CNC software solutions that allow its users to program smarter and faster machines. CAMVorks offers true machine processing that automatically adjusts changes in the part of the model, which eliminates the redirection of CAM time for updating the design.

Since it is integrated into the design environment, CAMVorks allows the user to: Keep association between design patterns and tools to ensure that the latest design changes are reflected in the toolbar; Removing past file transfers using standard file formats such as IGES and STEP; Use only one file for storing CAD and CAM data that drastically reduces file management; Work with the same familiar user interface that provides a short curve of learning; Use word and commands for CAMVorks machining by pressing the button and generating toolbars without leaving the design environment; CAMVorks provides users can work with multiple platforms including their own integrated CAD / CAM platform. CAMVorks Milling software for programming G-code CNC mill machine is available in various configurations, so today you can buy exactly what we need now and add to your CAM system how business grows.

Today in service activities, contemporary practice implies increased use of information and communication technologies. There are numerous advantages to facilitate work in service activities, but also in the use of dental services that become increasingly demanding in terms of aesthetics, with a clear desire for a minimum stay and residency in the dental office. Namely, when it is necessary to replace the removed pathologically modified tissue and produce fixed prosthetic inlays, inlays, crowns and veneers are indicated, or when the need for missing teeth is required, and therefore the bridges are truncated, it comes in principle to the application of CAD / CAM technology.

In the early nineties, more than 70% of private dental practices in the United States used computers (Casanova, AV Marshall, V.1986), it is undoubtedly the advantage of such an organization's work to increase the speed of work, communicate with patients, and reduce the storage space (Gilboe, D. B. Scott, D. A.1991). An important role is also to reduce the possibility of entering wrong, illogical or incomplete data (Chasteen, J. A.1992). This computer application today is the most common form of use in our profession. The use of computers in therapy is a challenge for enthusiasts and visionaries who have developed a whole new field: computerized dentistry CAD / CAM systems are the pinnacle of computer technology with a lot of realized and potential applications in dentistry. CAD / CAM systems in dentistry consist essentially of three components (Rekov, D.1987): The first component is a device that reflects the preparation of teeth and other supporting tissues and is responsible for the digitization of spatial data (CAI - Computer Aided Inspection); The second component consists of a computer that plans and calculates the form of a body of reconstruction, which is equivalent to the CAD area; The third

component is a numerically controlled rodent machine that produces a tooth restoration from the basic shape, the corresponding CAM area. As a rule, additional treatment is recommended, such as polishing or individual preference of a dental technician or doctor (Todorović, A.2005).

1. THE DEVELOPMENT CAD / CAM SYSTEM

With the development of software packages (CAD, CAM and others) and computer-controlled machines (CNCs) and entire plants in the process industry, as well as efforts to meet the individualized needs of consumers, some of the crucial points of delineation of preparation and production sharpness.

Process planning translates information on product design (geometric input) into process stages and instructions on efficient production. Similar to other product development and design features, process planning has been developed with the help of computers in computer aided process planning (CAPP). CAPP supported by a number of tools supported by a computer can be more efficient in using resources for production by simplifying and improving process planning. CAPP is based on Group Technology (GT) coding and classification to identify a number of features or parameters of product or product elements. These attributes allow the system to select the basic process plan for the family of parts and perform a large part of the planning. The rest of the work ends with the planner by fine-tuning the plan.

The next stage in development is generating CAPP. Generic process planning determines decision-making rules based on group divide technology, and also uses coding technology. The resulting process plan requires minimal manual interaction and modification (for example, dimension input). A pure generating system that can produce the entire process plan based on the classification of pieces and other design data is a goal for the future. This type of pure generating system will involve the use of artificial intelligence to create process plans and will be fully integrated into the CIM environment.

A further step at this stage is dynamic, generating CAPP, which will take into account the capacity of machines and plants, the ability to create tools, work centers and equipment layout, as well as the status of equipment (eg, maintenance jam) in the development of process plans. Dynamically, generating CAPP will require tight integration with production resource planning systems, will monitor the current situation by acquiring data from the plant's operation. CAPP will directly provide data to process controllers or, in less automated environment, provide charts about the state and schedule of equipment and material flows related to the process of the process under consideration.

Computer Aided Drafting (in some Designs Source) (CAD) or Computer Drawing has revolutionized the design process. Compared to traditional work techniques, manufacturers can work more efficiently using the CAD system because they can achieve better design faster and with lower cost. The designer can easily use the CAD system to generate multiple, complex, objects, and positioning them according to the requirements. Furthermore, the CAD system has the ability cancel entities, allows the user to choose a wide variety of frequently used parts from the formed interactive database. This improves the quality and reliability of the subject of work as well as the speed of their manufacture.

Many CAD systems are capable of providing geometric data when forming solid models and prototypes, thus integrating with RP techniques. It is commercially viable to integrate CAD with CAM (Computer Aided Manufacture) where possible. CAM software uses geometric data from the CAD program to generate instructions for controlling and managing automatic machines and tools (CNC lathes, drills, etc.).

The development of CAM software has enabled CAD / CAM to adapt to the improvement of the industry. A historically viewed, drilled paper tape (matrix) was used to program the Numerically Controlled (NC) machines, while later models used machine codes (for example, ASCII) that typed in the text editor (***. Txt). In both cases, the program controlled the speed of movement of cutting tools, depth of cutting, etc. Modern CAD / CAM systems automatically generate the movement of tools based on 3D CAD data and allow for the previous simulation of the machining process on the computer screen. CAD / CAM extension is a complete integration of all aspects of production and services using data generated by a computer. This is a process known as Computer Integrated Manufacture (CIM). The industry that accepts the philosophy of flexible production uses the most developed CIM systems in order to incorporate all production information into a locally available database. Quality control and quality assurance can be incorporated into CIM systems.

Digital production is a term that represents a wide network of digital models and methods that describe each aspect of the product life cycle. It represents the integration of various product design tools (CAD), process planning (CAPP), time management and business applications, plant design, ergonomics, robot simulation, analysis software, process simulation, CAM software and other applications used for planning and optimizing processes and facilities of a real enterprise.

In order to provide NC instructions to CAM equipment, basic decisions must be made concerning the use of equipment, tools and sequences of operations. This is a CAPP function. Without some elements of CAPP, CAD / CAM integration would not be possible.

The benefits of CAPP are: Reducing effort on process planning; Direct savings on the labor force; Material saving; Reduction of scratch; Tool saving; Reduction of work in the process.

In the market economy, product development will be the answer to the projected market needs, and this should usually be identified in the form of a short design, which will be the basis for further product development.

This is a very wide description of the engineering process and the detail at each stage is categorically different in terms of the number of people involved and by the nature and complexity of the product. Consideration should be given to the fact that the projecting process, for example aircraft engines or computer systems, is a very complex process involving large teams and is narrowly limited by technical factors. In some areas, the product can be the result of the work of one designer (designer) or a small team, or may be conditioned by someone factors that have a dominant role.

The architecture of the CAD system is shown in Figure 1 and it describes the design as a series of phases, in this case the progress from the requirements through the conceptual design and the design project to detail design. In this case, however, the different phases of the design process are generalized into a common pattern in which design models are developed through the process of analysis and evaluation, leading them to processing and finishing the model. In the early stages of design, a temporary solution is

suggested by the designer (designer). This is an estimate relative to a certain number of viewpoints in order to achieve a suitable design in relation to what is being sought. If the proposal is unusable, then the proposal is modified. The process is repeated until the project is good, where it can develop more in depth and the phase of the preliminary design can begin.

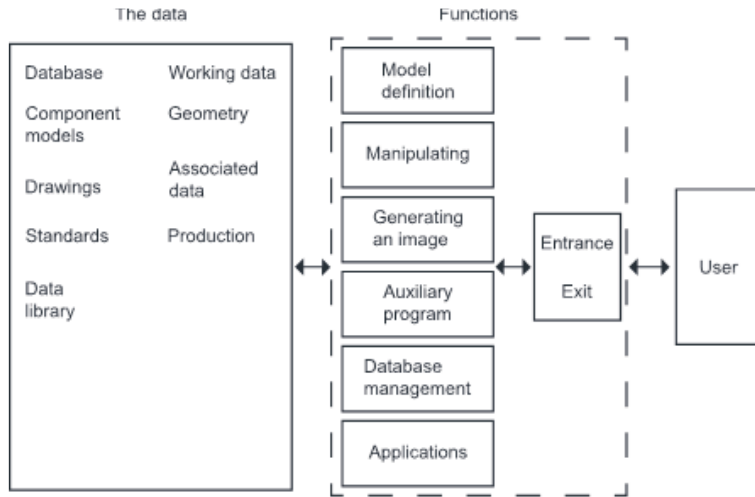


Figure 1: CAD architecture

At this stage, the project is purified, so that assessment and modification can be performed at a higher level of detail. Finally, the detail design phase contributes in a similar way to defining the design for production.

So far, CAD systems have been described in very general terms. More specifically, they may contain the following elements: hardware: a computer connected to a peripheral equipment; software: computer program (s) who works on hardware; data: the data structure created and manipulated by the software, human knowledge and activities.

2. ADVANCED METHODS AND DEVICES FOR CREATION OF GEOMETRY AND QUICK PRODUCTION OF PROTOTYPES

As classic scanning of photos or texts represents input sizes in various computer applications, and printing and drawing of the output form of computer applications, and while it is happening in a two-dimensional space, the development of new advanced peripheral edge technologies has shifted the boundaries toward a three-dimensional space. Indeed, industrial design has great benefits from these new methods that allow for a new dimension in the work of industrial designers. As CAD represented a major step forward compared to classical drawing based on orthogonal projection and paper, three-dimensional (3D) scanning and rapid prototyping make it an entirely new dimension in the presentation of the designer's ideas and concepts.

3D scanning

Under 3D scanning, we mean the collection of spatial data about the geometry of the observed object through devices that are broadly referred to as 3D scanners and which represent the relationship between the real object and the CAD model. 3D scanning has its wide application in industry, control of geometry of manufactured parts, quality assurance, engineering design, anthropometry, construction, urban planning, geodesy, film industry and computer animation, protection of monuments and cultural heritage, archeology, medicine, etc. 3D scanners are divided into two basic categories: contactless and non-contact scanners. The non-contact scanners include a range of technologies, such as Time of flight - scanner, triangular scanner, white light scanner, CT scan, magnetic resonance imaging (MRI), photogrammetry, and a number of others. The basic purpose of the 3D scanner is to create point clouds that represent the spatial coordinates of the points of the observed surface (Figure 2)

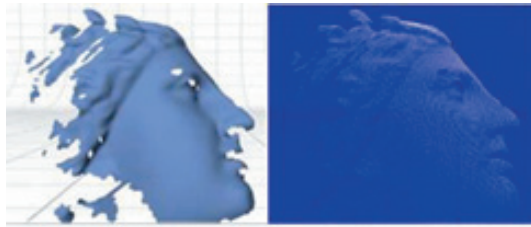


Figure 2: Sculpted Artemide sculpture and a cloud of dots

Contact scanners

Contact scanners (CMM - coordinate measuring machine) are one of the first 3D scanning technologies. (Figure 3). They operate on the pipal principle, which, by touching the object, reads the coordinates of the touch point, and consists of a moving stand, whose coordinates are read at the micrometer level, both the pipeline itself and the control software which, with the control, has the ability to drag the basic geometric shapes through the observed points. The disadvantages of these scanners are the slow data collection and touch that can or damage the object (eg fragile archeological findings), or deform or shrink smaller parts.



Figure 3: CMM scanner and contact pipalo

Time of flight laser scanners

„Time of flight” laser scanners (Figure 4) is based on the reading of the time difference between the sent laser pulse and the reflection of the reflected beam received by the detector. Based on the size of the time interval Δt and the known velocity of the laser beam (light velocity c), the distance as $s = (c \times \Delta t) / 2$ is calculated. The moving mirror at high speed transmits the emitted air over the surface of the object and thus creates a cloud of dots. These scanners are suitable for very long distances, but they do not have much precision (the resolution is several millimeters). Typical application of these scanners is in the construction, ie conservation and restoration works, and the preservation of cultural heritage.



Slika 4.: Time of flight laser scanners

Triangular scanners

Triangular Laser Scanners (Figure 5) consist of the source of the laser beam, and the lens and screen on which reflected air is projected. The lens is positioned so that it is located at a constant distance from the laser beam and at a constant angle with respect to the air. As the object is moved, the reflected beam moves on the screen. From these known sizes (the angle of the lens and the air, the distance of the lens from the air) and the position of the reflected beam on the screen, the unknown distance of the object is determined. More often it is not only about an air but about the laser beam, which reads the position of the entire line of points, and by crossing the beam across the object, the entire surface. How to do this in a way, it collects the geometry of the visible side of the object, often for smaller objects, a swivel base is used to rotate the object around its axis, resulting in a series of scanned surfaces, and from a known angle of rotation, it is easy to connect surfaces to a closed body. For larger objects that can not be placed on a rotating stand, scanning from different sides of the object is performed, and later by means of common markers (at least three for each adjacent scan), the adjacent scans are merged. The triangulation method is fast, and the scanning accuracy is high. Thus, e. g. NextEngine 3D Desktop Scanner (Figure 6) (www.nextengine.com) costs \$ 3, 000, has a resolution of 0, 125 mm.

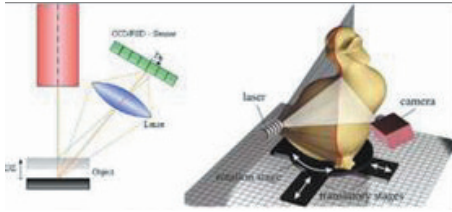


Figure 5: Laser Air Triangulation Principle and laser beam

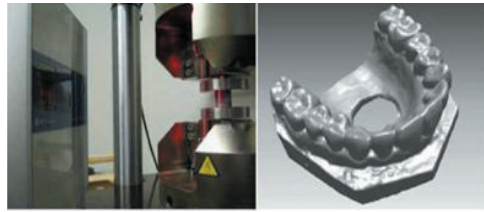


Figure 6: NextEngien Laser Triangulation Scanner and scanned geometry

Scanner with structured light

Structured light scanners, also called White Light Scanners (white light scanners), are based on the principle of projection of the white light line and the reading of the projections obtained, most often by digital (CCD) cameras (Figure 7). Usually, the systems are based on two CCD cameras, which, at the same angle, with regard to the projector among them, the software recognizes the edge between the light and the darkness of the projected line, and based on the known viewing angle, the distance is determined. This group includes scanners based on the transition of the ray of light over the object, and from the dynamic change of the projected contour, the surface is reconstructed. There are many more common scanners based on a sample of a series of parallel lines of light and darkness. The advantage of this method is that the patterns can be projected very quickly with lines, and the geometry of the objects can be read out much faster than the triangulation laser scanners. It is a shame that their use is limited in daylight, and the rooms where the scanning is done should be dimmed, or scanning outdoors at twilight or at night. As the projector is stronger and, therefore, more expensive, this problem is less pronounced. Also, due to the characteristics of the optics, it is often necessary to calibrate the CCD camera before performing the measurement. Their resolution ranges up to the order of one micron. The robustness of scanning with this method is somewhat higher than in triangulation laser scanners, and the overlapping of the surface with white powder of titanium dioxide completely eliminates the problem of reflection around the edges, present in triangulation scanners. The price of these scanners is slightly higher than the triangulation laser, so the price of GOM's ATOS scanner (Figure 8) is around 70, 000 EUR or more (depends on the power of the projector and the type of lens).

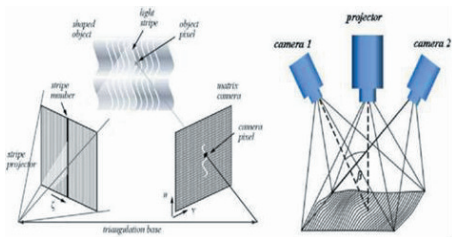


Figure 7: Structured Projection Principle the line of the contour reading of the surface



Figure 8: ATOM GOM scanner and scanned Francis turbine rotor

Computer tomography, microtomography and magnetic resonance

These are the methods that are mainly used in medicine and the study of the structure of the material. These methods provide successive cross-sections of objects of different composition, and later, 3D processing creates 3D geometry. The computer tomography (CT) of the three-dimensional image creates from a series of two-dimensional cross-sections of X-ray radiation (Fig.9). Microtomography is a tomography that allows the scanning of fine structures on a microniva, and in particular it has application in material science. Magnetic resonance (MRI) (Fig.10), unlike CT used by strong ionizing radiation, works on the principle of magnetic field and allows for greater contrast and better resolution in the recording of soft tissues. Unlike MRI, computer tomography has a greater use in determining the structure of various materials such as concrete, stone, metal foam, etc.

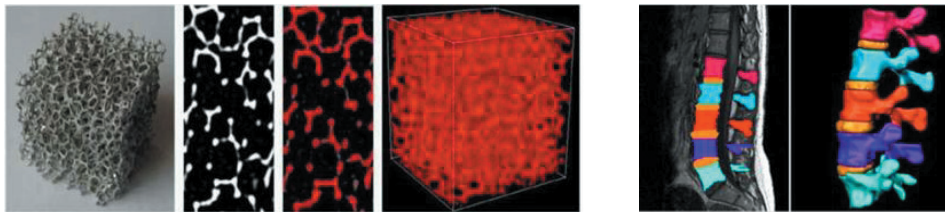


Figure 9: Metallic foam, a cross-section obtained by CT and reconstructed geometry from a series of CT cross sections

Figure 10: The spine geometry obtained by reconstruction of MRI recording

Convert point clouds to CAD geometry

By scanning and processing the scanned surface, the job is not finished, and just after the scan, there is a complicated work of converting scanned in CAD geometry. The format itself, STL format, represents a large number of data (coordinates of the cloud points) that need to be reduced in order to use the scanned geometry in other applications. Models formed from straight polygons (usually triangular) surfaces are formed, and surface models defined by NURBS of spatial surfaces, which are further transformed into a CAD body record. Models composed of a network of triangular surfaces, where some triangles are defined between the cloud points, still contain too much data to manipulate. Often, the scanner software makes it possible to define a network of triangular surfaces (Fig 11.). Such a network is still too complex and cumbersome to be used in various CADs applications, and it is necessary to simplify its mathematical functions and primitive geometries.



Figure 11: Scanned surface defined through a network of triangular surfaces

Most of the more serious CAD applications, such as CATIA, SolidWorks, Rincocerus, etc., allow you to load cloud points in the STL format and define primitive plots such as levels, spheres, couplings, cylinders, and complex mathematical surfaces such as NURBS. NURBS, whose name comes from the Non-uniform rational basis spline, finds its origins in the shipbuilding industry with applications for defining the ship's lines, and later these mathematical formulations of three-dimensional plots are used extensively in computer graphics for creating curves and plates that allow for great flexibility in defining analytical and free forms. In recent years there has been considerable development of software in the field of computer animation, where NURBS surfaces (Figure 12) are used to describe animated characters, and the characters themselves are created on the basis of a modeling model, which is scanned by 3D scanners such as the NextEngine scanner.

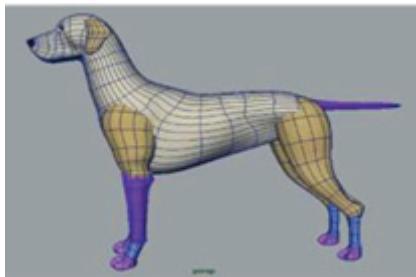


Figure 12: A model of a kernel composed of NURBS surfaces

Rapid Prototyping

Brza izrada prototipa (Rapid Prototyping) je automatizovana izrada tijela temeljena na formiranju slobodnih oblika. S ovim metodama se započelo oko 1989. godine, kada su se na temelju računski zadanih oblika mašina izrađivali modeli i dijelovi prototipa. Danas je brza izrada prototipa uznapredovala do nivoa da se čak koristi u proizvodnji maloserijskih dijelova proizvoda. Iako je cijena jednog izrađenog predmeta znatno veća nego cijena istog tog oblika proizvedenog na klasičan način, npr. brizganjem, uštede pri razvoju su znatne. Cijena uređaja za brzu izradu prototipa (zavisno o tehnologiji) iznosi od 40 000 EUR, do 120 000 EUR (za uređaje koji mogu izraditi objekte manjih dimenzi-

ja). Ako se ovo uporedi s gubicima jednog lošeg kalupa za brizganje plastičnih materijala, gdje uzrok greški leži u krivoj interpretaciji crteža od strane alatničara ili čak greški u CAD modelu, tada je dovoljno približno tri do četiri škart kalupa da bi gubici bili jednaki cijeni 3D štampača. Greške u izradi kalupa su vrlo česte u industriji polimernih proizvoda. Princip brze izrade prototipa je građenje dvodimenzionalnih presjeka tijela (xy ravni) u smjeru ose okomite na ravan presjeka (z ravan). Prvi uređaji za brzu izradu prototipa temeljili su se na izrezivanju kartona prema konturi presjeka u xy ravni i slaganje tih izrezanih poprečnih presjeka u smjeru z ravni. Pri tom je korak presjeka koji se izrezuje odgovarao debljini kartona iz kojeg se presjek izrezuje. Većina uređaja za brzu izradu prototipa upravo funkcioniše na ovim temeljima, gradi se sloj po sloj poprečnih presjeka u smjeru z ravni. Na slici 13. je prikazan princip stvaranja oblika koji odgovara polovini cilindra. Ako bi ipak željeli izraditi puni cilindar, tada bi trebalo u donjoj polovini cilindra, ispod cilindra postavljati materijal koji će cilindar držati u svom položaju kako se ne bi prevrnuo. Ovaj dodatni materijal se zove „materijal nosač“ (carrier material) i neophodan je pri izradi prototipa. Materijal nosač može biti ili materijal drugačijeg sastava od osnovnog materijala, koji se naknadno odstrani, ili čak ako se izrada prototipa temelji na prašini koja se međusobno povezuje (solidificira), nepovezane čestice prašine stvaraju podršku ovim ukrućenim (solidificiranim) česticama

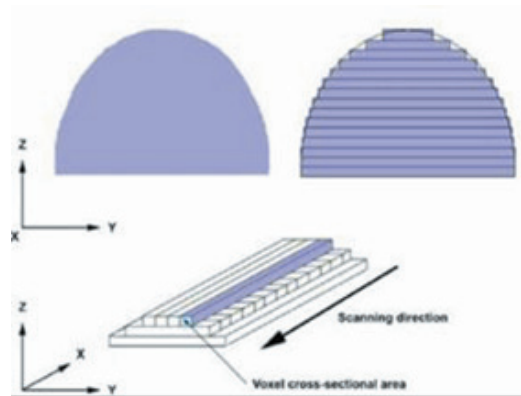


Figure 13: The principle of the construction of a prototype of a half cylinder

The prototype is defined in the computer in such a way that first virtual CAD programs create the virtual body geometry, which is then sent to the peripheral unit where the layer over the layer builds a prototype.

There is a standard format for communicating between CAD packages and software that manages the prototype STL (Stereolithography) format. Rapid prototyping technologies include:

- Laser sintering,
- modeling of liquid discharge,
- stereolithography,
- production of laminated models,
- melting with electronic air,
- 3D printing

3. CAD / CAM TECHNOLOGY IN THE SERVICE ACTIVITIES - IN DENTISTRY

In 1985, using triangular cameras, a multidimensional measurement was performed, enabling the transmission of measurement information to the computer screen. With the help of computer, imaging and CNC milling software, the first restoration of silicate injections at the University of Zurich is obtained. Then there is almost unimaginable technology and practically creating a new concept in dentistry. In Germany, CAD / CAM technology was introduced in dental practice in 1988 (Ritter, AV 2002). Modern software provides such a possibility that the minimum thickness of restoration is less than recommended, warns the dentist of an existing problem. Also, on the virtual model are marked and clearly recognizable critical areas that can be corrected by the offered tools. (www. sirona. com).

The development of technology went from copying the machine to a fully computer-controlled system, with a large tooth-shaped base, which enabled the automatic production of crowns and bridges. Today, there are several of these systems (Cerec, Cerecon Celaia, Lava, Everest) and it is believed that in the future they will have much greater use in the production of fixed restoration. Figure 14 shows a fixed restoration produced by a computer of a controlled system.

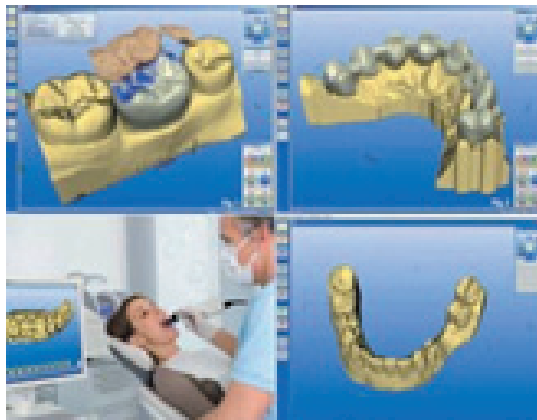


Figure 14: Production of fixed restoration using a computer system

Thanks to CAD / CAM technology and numerous studies, this has resulted in a formula for extremely fast restorative, which possesses not only outstanding aesthetic characteristics, but also extremely biocompatible. It's non-metallic ceramics. Depending on the defect in the teeth, these materials can be used for making crowns and bridges, dental veneers, but also for special supplements (Figure 15).

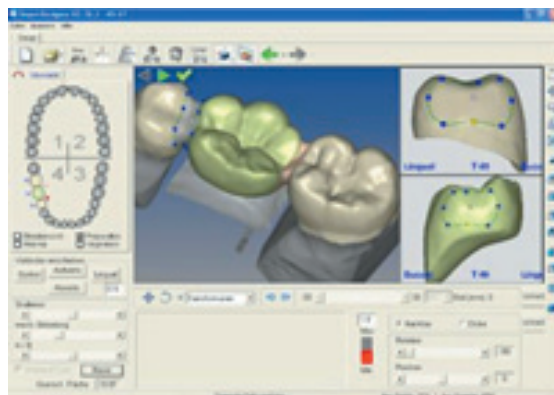


Figure 15: Innovative CAD / CAM technology

All these restorations are produced in dental technology laboratories, equipped with CAD / CAM technology (computer), which guarantees exceptional precision and aesthetics. By forming a 3D image of the teeth and gums on the screen, it allows the dentist to form a precise matching anatomical design of the missing dental substance by the cursor. The obtained 3D models provide the ideal basis for restoration. When designing, the relationship with adjacent teeth, teeth in the opposite jaw, establishing appropriate contacts, as well as the relationship between restoration and soft tissue and gums is taken into account in a very simple way.

CAD / CAM machines through the further milling of finished ceramic blocks produces tooth restoration which is exactly the replica of 3D drawings, i. e. Restoration design performed by the dentist via CAD / CAM software. Factory-made ceramic blocks that are processed by the milling process are made in many different shades, so the color responds to the needs of patients as well as the parameters that determine the high level of aesthetics.

4. THE PROCESS OF PRODUCING CERAMIC RESTORATIONS BY CAD/CAM TECHNOLOGY

The process of producing ceramic restorations by CAD/CAM technology is more precise than the conventional process of producing metal-ceramic crowns and bridges. Figure 16. provides an overview of the CAD/CAM system in the process of producing crown bridges.

By applying modern machines type MC XL for grinding of finished ceramic and zirconia blocks, fixed prosthetic restoration can be today made for only 2-3 hours in the office. The advantages of this machine are multiple. Precision of milling is moving in the range of +/- 25 microns, while the time required for grinding circular bridge does not exceed 6 minutes. Thanks to a grinding resolution of 7.5 microns, prosthetic restoration surfaces that are produced this way are certainly adhere better, compared to conventionally made works (www.kalmar.hr/usluge/cadcam).

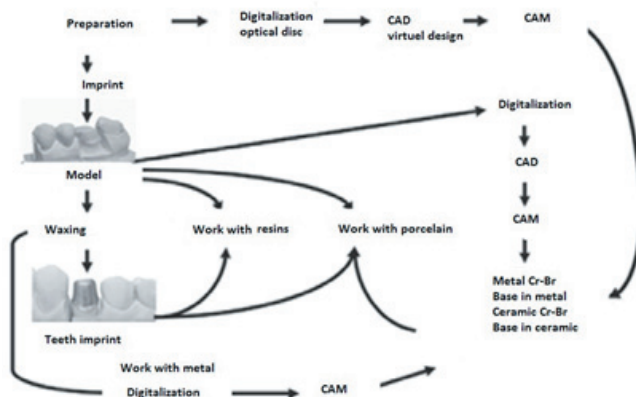


Figure 16.: Display of dental CAD/CAM system in the process of producing crown-bridges (M. Takashi, H. Yasuhiro, K. Jun, K. Soichi, T. Yukimichi, 2009).

Prosthetic restoration are made in several phases, which take place erwhich are allocated by the following order (Joda, T. Buser, D.2016) : a). *Overview and history* Based on the indications and the status of the tooth, the dentist diagnoses and recommends several options, explaining the pros and cons, depending on the indication. b). *Preparation of teeth for placing prosthetic restorations*. Process begins by grinding of teeth and its suppression, which is carried out by dentist depending on the type of the ceramics to be used for the certain clinical case, ie. to create prosthetic restoration. c). *Taking the tooth imprint*. The dentist performs the tooth imprint (one or more, depending on which prosthetic restorations works), on which it will carry out further construction and casting of prosthetic restoration. d). *Casting of the model*. Based on the tooth imprint plaster model is casted, on which is carried out further work, on the basis of tooth imprint. e) *3D scan of the model*. 3D oral camera captures teeth, after which the image is transferred to a computer and processed using the software. These cameras allow a high degree of accuracy and efficiency, and is particularly suitable for the restoration of individual crown. f) *Modeling*. CAD/CAM software modeling the teeth based on the entered requirements. g) *3D teeth printing*. Before you start teeth printing, you need to install ceramic blocks in the milling. The ceramic block is fixed on the wheel that allows block to be inserted. Bridge is produced by milling process on the basis of the 3D model from the block set in the CAD/CAM device. Milling machine develops the desired shape in accordance with the instructions of a computer. The ceramic block is processed by turning on its axis, a diamond disk rotates, moves up and down around the ceramic block and processes it. The movement of the diamond disk is enabled via electric rail. h) *Cementation*. Prosthetic restorations are cemented with special aesthetic cement for metal-free ceramics. There are two types of cementing - temporarily and definitively. Temporary cementing of restoration is done in the period of adaptation of prosthetic restoration to the jaw, while definitive cementing is done after ensuring that the prosthetic restorations is accepted.

The advantages of metal-free ceramic compared to metal-ceramic works: Complete biocompatibility of materials; The absence of allergy to this material (a large number of patients with metal-bridges suffer from allergic reactions because of the large

amount of nickel in the metal alloy); Absence of bimetallism at metal-free works (creating low-voltage levels between the two metals, eg. between metal-ceramic crowns); Firmness of works is 4 times higher than the metal used for metal-ceramic works; Persistence and not changing its physical and chemical properties even after long years spent in the mouth; The aesthetic superiority compared to metal-ceramic works; Beneficial effects on the gums, ie. „gingiva“ with which it comes into contact; The absence of dark discoloration of the „gingiva“ at the junction of crown and gums.

The disadvantages of metal-free ceramic compared to metal-ceramic works: *Price.* Due to the expensive and long-term development of this technology, expensive CAD/CAM machines and expensive process for manufacturing, metal free crowns are more expensive than metal-ceramic works. However, taking into account the relationship between price and quality, it can be said that the ratio is on the side of metal-free ceramics.

5. OPTICAL METHODS OF SPATIAL DIGITALISATION

Optical methods of spatial digitalisation, like mechanical, based on the criteria of space where the scan is performed, are divided as: a) intraoral and, b) extraoral methods.

In relation to the size of the scanning area, they are classified on the dotted and striped (surfaced). Intraoral scanning means work in a dental office, while the extraoral methods, mainly related to laboratory work. Both methods have been developed side by side, but today in the practical application is present only a single intraoral (two are in announcement) and the great number of extraoral systems. The requirements set for them are different. For ergonomic reasons, intraoral scanner should not be fixed to the remaining teeth. This affects the request of its shape, size, weight and ability to maintain hygiene, but above all the speed of scanning. Empirically it is proven that trained user can keep the scanner head immovable and still versus the scanned tooth, mostly for 0.5 seconds. The data on the speed of data measurements acquisition, in addition to the resolution, is one of the most important in the choice of the system and its broad applicability. Size of the scanning field is minimally 14x14mm, and optimally 25x14mm. The range of scanning depth should be at least 10 mm, but should not be greater than 14 mm. Scanner resolution should be at least $\pm 25\mu\text{m}$ (Pfeiffer J Dental 1998). The most famous representative of intraoral optical method is Cerec system (Sirona Dental Systems GmbH, www.Sirona.de) shown in the picture 17. (Schneider, W.2000).

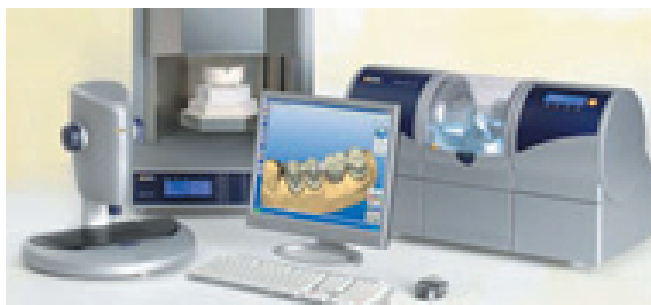


Figure 17.: Sirona, 3M Dental CAD/CAM System

This technique is using more light rays, in the form of lines, projected on the preparation (line hatched area). The rays in rapid oscillations move across the object, so that in a short period of time is obtained three-dimensional shape of preparation. Similarly to conventional photography, the camera at the time of recording should be kept as still as possible. Fixing the camera opposite to the object at this system is not necessary because the time required for data processing from all the 340, 000 pixels is less than 0.5 sec (Fig.18). During the year 2005 are shown two more intraoral scanners Evolution 4D and HintEls.

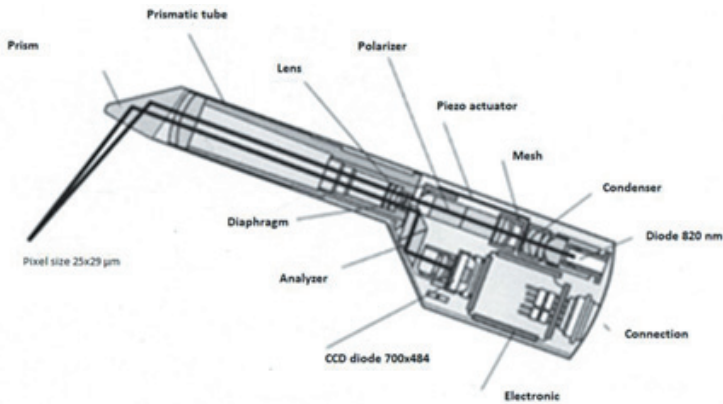


Figure 18.: Scheme of Cerec 2 scanner head section

Extraoral systems scan is carried out on the model, and for this reason there is a need for dental technical laboratory. In these systems it is not critical high speed data collection, because the head of the scanner and the object that is scanned are immovable, but the width of the scanning and precision measurements.

A different solution, to achieve the third dimension by using the CCD chips, gives the laser triangulation procedure, after Lelandais and Clainchard-in (1984). If you focus laser dot air with oscillating mirror for CCD camera there will be a clear limited laser line. The great advantage of this system is the possibility of scanning undermined surfaces. This mode is for now only possible as extraoral methods.

Representative of extraoral dot scanner is Cerec Scan (Fig.19) and Cerec inLab (Fig 20). The scanner is fixed to one of the motors of the milling machine and object of scanning is movable. Scanner resolution is similar to the intraoral scanner, but the scan time of one tooth is much longer. For the „four-member” bridge it takes 2-3 minutes. This year, the factory has developed a new high-resolution scanner, in which this time is reduced to about 40 seconds (Cerec INEOS) (Monkmeyer, U. R. et al.2005).

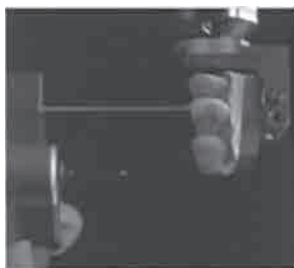


Figure 19.: Cerec Scan – integrated laser scanner; dot scanner in the left engine



20.: Cerec inLab system – from left to right: in Eos ekstraoral Cerec in Lab with inbuilt dot scanner, PC computer with 3D softver

6. RESEARCH ON PATIENTS SATISFACTION IN USE OF CAD/CAM TECHNOLOGY IN BOSNIA AND HERZEGOVINA

Generally speaking, given that they are essential for the provision of dental services, patients are essential, because if there are no patients for the service, there is no need, and it is crucial to continuously conduct research and analysis of feedback from patients. When analyzing the opinions, feelings and experiences of patients, it is necessary to take into account all factors that in any way touch the patient. These are above all: the speed of service delivery, the pain that is (not) felt when providing services, the aesthetic effects and the price of services as one of the most important elements, given the economic crisis and turbulent market trends in our country and in the regional one.

Accordingly, it is formulated ten questions, formed into the questionnaire for assessing the level of satisfaction of patients after making dental implants using CAD/CAM technology. After treating the patient, while still in the dentist's chair, ask the patient to set aside a few minutes to fill out the questionnaire, expressing their opinions and feelings about the experience with dental restorations.

In order to examine the level of patient satisfaction, 200 patients were screened and 10 questions were asked per patient, with the possibility of giving five responses to the question in the last 6 months (Table 1).

Also, in addition to the above questions, to which the patient responds, indicating the level of agreement with the above findings, the patient has the ability to verbally and in writing to state its suggestions that would contribute to the further improvement and advancement of providing these services.

Table 1: Structure of questions for patients with five suggested answers on the issue (Author 2018)

Questions	Disagree	Partially agree	Agree	Mostly agree	Strongly agree	Total:
1. The process of preparations for the prosthetic restoration is pleasant and does not last long.	0	20	26	56	98	200
2. It is not necessary repeatedly to come to the dentist, in order to complete the preparation process.	0	0	76	84	40	200
3. Producing restorations takes surprisingly short.	0	0	10	45	145	200
4. During producing restoration, it is involved surprisingly professional staff	25	30	25	36	84	200
5. Installing restoration is completely painless.	0	25	65	48	62	200
6. Restorations do not differ entiate from natural teeth, look completely natural.	0	0	25	40	135	200
7. Once the restoration is set up, it is needed a certain period of adaptation.	0	8	60	45	87	200
8. Dental restorations give completely natural feelings, no need for restrictions of certain foods.	0	0	0	0	200	200
9. Recommend the proces tom its frineds.	0	5	95	50	50	200
10. Price is afrodable.	0	0	22	25	153	200
Total:	25	88	404	429	1054	2000
Participations in %.	1, 25	4, 40	20, 20	21, 45	52, 70	100

The results showed that patients exceptionally satisfied with making dentures by CAD/CAM technology. Since the questions are formulated mainly that the first column (I disagree) reflects the lowest level of satisfaction of the patient (1, 25%), while the last two columns (I Mostly agree and I agree) reflect the highest level of patient satisfaction (74, 15%).

Results the research and the answers in dependence to patient satisfaction are shown in the following figure 21. (chart):

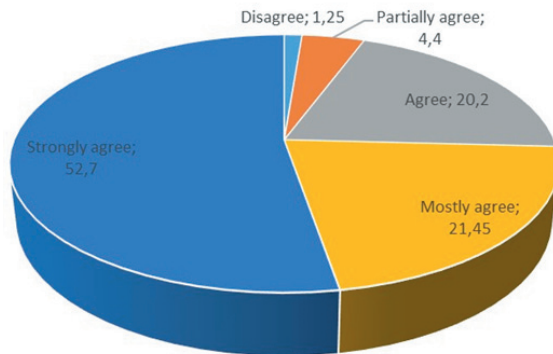


Figure 21.: Structure of the responses to the questionnaire on patient satisfaction (Author 2018.)

From Figure 21. can be noted that the most significant participation in the structure of responses take final answers to the set of 10 questions: most agree and strongly agree, that is the highest level of patient satisfaction in the amount of 74.15%. A minimum participation to the set of 10 questions take answers: do not agree, that is the lowest level of patient satisfaction of 1, 25%. The introduction of new technologies in Bosnia and Herzegovina leads to the improvement of services in the field of dental medicine, as confirmed by patient satisfaction (94, 35%). Accessibility prices to patients is very satisfactory (89%). On the issue of „Product restorations takes surprisingly short”, patient satisfaction is 95%. Asked whether dental restorations giving a natural feeling?, patient satisfaction is 100%.

Responding individually to each question asked from the questionnaire for the given structure, the answers are as follows: (Figure 22):

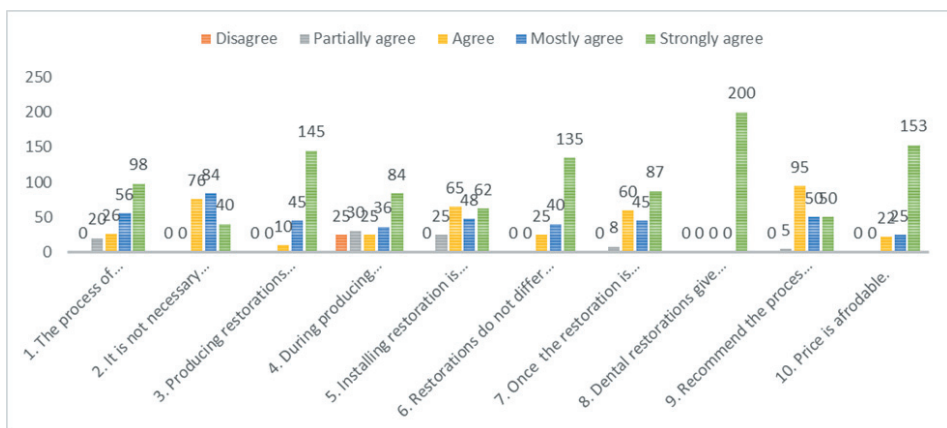


Figure 22.: The structure of the questionnaire responses on the issues of patient satisfaction (Author 2018)

CONCLUSIONS

Computer-supported production is what CAM represents and is used for programming CNC machines. CAM software has the ability to simplify the machining process, enabling users to set the Job Tree job - so they can organize their workflow, set Toolpaths, and run simulations of their parts that are interrupted for diagnostics. CAM will also create a g-code for its CNC machine that will be monitored during operations. In general, CAM begins with a Roughing cycle to remove material from the material. As the cycle approaches finishing, semi-finishing and finishing, Toolpaths refines the part into something that is ready for handling or distribution.

Computing production (CAM) is the use of software for controlling machine tools and related products. CAM can also refer to the use of computers to assist in all operations of the production plant, including planning, management, transport and storage. Its main purpose is to create a faster production process and components and tools with more precise dimensions and consistency of materials, which in some cases only uses the required amount of raw materials (thereby minimizing waste), while reducing energy consumption.

CAM is a subsequent computerized process with a computer design (CAD) and sometimes with the help of computer engineering (CAE), because the CAD model generated in CAE can be entered into the CAM software, which then manages the machine tool. CAM is used in many schools with the help of computer design (CAD) to create objects.

CAD / CAM technology in service activities - aesthetic fixed restoration is used in the development of inlays, onlays, crowns and bridges. The use of this technology provides high quality, professionalism, profit, as well as the constant growth of „new” and satisfied patients.

The application of new technologies (software technology) has a significant impact on industrial development, the development of service activities, the quality of products and services, the employment of new educated workers, higher consumption and quality of life in general.

Any progress in the field of information and communication technologies is simultaneously applied in all areas of activity including industry, medicine, dentistry, and other activities. This paper presents additional evidence of the necessity of applying new (information) technologies in industrial production and service activities. In the future, the expansion of information and communication technologies will contribute to an even greater influence in the industry in designing and designing new products, prototyping, creating new products, and in service activities on timely diagnosis, timely and adequate treatment, monitoring therapeutic effects, and achieving a high level of aesthetics in the field of medicine-dentistry.

„The ideal CAD / CAM system” has been the dream of many researchers for many years. Since CAD / CAM precision is in the function of all individual errors in procedures and equipment, and this scanning is the initial source of possible inaccuracies, the higher resolution scanner will most likely contribute to the quality of the entire system.

The research has shown that the new technologies in the field of medicine-dental services in Bosnia and Herzegovina have led to improvement of services, which confirms the satisfaction of patients (94, 35%). Accessibility rates for patients are very satisfactory

(89%). When asked if the restoration was short, the satisfaction of patients was 95%. When asked if dental restorations give a natural feeling? The patient's satisfaction is 100%. The use of CAD / CAM technology significantly reduces the time it takes to create prosthetic work, and CAD / CAM systems are easier to use. The above research leads to the conclusion that the possibility of employment in this branch of service activities for young educated personnel is constantly increasing.

REFERENCES

- Casanova, A, Marshall, W. (1986). Computer applications in large group practices. *DentClinic of North America*. 30, 673-81.
- Chasteen, J. A. (1992). Computer database approach for dental practice. *J Am Dent Assoc*, 123: 26 -33.
- Gilboe, D.B., Scott, D.A. (1991). Computer system for dental practice management. *J Can Dent Assoc*, 57:782-6.
- Joda, T. Buser, D. (2016). *Digital implant dentistry — a workflow in five steps*, URL: <http://www.dental-tribune.com/htdocs/uploads/printarchive/editions16-20.pdf>.
- Kindersley, London.
- Konz, S., Johnson, S. (2003). Occupational Ergonomics With CD / Edition 6.
- Marmaras, N. Poulakakis, G. Papakostopoulos, V. (1999). Ergonomics design in ancient Greece. *Applied Ergonomics*, 30, 361-368.
- Monkmeyer, U.R. et al. (2005). The prefabricated anatomical polychrome CAD/CAM crown for the inLab system. *Int J Comp Dent*, 16-78.
- Pfeiffer, J. Dental (1998). CAD/CAM technologies: the optical impression (I). *Int J Comp Dent* 29-33.
- Rekow, D. (1987). Computer aided design and manufacturing in dentistry: A review of the state of art. *J Prosthet Dent*, 58, 512-516.
- Ritter, A. V. (2002). Chairside CAD/CAM in Dentistry, *JERD*, 15(2).
- Schneider, W. (2000). Cerec 3. *Int J Comp Dent*. 33-46 [www. Sirona.de](http://www.sirona.de)
- Takashi, M., Yasuhiro, H., Jun, K. Soichi, K., Yukimichi, T. (2009). A review of dental CAD/CAM:current status and future perspectives from 20 years of experience. *Dental Materials Journal*.
- Tambini, M.(1999). *The look of the century - Design icons of the 20th century*. Dorling
- The Ergonomic Research Society - <http://www.ergonomics.org.uk/>
- Todorović, A. (2005). *The application of CAD/CAM technology in dental prosthetics*. Belgrade: Copyright edition.
- Ulrich, K., Eppinger, D. (2008). Product Desing and Development, fourth edition, Mc Graw- Hill, International edition.
- Veljača, T. (2008). *Kreiranje CAD i numeričkog modela iz 3D skeniranog objekta uz evaluaciju modela termovizijskom analizom naprezanja*. Završni rad. Split: FESB.
- www.nextengine.com

SPORT, TRAINING AND MARTIAL ARTS

STRUCTURE OF MORPHOLOGICAL CHARACTERISTICS OF STUDENTS OF FACULTY OF SECURITY SCIENCES

Original scientific paper

DOI: 10.7251/DEFENG1841005P

COBISS.RS-ID 7751960

UDK 316.344-057.875:316.647.8

Darko Paspalj, PhD¹

Faculty of Security Sciences, University of Banjaluka

Milan Gužvica, PhD

Faculty of Security Sciences, University of Banjaluka

Lazar Vulin, MSc

Primary school „Kozice”, OštraLuka

Abstract:

Set of 17 morphological measures was applied in order to determine the latent structure of morphological characteristics on a sample of 84 students of the first year of the Faculty of Security Sciences at the University of Banja Luka. Using factor analysis, we identified three factors that were interpreted as: volume and body mass factor, the factor of the longitudinal and transverse dimensionality of the body, and the factor of physical body composition which estimate was based on the thickness of the subcutaneous fat tissue. This research represents an attempt to show that segregated latent hierarchical structure of morphological factors has both theoretical and practical values, and these factors should represent certain mean for the prediction of anthropometric characteristics and programming of training operators in the process of teaching Special Physical Education.

Keywords: *morphological characteristics, Faculty of Security Sciences, Special Physical Education Program.*

INTRODUCTION

In all sports activities and skills, as well as in martial arts – in this case, the Special Physical Education (later in the text referred as SFO), the success of learning and the

¹ Corresponding author: Darko Paspalj, PhD, Faculty of Security Sciences, University of Banja Luka, Bulevar Vojvode Živojina Mišića 10 A, 78 000 Banja Luka. E-mail: dpaspalj@yahoo.com.

(practical) usage of such martial arts and their connections, depends largely on anthropological characteristics and their compatibility with the appropriate sport – skill.

Longitudinal dimensionality, volume and body mass, subcutaneous fat tissue, and transverse dimensionality (factors that determine the morphological space) have long been the subject of research by many authors. The ones that had the population of students as a subject are: Kurelić (1957), Viskić (1972), Stojanović, and associates (1975), Stojanović, and associates (1975), Szirovica, and associates (1980), Hošek and Jeričević (1982), Momirović, and associates (1987), Božić (1994) and Mudrić and Jovanović (2000), and they all point to the existence of four latent morphological dimensions that are considered responsible for explaining individual changes registered in the domain of manifest morphological indicators identified as the factor of longitudinal dimensionality, the factor of the transferal dimensionality, the body's volume factor and the physical body composition factor.

The well-known fact that the performance of an individual in sports depends on the compatibility of his antiprotonic characteristics with certain sports activity, and the research conducted in karate sports (Giampietro and associates (2003), Pieter et al. (2009), Abdel-Baser (2010), Sterkowicz and Przybycien (2010), in boxing: Blažević (2007) and in judo Marchocka (1988), Sertić (1993) and Sertić, Segedi and Žvan (2007) confirm that fact. Hence, based on experience and research related to motor learning, refinement and the efficiency of application of motor patterns, it is rightly believed that each of these factors can be of great help in the planning of curricula in the SFO. Practical experience and research indicate the advantages and disadvantages of certain morphological characteristics that can influence learning, improvement, and realization of specific motor programs. Milošević and associates (1985), Milošević and associates (1987), Božić (1989) and Blagojević (1996) point out the positive relations of longitudinal dimensionality and mechanisms for structuring and reprogramming the motor algorithm, the transferal dimensionality, and the volume of the body with the same mechanisms, but also on the negative relation between the subcutaneous fat tissue and the mechanism for reprogramming the motor algorithm and the mechanism for selective control and regulation of the facilitation and inhibition of peripheral motorways. Considering that the knowledge about the direction and intensity of the activity on the transformation of the psychosomatic status of students enables adequate and optimal programming of the teaching contents of the SFO, and based on the published research, it has been established that the morphological characteristics greatly influence the effectiveness of adoption and application of program Blagojević, (1996), as well as the fact that SFO teaching significantly influences the transformation of morphological characteristics of students Blagojević, (2002) and Jankovic (2009), this research aimed at determining the morphological hierarchical structure in the students of the Faculty security sciences in Banja Luka, to classify students based on morphological characteristics in as homogeneous groups as possible due to better efficiency of teaching in SFO subjects. Considering that the knowledge about direction and intensity of the activity on the transformation of the psychosomatic status of students enables adequate and optimal programming of the teaching contents of the SFO, and based on the research published so far, it has been established that the morphological characteristics greatly influence the efficiency of adoption and application of program contents of SFO, Blagojević, (1996), as well as the fact that teaching SFO significantly influences the transformation of morphological characteristics of students Blagojević, (2002) and Janković (2009), this research aimed at determining the morphological hierar-

chical structure among students of the Faculty of Security Sciences in Banja Luka, in order to classify students based on morphological characteristics in as homogeneous groups as possible for the best possible efficiency of teaching SFO. Based on this defined goal of the research, it is assumed that students of the Faculty of Security Studies have an appropriate structure of morphological characteristics and that the factor analysis algorithm will transform the set of manifest morphological variables into the predicted number of relevant morphological factors.

METHODS

Sample of respondents

The sample of respondents consisted of 84 male students, the first year of the Faculty of Security Studies in Banja Luka, the age of 19 ± 0.6 years. All the entities that constituted the sample were clinically healthy and without obvious morphological defects.

The sample of variables

To evaluate the morphological structure of the body, 17 variables were selected in order to cover a four-dimensional space defined as the longitudinal dimension of the skeleton, the transferal dimension of the skeleton, the subcutaneous fat tissue, and the volume and body mass. The following system of anthropometric variables was used: Body height (AVISTJ), Leg length (ADUZNO), Arm length (ADUZRU), Shoulder width (ASIRAM), Plevis width (ASIKAR), Elbow diameter (ADIJLA), Knee diameter (ADIJKO), Wrist diameter (ADIJRZ), Hock diameter (ADIJSZ), Body weight (ATEZTJ), Volume of the upper arm (AOBNAD), Volume of the forearm (AOBPOD), Volume of the upper leg (AOBNAT), Volume of the lower leg (AOBPOT), Skin fold on the upper arm (AKNNAD), Skin fold on the stomach (AKNTRB) and Skin fold on the lower leg (AKNPOT). Since all variables were measured according to the International Biological Program (IBP) method, the results of this study can be compared with most of the results of similar research in the country and the environment. Respondents were measured by a team of trainees for such measurements, composed of three teachers of Special Physical Education, measurer and one scorer, all male. The following instruments were used for taking these measures: decimal scales, anthropometer, caliper type „John Bull”, centimeter pant, pelvimetar, cephalometer, and slider. The accuracy of the reading was 0.1 mm, 0.1 kg on the scale, and 0.1 cm on the other instruments. All measures were taken three times, taking into account the mean value of the measured results.

DATA PROCESSING METHODS

Statistical data processing was done on the Pentium 4 PC, using the SPSS application program (version 20.00). The basic measures of the central tendency and the dispersion of results are defined by means of Mean and standard deviation (Std. Deviation). In order to test the correctness of data distribution, Kolmogorov-Smirnov test was used,

while in line with the aim of this empirical research, the testing of an alternative hypothesis was performed using a multivariate model of factor analysis. In order to determine the actual relations between the different dimensions, the Direkt Oblimin rotation was used, after which the matrix of the structure and the matrix of the assembly was obtained.

RESULTS

Table1 Basic descriptive parameters distribution of anthropometric variables

	N	Mean	Std. Deviation	KS p
AVISTJ	84	181.85	6.13	.932
ADUZNO	84	94.97	4.40	.516
ADUZRU	84	78.03	3.37	.160
ASIRAM	84	40.61	2.05	.033
ASIKAR	84	27.32	1.56	.105
ADIJLA	84	6.57	.47	.000
ADIJRZ	84	5.34	.41	.000
ADIJKO	84	8.93	.72	.000
ADIJSZ	84	7.04	.53	.000
ATEZTJ	84	78.25	9.19	.745
AOBNAD	84	29.53	3.00	.722
AOBPOD	84	26.41	1.81	.381
OABNAT	84	56.77	4.32	.528
OABPOT	84	37.13	2.39	.612
AKNNAD	84	7.64	2.71	.000
AKNTRB	84	11.10	4.72	.007
AKNPOT	84	9.68	2.91	.159
Valid N	84			

Legend: N – number of subjects; **Min** – lowest result; **Max** – highest result; **Mean** - arithmetic mean; **Std. Deviation** - standard deviation; **Skewness** - a measure of asymmetry; **Kurtosis** - a measure of elongation; **KS_p** - probability of Kolmogorov-Smirnov test; **AVISTJ** –body height; **ADUZNO** -Leg length; **ADUZRU** - Arm length; **ASIRAM** - Shoulder width; **ASIKAR** - Plevis width; **ADIJLA** - Elbow diameter; **ADIJKO** - Knee diameter; **ADIJRZ** - Wrist diameter; **ADIJSZ** - Hock diameter; **ATEZTJ** - Body weight; **AOBNAD** - Upper arm volume; **AOBPOD** –Forearm volume; **AOBNAT** - Upper leg volume; **OABPOT** - Lower leg volume; **AKNNAD** - Skin fold on the upper arm; **AKNTRB** –Abdominal skin fold and **AKNPOT** - Skin fold on the lower leg.

Table 1 shows the descriptive parameters of all measured anthropometric measures. Increased values of the standard deviation of the longitudinal dimensionality measures of the skeleton and body volume indicate a high variability of the results around the arithmetic mean, but taking into account the sample size, this phenomenon can be considered normal.

The results of the Kolmogorov-Smirnov test for the analysis of the normality of the disposition shows that the normal disposition is described by the variables for estimating the longitudinal dimension of the skeleton: body height (AVISTJ), leg length (ADULT) and arm length (ADUZRU), variables for estimating the circular dimensionality of the skeleton and body mass: upper arm volume (AOBNAD), forearm volume (AOBPOD), upper leg volume (AOBNAT), lower leg volume (OABPOT) and body weight (ATEZTJ)

as well as Plevis width (ASIKAR) and Skin fold on the lower leg (AKNPOT) variables, while values of less than 0, 05 were found in thethe variables: skin fold on the upper arm(AKNNAD), abdominal skin fold(AKNTRB), shoulder width (ASIRAM) and almost all variables for assessing transverse diagonal skeleton: elbow diameter (ADIJLA), wrist diameter (ADIJRZ) and the hock diameter (ADIJSZ).

By comparing the results of this research with the results of the research conducted by Mudrić and Jovanović (1997) on the population of students of the College of Interi-or from Zemun, no significant differences were found in the variables for which the longi-tudinal dimensionality of the skeletons and the variables for which the volume and mass were measured, but there are noticeable differences in the variables that were used to measure the transverse dimensionality of the body and the subcutaneous fat tissue. It is visible that students of the College from Zemun have slightly higher values of body weight, elbow diameter, knee diameters, hock diameter, wrist diameter, upper arm volume, fore-arm volume, lower leg volume, skin fold of the upper arm and abdominal skin fold, while the students of the Faculty of Security Studies from Banja Luka have higher values of body height, volume and skin fold on the lower leg, from which we can conclude that the stu-dents of the Faculty of Security Studies from Banja Luka are somewhat higher and with a lower percentage of the body mass than the students of the College from Zemun.

Table 2 Matrix of intercorrelation of morphological characteristics

	AVISTJ	ADUZNO	ADUZRU	ASIRAM	ASIKAR	ADIJLA	ADIJRZ	ADIJKO	ADIJSZ	ATEZTJ	AOBNAD	AOBPOD	AOBNAT	AOBPOT	AKNNAD	AKNTRB	AKNPOT
AVISTJ	1.00																
ADUZNO	.834	1.00															
ADUZRU	.807	.833	1.00														
ASIRAM	.493	.464	.417	1.00													
ASIKAR	.288	.283	.265	.097	1.00												
ADIJLA	.342	.305	.318	.367	.147	1.00											
ADIJRZ	.401	.408	.394	.445	.154	.432	1.00										
ADIJKO	.386	.383	.402	.360	.007	.308	.291	1.00									
ADIJSZ	.445	.434	.425	.485	.201	.318	.340	.580	1.00								
ATEZTJ	.586	.548	.510	.587	.267	.382	.393	.412	.474	1.00							
AOBNAD	.199	.199	.090	.391	.027	.251	.361	.201	.179	.680	1.00						
AOBPOD	.273	.253	.167	.392	.078	.378	.323	.289	.331	.645	.732	1.00					
AOBNAT	.236	.268	.147	.386	.100	.292	.268	.289	.338	.754	.604	.674	1.00				
AOBPOT	.344	.292	.215	.400	.185	.255	.155	.325	.504	.749	.527	.596	.733	1.00			
AKNNAD	.125	.115	.111	.219	.115	.139	.113	.045	.098	.573	.458	.370	.603	.484	1.00		
AKNTRB	.317	.241	.252	.369	.184	.221	.217	.144	.282	.674	.521	.399	.528	.518	.796	1.00	
AKNPOT	.375	.211	.320	.392	.159	.237	.238	.207	.305	.641	.399	.413	.521	.519	.676	.751	1.00

Legend: AVISTJ – body height; ADUZNO -Leg length;ADUZRU - Arm length; ASIRAM - Shoulder width; ASIKAR - Plevis width; ADIJLA - Elbow diameter; ADIJKO - Knee diameter; ADIJRZ - Wrist diameter; ADIJSZ - Hock diameter; ATEZTJ - Body weight; AOBNAD - Upper arm volume; AOBPOD – Forearm volume; AOBNAT - Upper leg volume; AOBPOT - Lower leg volume; AKNNAD - Skin fold on the upper arm; AKNTRB – Abdominal skin fold and AKNPOT - Skin fold on the lower leg.

Table 3 Matrix of typical roots and explained parts of common variance

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadingsa
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	7.129	41.933	41.933	6.721	39.535	39.535	5.292
2	2.589	15.228	57.161	2.288	13.457	52.992	4.677
3	1.373	8.077	65.238	.979	5.760	58.752	3.716
4	.999	5.878	71.116				
5	.907	5.334	76.450				
6	.812	4.776	81.225				
7	.617	3.628	84.854				
8	.540	3.177	88.031				
9	.408	2.398	90.428				
10	.378	2.221	92.649				
11	.320	1.883	94.532				
12	.270	1.591	96.122				
13	.185	1.087	97.210				
14	.161	.949	98.158				
15	.114	.669	98.828				
16	.112	.658	99.486				
17	.087	.514	100.000				

Extraction Method: Maximum Likelihood.

Rotation Method: Oblimin with Kaiser Normalization.

Table 4 Factor analysis of morphological characteristics - direct oblimin rotation

Matrica strukture				Matrica sklopa			
Pattern Matrix ^a				Structure Matrix			
	Factor				Factor		
	1	2	3		1	2	3
AOBNAT	.809	-.106	-.221	AOBNAT	.857	.276	-.539
AOBPOD	.796			ATEZTJ	.847	.637	-.619
AOBPOT	.713		-.191	AOBPOT	.800	.354	-.491
AOBNAD	.707	-.121	-.220	AOBPOD	.788	.293	-.350
ATEZTJ	.572	.337	-.318	AOBNAD	.748	.218	-.492
ADIJLA	.292	.266		ADIJLA	.393	.384	-.146
ADUZRU	-.179	.970		ADUZRU	.254	.906	-.163

ADUZNO		.911		ADUZNO	.370	.905	-.123
AVISTJ		.908		AVISTJ	.375	.905	-.205
ADIJSZ	.331	.391		ASIRAM	.531	.541	-.274
ASIRAM	.345	.385		ADIJSZ	.474	.521	-.158
ADIJRZ	.235	.371		ADIJKO	.419	.466	
ADIJKO	.334	.354	.154	ADIJRZ	.377	.464	-.132
ASIKAR		.309	-.124	ASIKAR	.130	.311	-.160
AKNTRB		.116	-.848	AKNTRB	.489	.311	-.906
AKNNAD	.141		-.828	AKNNAD	.452	.133	-.871
AKNPOT	.128	.169	-.694	AKNPOT	.489	.352	-.779

Legend: AVISTJ – body height; ADUZNO -Leg length;ADUZRU - Arm length; ASIRAM - Shoulder width; ASIKAR - Plevis width; ADIJLA - Elbow diameter; ADIJKO - Knee diameter; ADIJRZ - Wrist diameter; ADIJSZ - Hock diameter; ATEZTJ - Body weight; AOBNAD - Upper arm volume; AOBPOD – Forearm volume; AOBNAT - Upper leg volume; AOBPOT - Lower leg volume; AKNNAD - Skin fold on the upper arm; AKNTRB – Abdominal skin fold and AKNPOT - Skin fold on the lower leg.

Table 5 Matrix of intercorelation of isolated latent dimensions

	F1	F2 F3
F1	1.000	.421 -.417
F2	.421	1.000 -.186
F3	-.417	-.186 1.000

DISCUSSION

When analyzing the matrix of intercorrelation of the variables for the evaluation of morphological characteristics (Table 2), it is noticeable that the connections among the applied variables are generally positive and that a smaller number of coefficients of the applied variables have high and significant connection, while most of them show a medium and insignificant connection.

As in most of the earlier studies, the greatest connection was obtained within the block of variables for estimating the longitudinal dimension of the skeleton, the block of variables for estimating the measures of the subcutaneous fat tissue and the block of variables for estimating the circular dimensionality of the skeleton.

Variables for estimating the transverse dimensionality of the skeletons have achieved somewhat lower coefficients of interconnection, but are still homogenized within their block. It is visible from the matrix of intercorrelation that the measures of the subcutaneous fat tissue have a high correlation with measurements of volume and body weight, while the measures of longitudinal dimensionality made a significant connection

with body weight, shoulder width, wrist diameter and a hinge diameter, while somewhat weaker connection was made with other variables. It is also visible that body weight is significantly correlated with almost all applied variables, and that it represents a linear combination of almost all morphological characteristics.

Based on the value of Kajzer-Mejer-Oklin's index and statistical significance of Bartlett's sphericity test, the component model of factor analysis has determined the latent structure of morphological characteristics of students of the Faculty of Security Sciences in Banja Luka.

By analyzing the main components (Table 3) using the Guttman - Kaiser criterion, it is evident that we have three main components that explain a total of 65.2% of the complete variance of manifest variables, with their individual contribution being: the first major component of 41.9%, the second 15.2% and the third: 8.1% of the total variance.

Based on the matrix of the structure and matrix of anthropometric dimensions (Table 4), it is visible that the first isolated factor is saturated with measurements of volume and body mass, and the following variables have the greatest influence on it: upper leg volume (AOBNAT), body weight (ATEZTJ), lower leg volume (AOBPOT), forearm volume (AOBPOD), upper arm volume (AOBNAD) and the elbow diameter (ADIJLA), so this factor can be defined as the volume and body weight factor. However, the structure of this factor is partially different from the structure of the factor that was equally interpreted and obtained in previous studies, with the dominant role in its definition being body mass determined by the body weight. Here, however, it is dominantly defined by the upper leg volume and body weight, lower leg volume, forearm volume and the elbow diameter.

It is interesting how the diameter of the elbow interferes to this factor, which, in spite of the high projection, has a small correlation to this factor, while other measures of the transfusional dimensionality of the body, although having a more significant correlation than the elbow diameter, did not achieve a significant projection to this factor.

Since the width of the joints on extremities is considered a precondition for the development of muscle joints, and that all anthropometric measures are important for determining the mass and volume of the body, it is assumed that the diameter of the elbow of the students of the Faculty of Security Sciences is differentiated by a special morphological type in which the mass and the circular body dimensions are defined predominantly by the muscular mass and which differs from the morphological type that does not have a body mass defined by the structure of anthropometric dimensions that suggest that it is predominantly an athletic physical constitution.

Second isolated factor is determined by the variables which are the indicators of the longitudinal and transferal measures of the skeleton, as the following variables influence it the most: length of the arm (ADDRESS), length of the leg (ADULT), body height (AVISTJ), shoulder width (ASIRAM), hinge diameter (ADIJSZ), knee diameter (ADIJKO), wrist diameter (ADIJRZ) and pelvis width (ASIKAR), which means that this factor can be defined as a mixed factor of the longitudinal and transverse dimensionality of the skeleton.

„The explanation for” interfering „some of the transferal measures in the definition of the longitudinal dimension of the skeleton can revive the already represented hypothesis that the width of the pelvis and shoulder width, not only anatomically, but also constitutionally, do not represent a strict measure of bone growth in width, but better ap-

proximate the length of the bone and the length of the clavicle „(Popović, 2007). Having this in mind, we can consider the fact that there is justification in the joint involvement of these measures in forming the structure of this factor.

The third isolated factor consists of variables: abdomen skin fold (AKNTRB), upper arm skin fold (AKNNAD) and lower leg skin fold (AKNPOT), so this factor could be defined as a subcutaneous fat tissue factor.

Having in mind that the variables that determine this factor represent the measures of adiposity of the body for which variability the main factor is generator of the physical composition of the body based on the thickness of the subcutaneous fat tissue, this factor can also be considered as a factor of the physical body composition based on the thickness of the subcutaneous fatty tissue.

Analyzing the matrix of intercorrelation of the isolated main components (Table 5), it is visible that there is a statistically significant correlation between a factor that is interpreted as a volume and body mass factor and factor that is interpreted as a factor of the longitudinal and transverse dimensionality of the body.

It should be noted that there is a significant but negative correlation between the factor that defines the volume and weight of the body and factor of the subcutaneous fat tissue and that there is a weak but negative correlation between the factor of the longitudinal and transverse dimensionality of the body and factor of the subcutaneous fatty tissue.

In previously published studies researchers found high and significant connections between factors defining body volume and mass with factors that define longitudinal and transdermal dimensionality of the body, as well as weaker connections of these factors with subcutaneous fat tissue factor.

The results of this study match the results of research conducted by Stojanović, Momirović, Vukosavljević and Solarić (1975) on a sample of 737 male subjects aged between 19 and 27 with the aim of determining the structure of latent anthropometric dimensions from a population in which growth is completed and the process of deterioration of the morphological structure has not yet begun, and the existence of latent dimensions responsible for the volume and body mass, longitudinal dimensionality and subcutaneous fat tissue has been established, while the existence of the latent dimension responsible for the transferal dimensionality of the body remained questionable (which they connect with the procedure for determining the coordinate shaft in the space rescaled on an antiimage metric).

If we compare the results of this research with the results of research conducted by Mudrić and Jovanović (2000), on a sample of 102 students of the fifth semester of the College of Internal Affairs in Zemun, we see that identical factors with different effects in explaining the total variability (due to the application of different methods of factor analysis) were obtained.

Mudrić and Jovanović, by the method of the main components, distinguished four factors by combining varimaxsolution, three of which they managed to define as: the general factor of the body composition saturated with the thicknesses of the skin folds of the upper leg, the lower leg, the upper arm, the forearm, the breasts and the abdomen, as well as measures that determined composition of the body composition with a defined percentage of fat and muscle, a factor of longitudinal and transverse dimensionality of the body defined by the body height and diameter of the wrist, knee and hock, and the volume

and body mass factor that was defined by the body weight and volumes of the upper arm, forearm, upper leg lower leg.

Božić got similar results (1994), when, from a sample of 250 male students from the College of Internal Affairs in Zemun he formed a sample of 104 respondents aged 19 to 25 years, using the orthogonal Oblimin and Varimax solution also distinguished three factors that encompass the area of morphological characteristics, which he defined as: a factor of morphological development that was determined by the length of the leg, body height, arm length, pelvic width, elbow diameter and body weight; the physical body composition factor determined by the skin folds of: upper arm, lower leg, abdomen and back, and a body volume factor determined by the volume of the forearm, upperarm, chest, lower leg and wrist diameter. Analyzing the researches done to a similar population of the respondents, it is evident that almost identical results were obtained, which leads us to conclude that the results obtained by this research are valid and usable because they define the structure of morphological characteristics of the students of the Faculty of Security Sciences.

CONCLUSION

The research was conducted with the aim of determining the morphological structure of the students of the Faculty of Security Sciences in Banja Luka. On a sample of 84 students of the first year of the Faculty of Security Sciences, a battery of 17 variables was used to estimate morphological characteristics, which hypothetically cover the longitudinal and transverse dimensionality of the skeleton, the volume and mass of the body, and the subcutaneous fat tissue factor. The obtained data were processed on the Pentium 4 PC, using factor analysis software and with the application of statistical program SPSS (version 20.00). After we applied statistical procedures, three factors were segregated, and they explain about 65.2% of the variability of this area and could be defined as volume and body mass factor, the factor of the longitudinal and transverse dimensionality of the body, and the factor of body composition based on the thickness of the subcutaneous fat tissue. When we compare the results of this study with the results of many studies conducted on a similar population of subjects, it is easy to conclude that there are no significant differences between them.

It is believed that the observed and isolated morphological characteristics could be a signpost in the process of programming and implementation of teaching and training operators, which would enable each individual, according to his individual characteristics and capabilities, to learn the materials from the subject of the SFO easier and faster. Considering the fact that morphological characteristics have a significant impact on the manifestation of force and power, and that an inadequate level of morphological characteristics can be a limiting factor in teaching when applying content from the SFO, it is desirable that future candidates for enrollment at the Faculty of Security Sciences have appropriate abilities and characteristics.

Given that future security personnel could perform very dangerous and complex tasks, it is very important that they have optimal capabilities and characteristics that could contribute to the successful performance of professional tasks. That is why, in the teach-

ing process, in addition to learning and mastering the basic elements of the technique and their connections envisioned with the contents of the SFO program, it is necessary to also influence the selection and formation of the model characteristics of each individual, so that the future security worker can be successful in his profession.

Naturally, in order to obtain more precise and complete information on the model characteristics of students of the Faculty of Security Sciences, further research is needed in this field. It is believed that the information obtained could contribute to a better choice of candidates, and hence to a better quality security personnel.

LITERATURE

- Abdel-Baser, E. A. (2010). Using the Length and Weight of the Body and Some Dynamic Parameters to Perform Ura Mawshi Geri Skill to Predict Kumite Players' Performance. *World*, (3), 127 – 131.
- Blagojević, M. (1996). *Uticaoj morfoloških i motoričkih karakteristika policajaca na efikasnost učenja džudo tehnika*. Beograd: Policijska akademija.
- Blagojević, M. (2002). *Uticaoj nastave specijalnog fizičkog obrazovanja na promene morfoloških i motoričkih karakteristika studenata Policijske akademije*. Beograd: Energograf.
- Blažević, S. (2007). Relacije morfoloških i specifičnih motoričkih dimenzija kod boksača, *Acta Kinesiológica*, (1), 20 – 25.
- Božić, S. (1989). *Uticaoj antropometrijskih dimenzija i sposobnost brzog usvajanja novih složenih motoričkih zadataka na efikasnost izvođenja tehnika bacanja (nage waza) kod studenata Više škole unutrašnjih poslova*. Beograd: Fakultet za fizičko vaspitanje. Magistarski rad.
- Božić, S. (1994). Struktura morfoloških i motoričkih dimenzija kod studenata Više škole unutrašnjih poslova. *Zbornik radova prvog savjetovanja iz Specijalnog fizičkog obrazovanja, Policijske akademije u Beogradu*, 159 – 166.
- Giampietro, M., Pujia, A., & Bertini, I. (2003). Anthropometric feature and body composition of young athletes practicing karate at high and medium competitive level. *Acta Diabetol*, (40), 145 – 148.
- Janković, R. (2009). *Promene osnovnih morfoloških karakteristika i motoričkih sposobnosti studenata Kriminalističko-policijske akademije pod uticajem novog nastavnog plana i programa Specijalnog fizičkog obrazovanja*. Beograd: Fakultet sporta i fizičkog vaspitanja. Magistarski rad.
- Kurelić, N. (1957). Prilog proučavanju problema uticaja sistematskog tjelesnog vježbanja na neke fizičke sposobnosti i fizički razvitak sportista/studenata VŠFV. *Fizička kultura*, (3-4), 5 – 6.
- Marchocka, M. (1988). Body build and preferred techniques of judo fight. *Sport wyczynowy*, (9), 25 – 31.
- Milošević, M., Zulić, M., Božić, S., & Kovačević, Z. (1985). *Razvoj morfoloških dimenzija kod majstora u karate sportu*. Beograd: Jugoslovenski simpozijum o karate sportu.

- Milošević, M., Ivančević, V., Gavrilović, P., & Zulić, M. (1987). *Informaciona podrška modela upravljanja specijalnog fizičkog obrazovanja*. Zemun. Naučno stručno savjetovanje informatika i bezbjednost.
- Momirović, K., Mraković, M., Hošek, A., & Metikoš, D. (1987). Prilog poznavanju morfoloških obilježja studenata fizičke kulture. *Kineziologija*, 19(1), 19–22.
- Mudrić, R., & Jovanović, S. (2000). Model morfoloških karakteristika studenata VŠUP. *Bezbjednost* 42, (2), 219 – 225.
- Pieter, W., Bercades, L. T., & Center, O., (2009). Somatotypes of national elite combative sport athletes. *Brazilian Journal of Biomotricity*, (3), 21–30.
- Popović, D. (2007). *Borenja 1 (džudo i samoodbrana)*. Priština: Fakultet za Fizičku kulturu.
- Sertić, H. (1993). Utjecaj longitudinalne dimenzionalnosti tijela na uspjeh u izvođenju nekih bacanja u judu. *Hrvatski sportskomedicinski vjesnik*, (1), 10–16.
- Sertić, H., Segedi, I., & Žvan, M. (2007). Relations of certain anthropometric variables with the performance quality of throwing techniques in judo. *Kinesiologia Slovenica*, 13(1), 48–60.
- Sterkowicz-Przybycień, K. L. (2010). Body composition and somatotype of the top Polish male karate contestants. *Biol Sport*, (27), 195–201.
- Stojanović, M., Momirović, K., Vukosavljević, R., & Solarević, S. (1975). Struktura antropometrijskih dimenzija. *Kineziologija*, 5(1-2), 193–206.
- Stojanović, M., Vukosavljević, R., Hošek, A. & Momirović, K. (1975). Image analiza strukture antropometrijskih dimenzija. *Kineziologija*, 5(12), 207–228. Zagreb.
- Szivovica, L., Momirović, K., Hošek, A., & Gredelj, M. (1980). Latentne morfološke dimenzije određene na temelju faktorskog i taksonomskog modela u standardiziranom image prostoru. *Kineziologija*, 10(3), 15–20.
- Viskić – Štalec, N. (1972). Faktorska struktura tjelesne težine. *Kineziologija*, 2(2), 45–49.

DIFFERENCES BETWEEN THE QUALITY OF DEFENSES AGAINST DIFFERENT TYPES OF ATTACKS PERFORMED FROM THE STATE OF MOTIONLESSNESS AND THOSE ONES PERFORMED IN THE CONDITIONS OF PHYSIOLOGICAL STRESS

Original scientific paper

DOI: 10.7251/DEFENG1841006G

COBISS.RS-ID 7752216

UDK 613.86:[331.45:159.944.4.072

Milan Gužvica, PhD

Faculty of Security Science, Banja Luka

Darko Paspalj, PhD

Faculty of Security Science, Banja Luka

Lazar Vulin, MSc

Elementary School, Kozice

Abstract:

Contemporary civilization courses and urgency of situations make the job of a worker of security affairs very stressful, risky and complex, and it requires their complete mental and physical fitness. Accordingly, the teaching process within the course of Special Physical Education also needs to be adjusted, modernised, rationalised and brought closer to the realistic life conditions, so the worker of security affairs would be able to make relevant judgements and decisions in very complicated and dangerous situations. In that regard, in this paper we are interested in effectiveness of the defense against different types of attacks in the conditions of motionlessness and in the conditions of physiological stress. The research has been carried out at a sample of 25 respondents, consisting of the students of the fourth year at the Faculty of Security Science in Banja Luka, aged 23 and 24 years (22 male respondents and 3 female respondents). The research has been carried out after finishing the program of the course of Special Physical Education, being studied during four semesters. After having carried out the testing, based on the descriptive analysis of the heart rates measured in the morning hours (prior to the daily activities) and the values measured right before the activities, it can be affirmed that they have increased more than 55%. By the further analysis, the analysis of differences, the existence of statistically significant differences in the heart rates and defenses against a variable attack has been confirmed, while the existence of statistically significant differences between other observed variables has not been confirmed.

Key words: *heart rate, physiological stress, defense.*

INTRODUCTION

The job of the worker of security affairs is regarded as a very complex and risky job, it is constantly under pressure of events, it is also exposed to the worst types of aggression which can be even life-threatening. Various situations which can be experienced by the worker usually require physical and emotional overload, which can provoke a range of harmful physiological and psychological reactions, which are out of the framework of the regular or usual everyday life, and they are labelled as stressful reactions of an organism. In such situations it often leads to decreased competence, concentration, reasoning and memory performance (the conditions in which solving situational problems is more difficult), and to unadjusted and inadequate behaviour at the certain moment. Such situations cause a certain reaction of the organism to external and internal stimuli, provoke a disorder of the dynamic balance of the body and run a very complex mechanism of hormones and genes. The heart rate is increased, the muscles which are used in a movement and motion are filled with blood, while other organs which are not a priority at that moment get less blood. This is the situation when a man, already according to the abilities of immune system mobilisation, psychophysical resistance, reasoning and controlling a situation, is ready to fight or to escape. Many researchers dealing with the problematics of stress, among them also Lazarus and Folkman (1984), claim that there are individual differences in reacting to psychological stress, for which their explanation is the different cognitive estimation of a threatening or stressful situation, that is, the cognitive estimation of a threat which occurs in such a situation. They claim that cognitive processes are always present and engaged in in a situation of stress, and that they are intervening constructs between the perception of stress and the reaction to it. The same authors claim that cognitive processes are essential in determining whether a situation is dangerous or threatening, so that the cognition determines whether stress will occur or not and what emotional reactions will be like. In addition, (ibid), they claim that the cognition, emotions and behaviour are inseparable in the everyday life. Zajonc (1984) claims that emotional reactions which are typical for stress occur prior to the cognitive ones and the existence of awareness should not be referred to as cognition. Selye (1956) defines stress as a nonspecific biological response (physical and psychical) to every unusual requirement which surpasses the adaptive abilities of an organism. He says that stress is an individual reaction to the stressor and that it is a result of interactions of the environment and its requirements, as well as the person and their own abilities, possibilities and restrictions. According to Vlajković (1992), H. Selye (1977), says for stress that it is a reaction, a response of an organism to the threatening effect of a stimulus (stressor) from the external or internal environment and that its function is, first of all, defensive. Šupe and associates (2011) say that stress starts already in thoughts and emotions, so that the organism prepares and adapts (the response of the organism to the stressor), which is manifested by a uniform physiological response aimed at the current reaction to the threatening danger. Furthermore, McEwen BS., (1998) and Surtees PG, and associates (2007) refer to all physiological and psychological changes (biological response), as well as the changes in behaviour (behavioural response) occurring in an organism after exposing to stress as stressful reactions. Hence, a stressful reaction has a function of preserving the psychophysical integrity of a person, i. e., re-establishing the homeostasis of an organism. The reaction is reflected in intensifying or diminishing certain vital functions, i. e.,

adapting to the newfound conditions through some adequate physiological and behavioral processes. The possibility of reaching the stability through constant changes (allostasis) is of great importance to every person, but especially for those who deal with security affairs professionally. Quick adapting to changes, „turning on” and „turning off”, synchronising the best responses according to the requirements of the environment is very significant for the workers of security affairs. Otherwise, the impossibility of adapting the organism to the physiological and emotional excitement, especially if it is extreme, makes a worker inefficient and incompetent to perform professional tasks. Therefore, the worker must be capable of synthesizing the mental and physical activity in order to perform the task in accordance with legal norms and in the best way possible. That means that apart from the motor knowledge and skills, a security worker should also have optimum cognitive and conative abilities, which would enable him to overcome successfully dangerous and stressful situations. Individual characteristics and abilities, such as self-confidence, resistance to stress, the ability of internal locus of control (locus), the development of available overcoming strategies, the ability of subjective estimation of the stressor, i. e. estimation of its threatening effect, as well as the ability of estimation of one’s own strengths and possibilities to cope with the stressor are very significant for the efficiency in performing professional duties and responsibilities. Certainly, thereat it should not be forgotten that the strength and intensity of the stressor significantly influence whether an individual will be able to respond to the given hazard in an adequate and optimum way (by intensifying or diminishing the vital functions of the organism). The newfound and sudden, dangerous situations require adequate neuropsychical and physical load (for someone they can be extremely unstimulative, and for someone else they can be a first-class stimulator) and they make the cognitive analysis more difficult. That is why it is necessary for a future worker of security affairs to be completely prepared for new challenges already within their education through the program of the course of Special Physical Education (SPE). It is necessary that through the teaching process they adapt to various and unpredictable changes, which, among other things, require the ability of reacting quickly and releasing the additional energy to face the danger. Certainly, it is not always possible, especially not in the cases of intensive and long-lasting stress which the worker has been exposed to during their professional career. It is believed that the ability of controlling stress and the speed of decision making, apart from other known abilities, including also the high level of techniques, are of the greatest significance for the efficiency of defense and establishment of complete control over the attacker. Considering the abovementioned fact, concerning the risk and complexity of the tasks which are expected to be done by a future security worker, there is a need for continuous assessment, constant search and adjustment of teaching to the real life situations. In that regard the **problem** of this research is precisely the efficiency of defense against different types of attacks. The research **subject** is concerned with the quality of defense in the conditions of motionlessness and in the conditions of physiological stress. The **objective** is to determine the difference between the defenses against different types of attacks from the state of motionlessness and in the conditions of physiological stress. Hence, we have been interested in seeing whether there is a statistically significant difference in the mean values of the results obtained while estimating the quality of the defense against punches, kicks and those from an unknown attacker (variability = 50%), but precisely between the defenses from the state of motionlessness and the defenses in the stressful conditions caused by some physical load.

Our assumption is that the quality between the defenses against known and unknown attacks, performed from the state of motionlessness and those ones performed in the conditions of physiological stress, shall differ statistically significantly, as well as that the maximum pulse shall have a negative impact on the quality of the defenses performed in some stressful conditions.

RESEARCH METODOLOGY

The sample of respondents

The research has been carried out within the sample of 25 students of the fourth year at the Faculty of Security Science in Banja Luka, male (22 respondents) and female (3 respondents), aged between 23 and 24 years, but only after finishing the program of the course of Special Physical Education. The teaching material has been studied during all four years (in every study year one semester, a total of four semesters), whereby it is important to note that the students had a three-month break before every following semester.

The sample of variables

The sample of variables is divided in two subsamples: the variables for qualitative estimation and the variables for quantitative estimation. The first group consisted of the variables related to the defense quality (the defenses ended with a fixation and preparation for binding), in the conditions of motionlessness and in the conditions of physiological stress, whereas the second group of variables consisted of the heart rates prior to the daily activities and the ones right before the assigned activity (of defense). The quality of the following defenses has been checked: OUR – defense against a punch from the state of motionlessness; OURS - defense against a punch in the conditions of physiological stress; OUN – defense against a front kick from the state of motionlessness; OUNS - defense against a front kick in the conditions of physiological stress; OVN – defense from the state of motionlessness against the variable attack and OVNS - defense against the variable attack in the conditions of physiological stress. All the listed variables, by which the defense quality has been assessed, have been assessed using the model shown in Table 1.

Table 1 *Model for assessing the quality of defense performance and establishment of control*

Grade	Rationality and logic	Balance	Speed	Firmness	Rhythm	Control	Precision
10	+	+	+	+	+	+	+
9	+	+	+	+	+	+	-
8	+	+	+	+	+	-	-
7	+	+	+	+	-	-	-
6	+	+	+	-	-	-	-
5	-	-	-	-	-	-	-

The experiment description and the assessment of the quality of defense performance

The testing was conducted in the afternoon hours in a hall covered with tatami. The respondents were in proper sports equipment, the distance between them being about 2 m and they were side facing the cameraman (camera). The attack by punch or kick, as well as the unknown attack was performed from the fighting stance and guard, whereas the defense was performed from the preparatory position. The attacker was asked to perform the attack using the maximum speed and strength, and the defender was asked to perform defenses which would be logical, optimum possible, biomechanically justified, precise, fast and strong, with the optimum rhythm and with necessary control of aggressiveness. The attacks and defenses which were performed from the state of motionlessness did not cause fatigue in respondents, which enabled the respondents to perform both attack and defense using maximum speed and strength and full concentration. In the conditions of the maximum heart rate (stressful conditions) the attacks and defenses were performed successively. Prior to performing the attack, the defending respondent had to perform a complex of exercises, whose function was to achieve the maximum heart rate. The complex of exercises consisted of: 1. Starting position – standing upright position and 10 consecutive jumps with the knees raised high upward the chest; 2. Starting position – lying on the stomach – taking the fighting stance and guard maximum fast and consecutive performance of 2 punches on the focuser; 3. Starting position – lying on the back – taking the fighting stance and guard maximum fast and consecutive performance of 2 kicks on the focuser; 4. Starting position – lying on the right side – taking the fighting stance and guard maximum fast and performance of 2 alternate punches and 2 kicks on the focuser; 5. Starting position – lying on the left side and then also on the right side – taking the fighting stance and guard maximum fast and alternate performance of 2 punches and 2 kicks on the focuser; 6. Starting position – standing upright position – turning around for 360° and performance of 2 punches and 2 kicks on the focuser; 7. Starting position – standing position – forward roll, backward roll and 3 punches on the focuser. The rest between the previous performance of the complex of exercises and the defense and the following complex of exercises and the defense took as much time as the respondents needed to get back to the starting positions by moving slowly. This mode of activity caused certain fatigue in some respondents (at the beginning the activity was performed in the anaerobic mode, and afterwards it shifted into the mixed mode). The assessment of the defense quality was carried out after performing the defenses and establishing control from the state of motionlessness, and afterwards also with the maximum heart rate. In the known conditions the defense was assessed after the attack by a step forward and a punch by the same hand straight, as well as a front kick. The unknown attack was performed by one of the assigned punches or kicks. The attack was performed from the combat position and guard, and the defense from the preparatory combat position and guard with the distance of about 2 m.

RESULTS AND DISCUSSION

Table 2 shows the results of the descriptive analysis of the heart rates measured in the morning hours, prior to the regular activities and the values measured right before

the defense, as well as the expert grades for the defenses against punches and kicks, and finally, the defenses against a variable attack which were performed in the conditions of motionlessness and in the conditions of physiological stress. It can be seen from the table that values of the heart rate, measured prior to the regular activities, range from 57 beats all the way to 96 beats ($M = 73$), whereas the values of the heart contractions measured right before performing the defenses range from 108 to 163 ($M=132, 8$) per minute. The wide range of heart rates measured in the morning hours (prior to the regular activities) can be explained by the sex differences of respondents, as well as their fitness. Namely, dimensions of the female heart are somewhat smaller compared to the male heart. When adults are concerned, the heart volume of men is about 785 ml, of women 580 ml, and the stroke volume, probably because of less body weight, is 25 % less in women than it is in men. Furthermore, although the values of the cardiac output (CO), first of all, thinking of dynamic activities such as endurance, similar in trained and nontrained persons, yet because of the stroke volume (SV), which is higher in the trained persons than in the non-trained ones, the heart rate in the state of motionlessness is lower (Nikolić, 1995). When the fitness is concerned, it can be assumed that a certain number of respondents practiced the physical activity just in classes of the Special Physical Education, while the rest of the respondents had additional physical load, probably such as endurance. In that regard, it is important to mention that the planned curriculum comprised in the course of the Special Physical Education did not require a high intensity of load, (a level of load which could have an impact on the development of the functional abilities of an organism was mostly under the stimulus threshold, so that the energy factor was not present sufficiently), and therefore, the respondents who were oriented just to the process of acquiring and improving the basic elements of the technique and their relations, could not increase the cardio-respiratory fitness to the higher level. On the other hand, the respondents who used their free time for some additional physical activities, in which the energy factor was present sufficiently, managed to do it to a greater extent. The stronghold for this premise can be found in the generally known fact, and that is that under the impact of the physical load the heart rate slows down, the arterial pressure reduces and the cardiac muscle mass increases, which all together enable a more efficient cardiac function and a better blood flow (perfusion) through the heart in any stress. If one observes the heart rate in the state of motionlessness, right before the defense, one can conclude that the results are the expected ones, already because right before the expected activity certain psychical processes happen. Namely, the impulses in the cerebral cortex come directly and stimulate the cardioacceleratory centre, so that the heart rate increases even 50% to 80% of the overall increase of the heart rate during the activity (Nikolić, 1995). In our case the average heart rate right before the defense, compared to the average heart rate before the daily activities, increased somewhat more than 55%, which proves that our respondents were not at a high level of trainedness. We are obliged to make this conclusion (according to Nikolić, 1995) because of the research showing that the prestart increase of the heart rate is higher in trained persons than in untrained persons (in the case of our respondents it was at the lower-bound level of the average). On the other hand, when the defenses are concerned, it can be seen from the table that for the defense against a punch from the state of motionlessness the obtained mean value is 7.94, and for the defense in the conditions of physio-

logical stress it is 7.88. The quality of the defenses against a front kick from the state of motionlessness is assessed by the average grade of 7.58, and in the conditions of physiological stress the average grade is 7.48. When the defense against an unknown attack from the state of motionlessness is concerned, the obtained mean value is 7.80, while in the stressful conditions the quality of the defense against a variable attack is assessed by the average grade of 7.44. The absolute deviation (AD) for the defense against a punch from the state of motionlessness is 0.99, in the stressful conditions the standard deviation is 1.02 (which confirms the abovementioned premise about the differences in the fitness of the respondents), and the standard error of the arithmetic mean (SEM) for the defense against a punch from the state of motionlessness is 0.19, while for the defense against a punch in the stressful conditions the value has been calculated (SR = 0.20). The values of the skewness do not go over 1.00, so it can be concluded that there are no significant deviations from the normal distribution. The negative values of the skewness indicate the negative (hypocurtic) asymmetry, that is, a greater number of worse results, in the four variables which are observed, while the defenses performed in the more complex (stressful) conditions (the defense against a kick and the defense against a variable attack) represent a surprise because the positive values have been obtained, i. e., a greater number of better results has been achieved. However, if we think back, the same stress can be stimulative for someone, but for someone else who is vulnerable and predisposed to stress it is a great obstacle. Furthermore, the obtained results of the kurtosis indicate the extreme values, being under the normal values of the distribution (ranging from 0.029 to -1.110), which makes the distribution platykurtic or dissipated. Hence, considering the obtained results, it can be seen at the first sight that the results are the approximate values, that the average quality of the defense from the state of motionlessness really is performed at somewhat higher level, but that there is still a visible difference in the defense quality among the respondents. Since the defense quality has been assessed in the „laboratory” conditions, there is some doubt how efficient the shown defenses would be in the real life, stressful situations. The fact is that the respondents knew each other well, that there was a mutual respect among them and that they were not afraid of potential getting injured and hurt, which was probably the reason why the emotional stress did not occur, as a factor which could have a significant impact on the power of reasoning and the best responses. Apart from that, the doubt is also justified because the defense and the attack visibly deviated from an approximately real life situation, and we know that they mutually dependent because the defense is conditioned by the attack quality. Although the attackers were asked to perform the attacks using the maximum strength, speed and precision, they failed to do so. The attacks were slow, imprecise and „lukewarm”, and mostly performed imprecisely and directed next to the target. Somewhat worse average results of the defenses performed in the physiological stress, compared to the average results of the defenses from the state of motionlessness, can be also explained by the fact that in the case of some respondents in the stressful conditions the balance position disorder was noticed, so it caused a greater number of mistakes reflected in imprecision at blocking, „late” and insufficiently strong counterpunches, as well as imprecision of standfasts necessary to perform a leverage and the impossibility of timely knocking down the opponent and their fixation.

Table 2 Descriptive statistics of the defenses against punches and front kicks, as well as against a variable attack with the likelihood of 50%.

	N	Minimum	Maximum	Mean		Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic	Std. Error	Statistic	Std. Error
PUM	25	57.00	96.00	73.3200	2.27649	11.38244	.511	.464	-.405	.902
PO	25	108.00	163.00	132.8000	3.00832	15.04161	.124	.464	-.792	.902
KOOUR	25	6.00	10.00	7.9400	.19858	.99289	-.202	.464	-.241	.902
KOOURS	25	6.00	9.50	7.8800	.20469	1.02347	-.345	.464	-.913	.902
KOOUN	25	5.00	9.00	7.5800	.20952	1.04762	-.703	.464	.087	.902
KOOUNS	25	6.00	10.00	7.4800	.20913	1.04563	.325	.464	.029	.902
KOOVN	25	6.00	9.50	7.8000	.20616	1.03078	-.186	.464	-1.110	.902
KOOVNS	25	5.50	9.50	7.4400	.21664	1.08321	.167	.464	-.788	.902

Legend: PUM – Pulse in the state of motionlessness; PO – Pulse right before the beginning of the defense; KOOUR – Quality of the defense against a punch; KOOURS - Quality of the defense against a punch after the physical load; KOOUN - Quality of the defense against a kick; KOOUNS - Quality of the defense against a kick in the stressful conditions; KOOVN - Quality of the defense against a variable attack; KOOVNS - Quality of the defense against a variable attack in the stressful conditions

Table 3 shows the results related to the differences between the heart rate before the regular daily activities and the heart rates right before the defense against an attack, and then also the differences between the quality of the defenses and the establishment of full control over the attacker in the state of motionlessness and in the conditions of physiological stress. It can be seen from the table that the statistically significant differences have been obtained only between the measured heart rates and the defenses against a variable attack. When the heart rate is concerned, then it is something expected (in the above lines it has been explained, and it is related to the difference between sexes, trained and untrained persons...), but when the defenses are concerned, then it is a surprise to some extent because punches and kicks still represent a certain hazard to the integrity of the attacked person. When a hazard occurs, the organism suffers the dynamic balance disorder (the organism tries to adapt to the newfound conditions), which may have a negative impact on the timely reaction, i. e. the efficiency. The newfound situation requires the process of adaptation of the organism, during which the autonomic nervous and endocrine system is activated and the mechanism to overcome stress successfully is initiated and the immune system is mobilized. Having activated these systems the blood flow to the musculature which is involved in a movement and motion increases rapidly, whereas other organs which are not a priority at that moment get less blood, which may have a negative impact on the power of reasoning and reacting, and thus on the defense efficiency. Therefore, the obtained results seem confusing because the requests to perform the complex of exercises and to perform the defenses implied performing as fast as possible. The complex of exercises, their intensity and duration along with performing the defenses caused the increase of the heart rate, almost to the maximum (in this situation the nervous system regarding the oxygen delivery and blood flow is neglected), so it is realistic to expect that the defense in such conditions is somewhat worse compared to the defenses performed with full concentration and from the state of motionlessness. However,

judging by the obtained results, yet it has not actually and completely occurred. Namely, the immune system, which has probably developed to some extent during the training, the acquired experience and the absence of emotional stress have undoubtedly had an impact on the success of the defenses.

If we think back, the cognitive processes are always present and engaged in the situation of stress, they are crucial when determining the degree of danger and they determine the emotional reactions. However, as a result of their good knowledge of each other and mutual trust, the respondents knew in advance which degree of danger could threaten them, as well as because of the security that they would not be injured, nor would they suffer the pain, fear and other emotional reactions typical for stress, these very significant stressors, on this occasion were absent as it is most likely, so this may be the reason of the relative success in defending. This is also supported by the observation related to performing the complex of exercises. Namely, at first it was noted that the exercises were performed in accordance with the imposed requirements, but also that their rate and duration led to their decrease. The requirement was to perform the exercises as fast as possible (in the anaerobic mode and with the domination of fast muscle fibers), so that after a short period of time the fast discharging of energy and transition to the mixed operating mode occurred, whereby the domination was overtaken by the slow muscle fibres. As a result of this, and probably as a result of the weaker nerve conduction, there have been noticed the weaker muscle contractility, weaker expression of force, worse coordination and less precision when performing the techniques. This observation and the assumption are expected and in accordance with the paper of Bok and Jukić (2013), who in their paper discuss the share of the aerobic metabolism in the case of the individual sprint repetitions for which they say that it is very small (about 3-8%), and after the tenth sprint that share is up to 40%. The share of the metabolism of the anaerobic glycolysis is relatively big at an individual sprint (about 32 -40%), whereas its share decreases at the repetition of sprints, so that in the tenth sprint lasting for 6 seconds it is just 9%. Hence, to these above stated reasons, partially confirmed premise about the statistically significant differences, apart from the absence of emotional stressor, there may be also added the observation that the respondents did not master the specific fitness sufficiently, nor did they master the technique which would provide them with the rationality when performing the complex activities.

Table 3 *the significance of the differences between the observed variables: koour - koours; kooun - koouns; koovn - koovns.*

		PAIRED DIFFERENCES				t	df	Sig. (2-tailed)	
		M	Std. D.	Std. E. M.	95% Confidence Inter- val of the Difference				
					Lower				Upper
Pair 1	PUM - PO	-.59.48	14.2423	2.84846	-.65.35894	-.53.60106	-20.88	24	.000
Pair 2	KOOUR - KOOURS	.06000	.65064	.13013	-.20857	.32857	.461	24	.649
Pair 3	KOOUN - KOOUNS	.10000	.97895	.19579	-.30409	.50409	.511	24	.614
Pair 4	KOOVN - KOOVNS	.36000	.87226	.17445	-.00005	.72005	2.064	24	.050

CONCLUSION

In this paper the qualitative difference between the defense from the state of motionlessness and in the state of physiological stress, to be specific, against the attack by punch, by kick or an unknown attack with the variability of 50% has been researched. The research has been organized within a sample of 25 respondents (the students of the fourth year at the Faculty of Security Science in Banja Luka), whereby there were 22 male respondents and all in all 3 female respondents. The respondents were aged between 23 and 24 years. All respondents were clinically healthy, without any visible physical defects or morphological aberrations. The teaching material has been studied during all four years (in every study year one semester, a total of four semesters), whereby it is important to note that the students had a three-month break before every following semester. The mathematical processing of the obtained data has been done on the PC computer, using the statistical application program of SPSS-20. All the data obtained by this research have been processed using the descriptive and comparative statistical procedure. Testing the significance of the differences in the arithmetic means obtained from the conducted tests has been done using the paired sample T-test, whereby the statistically significant differences have been obtained only between the heart rates and the defenses against an unknown attack, while between the defenses against an attack by punch and by kick the statistically significant differences have not been obtained, by which the assumed hypothesis has been partially confirmed. The statistically significant differences between the heart rates prior to the daily activities and the ones right before the defense can be explained by the sex differences, morphological characteristics of the respondents, their fitness, as well as the psychological processes occurring right before the activity. When it comes to the defenses against an attack, our expectations have proved true only in the case of an unknown attack, whereas in the case of an attack by punch or kick it has not occurred. The obtained results can be explained by the fact that the respondents knew each other well, mutually trusted each other very much and knew in advance that they would not suffer any pain nor would they be injured. Apart from this, the attacks were imprecise (they did not hit the targets), slow and lacking the necessary minimum of strength manifestation. As a result of this, the emotional (psychical) stressor was absent, so that the addition with physiological stress, which would be caused by some physical load, did not occur. This seems to be reasonable considering that just the educational process is concerned. Therefore, when the education process of the staff of security affairs is concerned, it is suggested to adjust additionally the curriculum to the real life situations, especially in its final phase. It is believed that changing the distribution of classes (theoretical, practical lectures and exercises) would contribute to creating the engram of the motor programs, by which a greater efficiency of their realization in more complex situational conditions would be achieved. Namely, within the curriculum and syllabus of the Special Physical Education it is necessary to change the relation between practical lectures and exercises, in favor of the exercises. In that way students could increase the intensity and quantity of repetitions of certain motor programs, certainly adjusted to the optimum abilities and preferences of each individual, by which there would be created the conditions to achieve more quickly a high level of knowledge acquisition, i. e. the automatization of the techniques and the possibilities to apply them in practice. It is believed that this approach could initiate further research of this problematics and thus contribute to educating the abovementioned staff more effectively.

REFERENCES

- Bok, D., Jukić, I. (2013), Ability to repeat sprints: Limiting factors and training strategies. Clinical preparation of athletes, p.54, Proceedings, Zagreb.
- Nikolić, Z., (1995), Physiology of Physical Activity, University of Belgrade.
- Lazarus, R:S., and Folkman (1984), Stress, appraisal, and coping. New York, Springer
- Zajonc, R:B., (1984) On the primacy of affect. American Psychologist, 39, 117 -123.
- Sely, H., (1956) The stress of life. New York, McGraw-Hill.
- S. Šupe, Z. Poljaković, Lj. Kondić1, L. Unušić, D. Alvir, (2011), Neurological basics of stress and risk of stroke development, Neurol. Croat. Vol.60, 1McEwen BS. (1998), Stress, adaptation, and disease. Allostasis and allostatic load. Ann N Y Acad Sci 840: 33-44.
- Surtees PG, Wainwright NW, Luben RL and associates (2007), Adaptation to social adversity is associated with stroke incidence: evidence from the EPIC-Norfolk prospective cohort study. Stroke; 38: 1447-53.
- Vlajković, J. V. (1992). Life crises and their overcoming. Belgrade: Nolit.

INSTRUCTIONS FOR AUTHORS

Theoretical Journal Defendologija publishes scientific (original scientific paper, review article, short and former report, scientific criticism – i.e. polemics) and professional articles (professional paper, informative supplement, presentations) in Serbian and English.

In order to meet scientific requirements, the Editorial Board of the Journal Defendologija subjects every paper to anonymous review. The Editorial Board is obliged to send in due time a reviewed copy of paper with the remarks of the reviewer to authors for correction. Two anonymous reviewers will review each paper sent to the Editorial Board, and the paper will be published if the reviewers think it meets required scientific criteria.

The manuscript is very important, so we urge all authors to follow the instructions for writing articles in the Journal Defendologija.

The paper should include the following elements:

- **Paper volume:** minimum six (6), maximum sixteen (16) language-edited pages;
- **Font:** Times New Roman, spacing 1, aligned left and right border;
- **THE MAIN TITLE** (bold) is written with capital block letters, size (11pt);
- **The scientific title, name and surname of the author** (bolded), name of the institution where he is employed and where he comes from in the top left corner, size (11pt);
- **The second line titles** (bolded) are written with small letters (11pt);
- *Other subtitles* – small italic letters (11pt);
- **Abstract:** (bolded), the rest of the text 150-250 words in Serbian;
- **Key words:** (bolded), three to ten (3-10) words;
- **Main body of the paper** is written with small block letters, equal alignment (11pt);
- **Tables and photos:** The name of the tables and photos must be numbered and written with regular font above the table or photo, left alignment. Bigger tables and photos can be displayed vertically on a separate page. The data source for the table or photo is written below the table or photo, left alignment. The size of the table or photo must be adjusted to the page size.

Table 1. The name of the table

Name of the column	Name of the column
Name of the line	x
Name of the line	x
Name of the line	x
Name of the line	x

Data source:

- **References** (bolded), central alignment. The references should be numbered alphabetically;
- **Quoting:** For references and bibliography, the theoretical Journal Defendologija uses APA standard quoting. The examples of APA quoting can be found on the website of the Defendologija Center: www.defendologija.com;
- The paper should be submitted in two original copies, in Serbian and English, as well as in electronic form. One copy with all the above, and the second copy without the author's name and surname, and the employment institution. Also, the author should write his email address, i.e. the email address of the correspondent if it is a co-author paper;
- The Editorial Board of the Journal retains the right to choose from the papers and supplements, and only those papers that have not been published before will be taken into consideration;
- The paper should be submitted personally or via post to the address of the Defendologija Center: Srspska 63, 78000 Banja Luka, Republic of Srspska, BiH.